

# **APPENDICES**

**APPENDIX 3.2.1 ROAD LENGTH BY CLASS AND SURFACE TYPE (unit: km)**

Province	Paved			Gravel			Earth			Grand Total		
	Classified	Unclassified	Total	Classified	Unclassified	Total	Classified	Unclassified	Total	Classified	Unclassified	Total
Nairobi	351.6	1,250.0	1,601.6	30.8	200.0	230.8	1.5	400.0	401.5	383.9	1,850.0	2,233.9
Central	1,992.9	54.7	2,047.6	3,610.7	1,175.2	4,785.9	2,319.4	17,389.1	19,708.5	7,923.0	18,619.0	26,542.0
Eastern	1,188.9	21.1	1,210.0	4,898.8	1,156.0	6,054.8	6,994.6	24,182.0	31,176.6	13,082.3	25,359.1	38,441.4
Rift Valley	3,040.3	410.0	3,450.3	10,347.4	1,274.9	11,622.3	7,126.3	39,285.3	46,411.6	20,514.0	40,970.2	61,484.2
Western	438.2	20.0	458.2	2,634.3	441.0	3,075.3	973.1	7,326.0	8,299.1	4,045.6	7,787.0	11,832.6
Nyanza	751.9	108.0	859.9	3,888.0	1,367.0	5,255.0	2,641.7	14,093.0	16,734.7	7,281.6	15,568.0	22,849.6
Coast	760.5	262.0	1,022.5	1,832.7	851.0	2,683.7	3,265.7	14,525.0	17,790.7	5,858.9	15,638.0	21,496.9
North Eastern	147.4	3.0	150.4	659.0	0.0	659.0	4,046.2	8,241.0	12,287.2	4,852.6	8,244.0	13,096.6
Total	8,671.7	2,128.8	10,800.5	27,901.7	6,465.1	34,366.8	27,368.5	125,441.4	152,809.9	63,941.9	134,035.3	197,977.2

**APPENDIX 3.6.1 FORCE ACCOUNT DATA SUMMARY OF  
QUESTIONNAIRE DATA FROM FIELD SURVEYS**

**1. Provinces**

Province	Individual	Comment
Central	PWO	Used extensively. Very important Inadequate staff, funds and equipment
Eastern	PWO	20%; Ongoing works are under Force Account Inadequate staff, funds and equipment
Coast	PWO	20%
North Eastern	PRE	50% Inadequate staff, funds and equipment
Nairobi	PWO/PRE	Capacity hampered by lack of equipment
Nyanza	PWO/PRE	50% Routine, 0% Periodic Inadequate equipment
Western	PWO	100% Routine maintenance works done under Force Account. Inadequate staff, funds and equipment
Rift Valley		30% of Routine, 0% Periodic

**2. Districts**

District	Individual	Comment
Nyeri	DWO	High proportion of works carried out under Force Account Routine maintenance on unpaved roads Inadequate staff, funds and equipment
Nyandarua	DWO/DRE	80% mainly labour based works Casual labour is available but inadequate funds and equipment
Machakos	DWO	All routine maintenance works done under Force Account Inadequate staff, funds and equipment
Meru Central	DWO	10% done under Force Account Old and unserviceable equipment
Isiolo	DWO	Use of Force Account preferred Inadequate staff, funds and equipment
Kilifi	DRE	All routine maintenance works Inadequate funds and equipment Ongoing under force account
Taita Taveta	Engineer	All routine maintenance works under Force Account Inadequate funds and equipment
Nakuru	DRE	80%
Baringo	DWO/DRE	90% Inadequate funds and equipment
Turkana	DWO	100%
Narok	DWO/DRE	75% Inadequate staff, funds and equipment
Kericho	DWO	70% Inadequate staff, funds and equipment
Garissa	DWO	50% mainly pothole, patching and marking
Kisumu	DWO	Inadequate staff
Migori	DWO	70% Inadequate equipment
Kisii	DWO	Minor routine maintenance works done under Force account Inadequate staff, funds and equipment
Kakamega	DWO/DRE	Minor routine maintenance work under force account Inadequate funds and equipment
Busia	DWO/DRE	All routine maintenance works under Force account Inadequate staff, funds and equipment

### 3. County Councils

County Council	Individual	Comment
Meru Central	Works Superintendent	100% Inadequate staff, funds and equipment
Embu	WO	20%
Gusii		100% Ongoing under force account Inadequate staff, funds and equipment

### 4. City Councils

City Council	Individual	Comment
Nairobi	Dep City Eng/Asst City Eng	All routine maintenance

### 5. Municipalities

Municipality	Individual	Comment
Nyeri	ME	Yes Inadequate staff, funds and equipment
Nyahururu	Town Surveyor/Works Inspector	100% Inadequate staff, funds and equipment
Nakuru	Works Officer	100% Inadequate staff, funds and equipment
Machakos	Deputy Town Engineer	Cleaning and opening of drains
Embu	ME	Force account used on casuals Inadequate staff, funds and equipment
Mombasa	Deputy ME	Inadequate staff, funds and equipment
Voi	Works Superintendent	All routine maintenance works done under Force Account Inadequate funds and equipment
Turkana	Town Clerk	100%
Kericho		
Garissa	WO	4%
Kisumu	Town Engineer	30% Inadequate staff, funds and equipment Plenty of casual labourers
Kakamega	ME	20% Routine maintenance of paved roads Inadequate staff, funds and equipment
Busia	Works Foreman	All routine maintenance works under force account 25% of total maintenance for 2000/2001 Inadequate staff, funds and equipment

### 6. Townships

Township	Individual	Comment
Migori	Town Clerk/Treasurer	None (but no work going on)

### 7. Forest Department

Forest Department	Individual	Comment
Nyeri	Roads Superintendent	Most work is done under Force Account Lack some staff and equipment. Use casual labourers.
Kericho	DFO	100%
Karura (HQ)	Conservator	100%

### 8. Kenya Wildlife Service

KWS	Individual	Comment
Aberdares	Works Superintendent	Force Account used extensively
Tsavo East	Civil WO	Inadequate staff, funds and equipment Ongoing under Force Account
Nakuru	Works Superintendent	75% Inadequate staff, funds and equipment
Masai Mara	Warden/Foreman	100%
Nairobi HQ	Head of Technical Services/Sen Eng Roads	21%

### 9. Others

Organization	Individual	Comment
Sony Sugar Company	Workshop Manager/Roads Supt	100%
Chemelil	Agricultural Engineer	All routine and periodic maintenance for gravel and earth roads are done under force account
Mumias	Agricultural Officer	100% maintenance work Inadequate staff, funds and equipment

APPENDIX 3.6.2 VEHICLE PREVENTATIVE MAINTENANCE SERVICE CHECK OF MECHANICAL AND TRANSPORT DEPARTMENT


GK No. GP188 No.

MINISTRY OF PUBLIC WORKS  
VEHICLE PREVENTATIVE MAINTENANCE SERVICE CHECK

CLASS 01, 02, 04, 16, 19, 20  
21, 24, 33, 34

JOB ORDER

KILOM/HRS

THIS FORM IS TO BE USED ONLY FOR PM RECORDS. ALL REPAIRS RESULTING FROM OR SCHEDULED WITH THIS INSPECTION FORM WILL BE RECORDED ON A SEPARATE JOB REPAIR ORDER

	PM-A
	PM-B
	PM-C

Date/Time Received in Shop  Check if Inspection Made on Date Scheduled  Check if Inspection NOT on Scheduled Date

MARK BOXES BELOW AS FOLLOWS:  CHECK IF ITEM OK  IF REPAIR REQUIRED  WHEN ADJUSTMENT MADE

GROUP A SERVICE - PRELIMINARY ROAD TEST

- |                             |  |                             |  |
|-----------------------------|--|-----------------------------|--|
| 1 <input type="checkbox"/>  | Tyre - Condition, Inflation, Rims, Lugs              | 17 <input type="checkbox"/> | Transmission - Mounting, Lubricant Level, Vent                           |
| 2 <input type="checkbox"/>  | All Lights and Signals                               | 18 <input type="checkbox"/> | PTO and Cargo Pump Mounting, Controls, Operation                         |
| 3 <input type="checkbox"/>  | Body - Damage, Paint, Mudguards, Bumpers             | 19 <input type="checkbox"/> | Drive Shaft, Universal Joints, Yokes, Splines                            |
| 4 <input type="checkbox"/>  | Instruments - Oil, Water, Temp, Volts                | 20 <input type="checkbox"/> | Differential - Lubricant Levels, Vent                                    |
| 5 <input type="checkbox"/>  | Clutch Pedal, Brake, Throttle                        | 21 <input type="checkbox"/> | Brakes - Adjust if Required  |
| 6 <input type="checkbox"/>  | Cab Internal, Window Glass and Mirrors               | 22 <input type="checkbox"/> | Mounted Equipment - Hydraulic Hoists, Winches, etc.                      |
| 7 <input type="checkbox"/>  | Air Conditioner - Controls and Operation             | 23 <input type="checkbox"/> | Air System Operation - Drain Air Tanks                                   |
| 8 <input type="checkbox"/>  | Radiator - Water Level, Pressure Test                | 24 <input type="checkbox"/> | Fifth Wheel Plate - Check for Cracks, Wear, King Pin                     |
| 9 <input type="checkbox"/>  | Fan Belt, Alternator Belt - Adjust or Replace        | 25 <input type="checkbox"/> | Landing Gear - Condition and Operation                                   |
| 10 <input type="checkbox"/> | Fuel and Oil Filters - Replace if Required           | 26 <input type="checkbox"/> | Tank Dome Covers, Vents, Valves  |
| 11 <input type="checkbox"/> | Air Filter - Clean or Replace                        | 27 <input type="checkbox"/> | Unloading Equipment - Piping, Meters and Readings                        |
| 12 <input type="checkbox"/> | Crankcase - Drain and Refill, Check For Engine Leaks | 28 <input type="checkbox"/> | Safety Equipment - Emergency Valves, Remote Controls, Fire Extinguishers |
| 13 <input type="checkbox"/> | Battery - Electrolyte Level, Terminals and Mounting  | 29 <input type="checkbox"/> | Radiator - Clean if Required   |
| 14 <input type="checkbox"/> | Exhaust System Condition                             | 30 <input type="checkbox"/> | Complete Lubrication   |
| 15 <input type="checkbox"/> | Suspension - Axles, Springs, "U" Bolts               | 31 <input type="checkbox"/> | Road Test  |
| 16 <input type="checkbox"/> | Wheel Bearing Adjustment                             |                             |  |

COMPLETE THE FOLLOWING SPECIAL PROCEDURES (1)

GROUP B SERVICE

- 1-31  Complete Group A Service
- 34  Governor - Check and Adjust
- 35  Ignition Points, Plugs, Timing
- 36  Carburetor - Clean and Adjust
- 37  Thermostat
- 38  Air Compressor - Clean Air Filter

GROUP C SERVICE

- 1-38  Complete GROUP A and GROUP B Service
- 39  Condition of Timing Belt or Chain
- 40  Fuel Pump - Mounting, Pressure, Operation
- 41  Injectors - Valve Adjustment
- 42  Wheel Alignment - Adjust if Necessary
- 43  Engine - Torque Cylinder Heads, Rockers, Manifolds & Turbocharger
- 44  Brakes - Drum, Linings and Cylinders
- 45  Transmission and Rear Axle Oil - Drain and Refill

THIS CHECK AND LUBRICATION HAS BEEN COMPLETED AND ALL INDICATED REPAIRS HAVE BEEN SCHEDULED, COMPLETED OR NOTED FOR REFERENCE.

Remarks:

Date Completed:

Signature of Supervisor:

FORM NO. 510

P.T.O. FOR COMMENTS

SERVICE COMMENTS

1 <input type="checkbox"/>	17 <input type="checkbox"/>
2 <input type="checkbox"/>	18 <input type="checkbox"/>
3 <input type="checkbox"/>	19 <input type="checkbox"/>
4 <input type="checkbox"/>	20 <input type="checkbox"/>
5 <input type="checkbox"/>	21 <input type="checkbox"/>
6 <input type="checkbox"/>	22 <input type="checkbox"/>
7 <input type="checkbox"/>	23 <input type="checkbox"/>
8 <input type="checkbox"/>	24 <input type="checkbox"/>
9 <input type="checkbox"/>	25 <input type="checkbox"/>
10 <input type="checkbox"/>	26 <input type="checkbox"/>
11 <input type="checkbox"/>	27 <input type="checkbox"/>
12 <input type="checkbox"/>	28 <input type="checkbox"/>
13 <input type="checkbox"/>	29 <input type="checkbox"/>
14 <input type="checkbox"/>	30 <input type="checkbox"/>
15 <input type="checkbox"/>	31 <input type="checkbox"/>
16 <input type="checkbox"/>	
1-31 <input type="checkbox"/>	1-38 <input type="checkbox"/>
36 <input type="checkbox"/>	39 <input type="checkbox"/>
37 <input type="checkbox"/>	40 <input type="checkbox"/>
38 <input type="checkbox"/>	41 <input type="checkbox"/>
38 <input type="checkbox"/>	42 <input type="checkbox"/>
	43 <input type="checkbox"/>
	44 <input type="checkbox"/>
	45 <input type="checkbox"/>

FORM NO. 510

APPEDIX 3.6.3 BREAKDOWN OF COST ESTIMATE FOR DESIRABLE CASE

(unit: Ksh. million)

Item	Status						Total	Desirable No.	Required No.	Year-1								Year-2									
	Serviceable		Under Repair		Unserviceable					Cost of Purchase		Cost of Maintenance		Cost of Rehabilitation		Provision for Replacement	Salvage Value		Total Cost	Cost of Purchase		Cost of Maintenance		Cost of Rehabilitation		Provision for Replacement	Total Cost
	No.	%	No.	%	No.	%				Unit Cost	Total	Unit Cost	Total	Unit Cost	Total		Unit Value	Total		Unit Cost	Total	Unit Cost	Total	Unit Cost	Total		
Flat bed	50	26.0	37	19.3	105	54.7	192	97	10	3.40	11.33	0.41	20.50	0.83	10.24	21.99	0.09	9.45	54.61	3.57	11.90	0.43	28.27	0.87	10.75	21.99	72.90
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	122	3.70	150.47	0.45	28.35	0.90	13.50	56.73	0.10	9.00	240.05	3.89	157.99	0.47	56.07	0.95	14.18	56.73	284.97
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	170	1.90	107.67	0.25	34.50	0.45	14.40	51.17	0.05	9.70	198.04	2.00	113.05	0.26	59.50	0.47	15.12	51.17	238.84
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	140	2.30	107.33	0.28	0.00	0.55	0.00	21.47	0.06	0.00	128.80	2.42	112.70	0.29	13.72	0.58	0.00	21.47	147.89
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	156	1.90	98.80	0.25	41.00	0.45	10.20	49.15	0.05	20.05	179.10	2.00	103.74	0.26	62.65	0.47	10.71	49.15	226.25
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	6	23.00	46.00	3.05	30.50	5.50	53.17	69.00	0.35	15.05	183.62	24.15	48.30	3.20	69.39	5.78	55.83	69.00	242.51
Motor grader	67	19.1	70	20.0	213	60.9	350	248	111	19.00	703.00	2.55	170.85	4.50	105.00	314.13	0.35	74.55	1218.43	19.95	738.15	2.68	340.94	4.73	110.25	314.13	1503.47
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	104	1.10	38.13	0.15	2.25	0.27	1.89	10.27	0.03	1.11	51.43	1.16	40.04	0.16	8.93	0.28	1.98	10.27	61.22
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	41	8.00	109.33	1.15	12.65	2.00	12.00	37.33	0.23	7.36	163.96	8.40	114.80	1.21	37.03	2.10	12.60	37.33	201.76
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	16	6.00	32.00	0.80	2.40	1.60	3.73	10.40	0.16	2.72	45.81	6.30	33.60	0.84	8.96	1.68	3.92	10.40	56.88
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	16	6.50	34.67	0.85	5.10	1.70	2.27	11.27	0.18	1.44	51.86	6.83	36.40	0.89	11.31	1.79	2.38	11.27	61.35
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	2	29.00	19.33	3.85	11.55	7.20	7.20	15.47	0.30	2.70	50.85	30.45	20.30	4.04	18.87	7.56	7.56	15.47	62.19
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	4	19.00	25.33	2.55	0.00	4.60	0.00	5.07	0.30	0.00	30.40	19.95	26.60	2.68	3.57	4.83	0.00	5.07	35.24
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	4	4.50	6.00	0.58	1.16	1.10	0.37	2.10	0.13	0.13	9.50	4.73	6.30	0.61	2.23	1.16	0.39	2.10	11.02
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	51	0.30	5.10	0.04	0.72	0.08	0.03	1.40	0.01	0.31	6.94	0.32	5.36	0.04	1.48	0.08	0.03	1.40	8.27
Generator	1	33.3	1	33.3	1	33.3	3	70	68	0.50	11.33	0.07	0.07	0.13	0.04	2.33	0.01	0.01	13.77	0.53	11.90	0.07	1.76	0.14	0.05	2.33	16.04
Compressor	0	0.0	3	33.3	6	66.7	9	18	15	3.00	15.00	0.45	0.00	0.83	0.83	3.60	0.09	0.54	18.89	3.15	15.75	0.47	2.84	0.87	0.87	3.60	23.06
Water tanker	2	8.0	4	16.0	19	76.0	25	70	64	3.50	74.67	0.50	1.00	0.90	1.20	16.33	0.10	1.90	91.30	3.68	78.40	0.53	12.95	0.95	1.26	16.33	108.94
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	53	0.30	5.30	0.04	0.44	0.08	0.16	1.40	0.01	0.12	7.18	0.32	5.57	0.04	1.29	0.08	0.17	1.40	8.42
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	27	0.25	2.25	0.03	0.00	0.06	0.00	0.45	0.01	0.00	2.70	0.26	2.36	0.03	0.28	0.06	0.00	0.45	3.10
Water trailer	37	29.6	33	26.4	55	44.0	125	70	0	0.25	0.00	0.03	1.11	0.06	0.66	1.17	0.01	0.55	2.39	0.26	0.00	0.03	1.51	0.06	0.69	1.17	3.37
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	3	9.00	9.00	1.25	3.75	2.20	2.20	5.40	0.25	2.25	18.10	9.45	9.45	1.31	6.56	2.31	2.31	5.40	23.72
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	67	0.25	5.58	0.03	5.58	0.06	3.56	7.18	0.01	3.83	18.08	0.26	5.86	0.03	8.43	0.06	3.74	7.18	25.22
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	34	16.00	181.33	2.18	34.88	4.00	26.67	74.67	0.43	20.64	296.91	16.80	190.40	2.29	77.83	4.20	28.00	74.67	370.89
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	9	16.00	48.00	2.18	0.00	4.00	0.00	9.60	0.43	0.00	57.60	16.80	50.40	2.29	6.87	4.20	0.00	9.60	66.87
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	48	3.50	56.00	0.50	6.00	0.90	3.00	16.33	0.10	1.70	79.63	3.68	58.80	0.53	16.45	0.95	3.15	16.33	94.73
Towed roller	6	33.3	4	22.2	8	44.4	18	70	60	2.50	50.00	0.30	1.80	0.58	0.77	11.67	0.06	0.48	63.76	2.63	52.50	0.32	8.61	0.61	0.81	11.67	73.59
Water pump	6	26.1	6	26.1	11	47.8	23	70	58	0.20	3.87	0.03	0.18	0.05	0.10	0.93	0.01	0.11	4.97	0.21	4.06	0.03	0.86	0.05	0.11	0.93	5.96
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	3	14.00	14.00	1.91	0.00	3.50	0.00	2.80	0.38	0.00	16.80	14.70	14.70	2.01	2.01	3.68	0.00	2.80	19.51
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	37	4.00	49.33	0.57	13.11	1.05	3.50	18.67	0.11	1.32	83.29	4.20	51.80	0.60	23.14	1.10	3.68	18.67	97.28
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	4	2.00	2.67	0.25	2.25	0.45	0.75	2.40	0.05	0.15	7.92	2.10	2.80	0.26	3.15	0.47	0.79	2.40	9.14
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	11	2.50	9.17	0.31	0.93	0.58	0.77	3.00	0.06	0.48	13.39	2.63	9.63	0.33	2.60	0.61	0.81	3.00	16.04
Total	865	26.0	687	20.7	1773	53.3	3325	3066	1514		2,032.00		432.63		278.20	854.87		187.65	3,410.06		2,133.60		900.05		292.11	854.87	4,180.63



(Cont'd)

Item	Status						Total	Desirable No.	Required No.	Year-3						Grand Total							
	Serviceable		Under Repair		Unserviceable					Cost of Purchase		Cost of Maintenance		Cost of Rehabilitation		Provision for Replacement	Total Cost	Purchase	Maintenance	Rehabilitation	Provision for Replacement	Salvage Value	Total
	No.	%	No.	%	No.	%				Unit Cost	Total	Unit Cost	Total	Unit Cost	Total								
Flat bed	50	26.0	37	19.3	105	54.7	192	97	10	3.75	12.50	0.45	36.76	0.92	11.29	21.99	82.53	35.73	85.53	32.27	65.96	9.45	210.04
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	122	4.08	165.89	0.50	86.49	0.99	14.88	56.73	324.00	474.35	170.91	42.56	170.20	9.00	849.02
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	170	2.09	118.70	0.28	86.91	0.50	15.88	51.17	272.67	339.42	180.91	45.40	153.52	9.70	709.55
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	140	2.54	118.34	0.31	28.81	0.61	0.00	21.47	168.61	338.37	42.53	0.00	64.40	0.00	445.30
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	156	2.09	108.93	0.28	86.36	0.50	11.25	49.15	255.68	311.47	190.01	32.16	147.44	20.05	661.03
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	6	25.36	50.72	3.36	112.09	6.06	58.62	69.00	290.42	145.02	211.98	167.61	207.00	15.05	716.55
Motor grader	67	19.1	70	20.0	213	60.9	350	248	111	20.95	775.06	2.81	527.60	4.96	115.76	314.13	1732.55	2216.21	1039.39	331.01	942.40	74.55	4454.46
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	104	1.21	42.04	0.17	16.26	0.30	2.08	10.27	70.65	120.22	27.44	5.96	30.80	1.11	183.30
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	41	8.82	120.54	1.27	63.82	2.21	13.23	37.33	234.92	344.67	113.50	37.83	112.00	7.36	600.64
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	16	6.62	35.28	0.88	16.17	1.76	4.12	10.40	65.97	100.88	27.53	11.77	31.20	2.72	168.66
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	16	7.17	38.22	0.94	18.12	1.87	2.50	11.27	70.10	109.29	34.52	7.15	33.80	1.44	183.32
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	2	31.97	21.32	4.24	26.88	7.94	7.94	15.47	71.60	60.95	57.30	22.70	46.40	2.70	184.64
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	4	20.95	27.93	2.81	7.50	5.07	0.00	5.07	40.49	79.86	11.07	0.00	15.20	0.00	106.13
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	4	4.96	6.62	0.64	3.41	1.21	0.40	2.10	12.53	18.92	6.80	1.16	6.30	0.13	33.04
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	51	0.33	5.62	0.04	2.32	0.09	0.03	1.40	9.37	16.08	4.53	0.08	4.20	0.31	24.58
Generator	1	33.3	1	33.3	1	33.3	3	70	68	0.55	12.50	0.08	3.63	0.14	0.05	2.33	18.50	35.73	5.46	0.14	7.00	0.01	48.32
Compressor	0	0.0	3	33.3	6	66.7	9	18	15	3.31	16.54	0.50	5.95	0.92	0.92	3.60	27.01	47.29	8.79	2.62	10.80	0.54	68.95
Water tanker	2	8.0	4	16.0	19	76.0	25	70	64	3.86	82.32	0.55	26.09	0.99	1.32	16.33	126.07	235.39	40.04	3.78	49.00	1.90	326.31
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	53	0.33	5.84	0.04	2.22	0.09	0.18	1.40	9.64	16.71	3.95	0.50	4.20	0.12	25.24
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	27	0.28	2.48	0.03	0.60	0.07	0.00	0.45	3.53	7.09	0.88	0.00	1.35	0.00	9.32
Water trailer	37	29.6	33	26.4	55	44.0	125	70	0	0.28	0.00	0.03	1.95	0.07	0.73	1.17	3.85	0.00	4.57	2.08	3.50	0.55	9.60
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	3	9.92	9.92	1.38	9.65	2.43	2.43	5.40	27.39	28.37	19.96	6.94	16.20	2.25	69.22
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	67	0.28	6.16	0.03	11.55	0.07	3.92	7.18	28.82	17.60	25.57	11.22	21.55	3.83	72.11
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	34	17.64	199.92	2.40	124.98	4.41	29.40	74.67	428.97	571.65	237.69	84.07	224.00	20.64	1096.77
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	9	17.64	52.92	2.40	14.42	4.41	0.00	9.60	76.94	151.32	21.29	0.00	28.80	0.00	201.41
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	48	3.86	61.74	0.55	27.93	0.99	3.31	16.33	109.31	176.54	50.38	9.46	49.00	1.70	283.68
Towed roller	6	33.3	4	22.2	8	44.4	18	70	60	2.76	55.13	0.33	16.10	0.64	0.85	11.67	83.74	157.63	26.51	2.44	35.00	0.48	221.09
Water pump	6	26.1	6	26.1	11	47.8	23	70	58	0.22	4.26	0.03	1.61	0.06	0.11	0.93	6.92	12.19	2.65	0.32	2.80	0.11	17.85
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	3	15.44	15.44	2.11	4.21	3.86	0.00	2.80	22.45	44.14	6.22	0.00	8.40	0.00	58.75
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	37	4.41	54.39	0.63	34.14	1.16	3.86	18.67	111.06	155.52	70.40	11.03	56.00	1.32	291.63
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	4	2.21	2.94	0.28	4.13	0.50	0.83	2.40	10.30	8.41	9.53	2.36	7.20	0.15	27.36
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	11	2.76	10.11	0.34	4.44	0.64	0.85	3.00	18.40	28.90	7.98	2.44	9.00	0.48	47.83
<b>Total</b>	<b>865</b>	<b>26.0</b>	<b>687</b>	<b>20.7</b>	<b>1773</b>	<b>53.3</b>	<b>3325</b>	<b>3066</b>	<b>1514</b>		<b>2,240.28</b>		<b>1,413.12</b>		<b>306.72</b>	<b>854.87</b>	<b>4,814.99</b>	<b>6,405.88</b>	<b>2,745.80</b>	<b>877.04</b>	<b>2,564.62</b>	<b>187.65</b>	<b>12,405.68</b>

**APPENDIX 3.6.4 BREAKDOWN OF COST ESTIMATE FOR DO-MINIMUM CASE**

(unit: Ksh. million)

Item	Status						Total	Year-1						Year-2						Year-3						Grand Total			
	Serviceable		Under Repair		Unserviceable			Cost of Maintenance		Cost of Rehabilitation		Salvage Value		Total Cost	Cost of Maintenance		Cost of Rehabilitation		Total Cost	Cost of Maintenance		Cost of Rehabilitation		Total Cost	Maintenance	Rehabilitation	Salvage Value	Total	
	No.	%	No.	%	No.	%		Unit Cost	Total	Unit Cost	Total	Unit Value	Total		Unit Cost	Total	Unit Cost	Total		Unit Cost	Total	Unit Cost	Total						
Flat bed	50	26.0	37	19.3	105	54.7	192	0.41	20.50	0.83	10.24	0.09	9.45	21.29	0.43	26.83	0.87	10.75	37.58	0.45	33.75	0.92	11.29	45.04	81.09	32.27	9.45	103.91	
Tipper truck	63	31.8	45	22.7	90	45.5	198	0.45	28.35	0.90	13.50	0.10	9.00	32.85	0.47	36.86	0.95	14.18	51.03	0.50	46.14	0.99	14.88	61.02	111.34	42.56	9.00	144.90	
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	0.25	34.50	0.45	14.40	0.05	9.70	39.20	0.26	44.63	0.47	15.12	59.75	0.28	55.68	0.50	15.88	71.55	134.80	45.40	9.70	170.50	
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0.28	0.00	0.55	0.00	0.06	0.00	0.00	0.29	0.00	0.58	0.00	0.00	0.31	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	0.25	41.00	0.45	10.20	0.05	20.05	31.15	0.26	49.00	0.47	10.71	59.71	0.28	57.70	0.50	11.25	68.94	147.70	32.16	20.05	159.80	
Crawler tractor	10	12.2	29	35.4	43	52.4	82	3.05	30.50	5.50	53.17	0.35	15.05	68.62	3.20	62.98	5.78	55.83	118.81	3.36	98.64	6.06	58.62	157.25	192.12	167.61	15.05	344.68	
Motor grader	67	19.1	70	20.0	213	60.9	350	2.55	170.85	4.50	105.00	0.35	74.55	201.30	2.68	241.87	4.73	110.25	352.12	2.81	319.56	4.96	115.76	435.32	732.28	331.01	74.55	988.74	
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	0.15	2.25	0.27	1.89	0.03	1.11	3.03	0.16	3.47	0.28	1.98	5.45	0.17	4.80	0.30	2.08	6.88	10.51	5.96	1.11	15.36	
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	1.15	12.65	2.00	12.00	0.23	7.36	17.29	1.21	20.53	2.10	12.60	33.13	1.27	29.16	2.21	13.23	42.39	62.34	37.83	7.36	92.81	
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	0.80	2.40	1.60	3.73	0.16	2.72	3.41	0.84	4.48	1.68	3.92	8.40	0.88	6.76	1.76	4.12	10.88	13.64	11.77	2.72	22.69	
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	0.85	5.10	1.70	2.27	0.18	1.44	5.93	0.89	6.55	1.79	2.38	8.93	0.94	8.12	1.87	2.50	10.62	19.77	7.15	1.44	25.47	
Bitumen premix	3	20.0	3	20.0	9	60.0	15	3.85	11.55	7.20	7.20	0.30	2.70	16.05	4.04	16.17	7.56	7.56	23.73	4.24	21.22	7.94	7.94	29.16	48.94	22.70	2.70	68.94	
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	2.55	0.00	4.60	0.00	0.30	0.00	0.00	2.68	0.00	4.83	0.00	0.00	2.81	0.00	5.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Road marking machine	2	50.0	1	25.0	1	25.0	4	0.58	1.16	1.10	0.37	0.13	0.13	1.40	0.61	1.42	1.16	0.39	1.81	0.64	1.71	1.21	0.40	2.11	4.29	1.16	0.13	5.31	
Concrete mixer	18	36.0	1	2.0	31	62.0	50	0.04	0.72	0.08	0.03	0.01	0.31	0.44	0.04	0.77	0.08	0.03	0.80	0.04	0.82	0.09	0.03	0.85	2.31	0.08	0.31	2.09	
Generator	1	33.3	1	33.3	1	33.3	3	0.07	0.07	0.13	0.04	0.01	0.01	0.10	0.07	0.10	0.14	0.05	0.14	0.08	0.13	0.14	0.05	0.18	0.30	0.14	0.01	0.42	
Compressor	0	0.0	3	33.3	6	66.7	9	0.45	0.00	0.83	0.83	0.09	0.54	0.29	0.47	0.47	0.87	0.87	1.34	0.50	0.99	0.92	0.92	1.91	1.46	2.62	0.54	3.54	
Water tanker	2	8.0	4	16.0	19	76.0	25	0.50	1.00	0.90	1.20	0.10	1.90	0.30	0.53	1.75	0.95	1.26	3.01	0.55	2.57	0.99	1.32	3.90	5.32	3.78	1.90	7.21	
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	0.04	0.44	0.08	0.16	0.01	0.12	0.48	0.04	0.55	0.08	0.17	0.71	0.04	0.66	0.09	0.18	0.84	1.65	0.50	0.12	2.03	
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0.03	0.00	0.06	0.00	0.01	0.00	0.00	0.03	0.00	0.06	0.00	0.00	0.03	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water trailer	37	29.6	33	26.4	55	44.0	125	0.03	1.11	0.06	0.66	0.01	0.55	1.22	0.03	1.51	0.06	0.69	2.21	0.03	1.95	0.07	0.73	2.68	4.57	2.08	0.55	6.10	
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	1.25	3.75	2.20	2.20	0.25	2.25	3.70	1.31	5.25	2.31	2.31	7.56	1.38	6.89	2.43	2.43	9.32	15.89	6.94	2.25	20.58	
Towed trailer	186	24.9	178	23.8	383	51.3	747	0.03	5.58	0.06	3.56	0.01	3.83	5.31	0.03	7.73	0.06	3.74	11.47	0.03	10.08	0.07	3.92	14.00	23.38	11.22	3.83	30.78	
Wheel loader	16	19.0	20	23.8	48	57.1	84	2.18	34.88	4.00	26.67	0.43	20.64	40.91	2.29	51.88	4.20	28.00	79.88	2.40	70.50	4.41	29.40	99.90	157.27	84.07	20.64	220.69	
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	2.18	0.00	4.00	0.00	0.43	0.00	0.00	2.29	0.00	4.20	0.00	0.00	2.40	0.00	4.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel tanker	12	30.8	10	25.6	17	43.6	39	0.50	6.00	0.90	3.00	0.10	1.70	7.30	0.53	8.05	0.95	3.15	11.20	0.55	10.29	0.99	3.31	13.60	24.34	9.46	1.70	32.10	
Towed roller	6	33.3	4	22.2	8	44.4	18	0.30	1.80	0.58	0.77	0.06	0.48	2.09	0.32	2.31	0.61	0.81	3.12	0.33	2.87	0.64	0.85	3.72	6.98	2.44	0.48	8.93	
Water pump	6	26.1	6	26.1	11	47.8	23	0.03	0.18	0.05	0.10	0.01	0.11	0.17	0.03	0.25	0.05	0.11	0.36	0.03	0.33	0.06	0.11	0.44	0.76	0.32	0.11	0.97	
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	1.91	0.00	3.50	0.00	0.38	0.00	0.00	2.01	0.00	3.68	0.00	0.00	2.11	0.00	3.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile workshop	23	51.1	10	22.2	12	26.7	45	0.57	13.11	1.05	3.50	0.11	1.32	15.29	0.60	15.76	1.10	3.68	19.44	0.63	18.64	1.16	3.86	22.50	47.51	11.03	1.32	57.23	
Service vehicle	9	52.9	5	29.4	3	17.6	17	0.25	2.25	0.45	0.75	0.05	0.15	2.85	0.26	2.80	0.47	0.79	3.59	0.28	3.40	0.50	0.83	4.23	8.45	2.36	0.15	10.66	
Heavy trailer	3	20.0	4	26.7	8	53.3	15	0.31	0.93	0.58	0.77	0.06	0.48	1.22	0.33	1.41	0.61	0.81	2.22	0.34	1.94	0.64	0.85	2.79	4.28	2.44	0.48	6.24	
<b>Total</b>	<b>865</b>	<b>26.0</b>	<b>687</b>	<b>20.7</b>	<b>1773</b>	<b>53.3</b>	<b>3325</b>		<b>432.63</b>		<b>278.20</b>		<b>187.65</b>	<b>523.18</b>		<b>615.37</b>		<b>292.11</b>	<b>907.48</b>		<b>815.30</b>		<b>306.72</b>	<b>1,122.01</b>	<b>1,863.29</b>	<b>877.04</b>	<b>187.65</b>	<b>2,552.68</b>	

APPENDIX 3.7.1 MINISTRY OF ROADS AND PUBLIC WORKS SCHEDULE OF CONTRACTORS CLASSIFICATION

NO	NAME	ADDRESS	TOWN	NATIONALITY	REGISTRATION CATEGORY							REMARKS
					PAVED	BRIDGES	LABOUR	GRAVELLING	RESEAL	ROUTINE		
1	Aegis Construction Ltd	10188	NAIROBI	KENYAN	C	D		C	C	G		
2	Alpine Construction Ltd	62225	Nairobi	"	F	G		F	F	G		
3	Berna Construction Ltd	1733	Nakuru	"	G	G		G	G	G		
4	Bims Constr. Ltd	7180	Nakuru	"	D	G		D	E	G		
5	Bivanithon Building Ltd	36	Wajir	"			G	E		G		
6	Bometot Contractors	2	Bomet	"			G	D		G		
7	Borderland Construction Co. Ltd	24310	Nairobi	"	D	G		D	E	G		
8	Boyo General Contractors	11815	"	"	G	G		G	G	G		
10	Bridgestone Construction Ltd	2634	Kisumu	"	C	C		C	C			
11	Buildcraft Ltd	45211	Nairobi	"	E	G		D	E			
12	Ceabud Engineering co Ltd	27581	"	"	E	G		C		G		
13	Chart Eng. Ltd	35017	"	"	E	G		E	E	G		
14	Coastal (K) Enterprises Ltd	46925	"	"	C	C		C	C	G		
15	Columbia Developers Ltd	411	Nairobi	"	E	G		E	G	G		
16	Completion Sure Contractors	21742	"	"	G	G		G	G	G		
18	Conmatic Construction co. Ltd	13908	"	"	C	D		C	D			
19	Constain Brown Ltd	79528	"	"	D	H		C	E	G		
21	Crimson Construction Ltd	67859	"	"	C	G		D	D	G		
22	David Engineering	27722	"	"	C	D		E	E			
23	Denzek Engineering construction	60756	"	"	H			H	H	H		
24	Dericom Construction Ltd	27672	"	"	G	G		G	G	G		
25	Diks Building Contractors	1361	Nakuru	Kenyan				H	H			
26	Elite Earthmovers Ltd	64466	Nairobi	"	F	H		F	F	H		
27	Enkei Construction Services	19465	"	"	H	H		H	H	G		
28	Exact Constr. Eng Ltd	823	Nyamira	"	D	E		D	D	G		
29	F.M Construction Co. LTD	72855	Nairobi	"	G	G		G	G	G		
30	Fahari Building & CIVIL	65607	Nairobi	"	E	G		E	G	G		
31	Falcon Autosparcs Ltd	16143	Nakuru	"	G	G		G	G	G		
32	Farcrest Construction Co	8026	Nairobi	"	E	H		E	F	H		
34	Frankim Const. Co Ltd	11366	Nairobi	"	G	H		F	F	G		
35	Galipara Building Ltd	1009	Nakuru	"	C	G		E	G			
36	Gesoko General contractors ltd	32460	Nairobi	"			G	E	E			
37	Gogni Raioppe construction	8978	"	"	C	E		C	C			

(Cont'd)

NO	NAME	ADDRESS	TOWN	NATIONALITY	PAVED	BRIDGES	LABOUR	REGISTRATION CATEGORY			ROUTINE REMARKS
								GRAVELLING	RESEAL	ROUTINE	
38	Guumba Building Contractors	6085	Kisumu	"			H	F		H	
39	H.K Builders	3123	Nairobi	"	C	G		D	D		
40	Imco Holdings	7078	Nairobi	"	E	G		E	F	G	
41	Inswil Building Eng Ltd	8871	"	"	F	G		F	F	G	
42	Karuri Civil Engineering Ltd	32126	"	"	C	D	C	C			
43	Kher Construction & Eng. Comp.	311	Garissa	"	F	G	G	F	F	F	
44	Kima & Partners	21069	Nairobi	"	E	G		E	E	G	
45	Kimori Construction Co	12977	Nairobi	"	A	D		C	A	G	
46	Kirinyaga Construction Comp. Ltd	48632	"	"			H	H		H	
47	Kisumu General Merchants	2543	Kisumu	"			H	H		H	
48	Kiwam Construction Ltd	1718	Karatina	"							
49	Kokomo Investment Agencies	6766	Kisumu	"	F	G	H	G	F	G	
50	Kurnd Limited	110	Nairobi	"	G	G		F	G	G	
51	Legend Construction Comp. Ltd	4500	Nairobi	"	G	G		F	G	G	
52	Lefine Gener. Cons. (K) Ltd	7092	"	"	G	G		G	G	G	
53	Lule Auto Spares Ltd	13945	Nakuru	"	G	G		F	G	G	
54	Makal Contractors	69083	Nairobi	"	F	G		C	D		
55	Maxson Construction Co. Ltd	3267	Eldoret	"	G	G		G	G	G	
56	Midland Emporium Ltd	4	Kakamega	"	E	G		E	E	G	
57	Mondla Ltd	64180	Nairobi	"	E	F		E	D		E(special)
58	Mowlem Construction Co E.A Ltd	30078	Nairobi	"	A	A	E	C			
59	Mugasa Group Ltd	29096	"	"	E						
60	Mugurini Builders Contractors	67860	Nairobi	"	F	G		F	F	H	
61	Munah General Construction Ltd	64554	"	"	G	H		G	G	G	
62	Myomumwe Construction Co.	12791	Nairobi	"	E			E			
63	Nagashaki Construction Co. Ltd	50694	"	"	G			G			
64	Nakuru Machinery Services Ltd	14965	Nakuru	"	H	H		E	D	E	
65	Nassir Rabbi Gen. Company	100	Kajiado	"	D	E	E	D	E		
66	Niconia Construction Co	628	Nakuru	"	G			G			
67	Ninety Eight Traders Ltd	6876	Nairobi	"	E	H		C	G	G	
68	Ninon Engineering Works	18857	"	"	H	H		H	H	H	
69	Niuca Consolidated Comp. Ltd	55	Makuyu	"	E	H		C	G	G	
70	Nova Construction co. Ltd	61323	Nairobi	"	E	H		C	G	G	
72	Nvoro Construction Co Ltd	74416	"	"	A	C		C	B	G	
73	Odino Building Co. Ltd	5054	"	"	G			G			
74	Oidaiga Construction Co Ltd	73	Karatina	"	D	E		D	D	G	
75	Oi-Ngaata Construction Ltd	383	Karatina	"	G			G	G	G	
76	Ongata Building Works	58160	Nairobi	"	E	D		C	C		
77	Pankal Construction Co	67653	Nairobi	"	H	H		H	H	H	
78	Phenty Construction Company	60756	"	"	G			G	G	G	

(Cont'd)

NO	NAME	ADDRESS	TOWN	NATIONALITY	REGISTRATION CATEGORY							
					PAVED	BRIDGES	LABOUR	GRAVELLING	RESEAL	ROUTINE	REMARKS	
79	Powen General Contractors	8630	"	"	D	G		D	D			
80	Prasun Construction Comp. Ltd	12205	Nakuru	"	G	H		F	G			G
81	Priscot Co. Ltd	795	"	"		E		D	D			G
82	Priscot Co. Ltd	795	Nakuru	"		E		D	D			G
83	Raj Chem & Hardware Ltd	3570	"	"		G		G	G			G
84	Rajwa Building Contractors	62019	Nairobi	"	G	G		G	G			G
85	Ramgin Construction Ltd	33315	"	"	G	G		G	G			G
86	Rift Valley Cycles Ltd	16205	"	"	F	G		F	F			G
87	Ruki Auto Mart Ltd	2468	Nakuru	"	G			G	G			G
88	Samar Technical Services Ltd	33541	Nairobi	"	G	G		E	G			G
89	Samka Holding Ltd	139	Eldama/R.	"		G		G	G			G
90	Seplan Environmental Serv. Ltd	7348	Nairobi	"		G		G	G			G
91	Shamanek Eng. Construction	27720	Nairobi	"	G	G		G	G			G
92	Siivot Enterprises Ltd	27670	"	"	G	G		G	G			G
93	Spancrete Construction Ltd	38710	"	"	C	D		C	D			D
94	Spenco (k) Ltd	14294	"	"	D	E		D	D			D
95	Tenfold Ltd	66694	Nairobi	"	B	G		C	B			B
96	Toretta Agencies	85736	Mombasa	"	H	G		G	G			H
97	Trans Nile Enterprises Ltd	914	Kenicho	"	G	G		G	G			G
98	Trapoz Construction Ltd	37221	Nairobi	"	G	G		G	G			G
99	Universal F&B Ltd	45695	"	"	C	D		C	C			C
100	WayBridge Construction	58121	"	"	E	H		E	E			E
101	Zakhem Constructio (K) Ltd	41196	"	"	C	C		C	C			C
102	Nakuru Express Supplies Ltd	15647	Nakuru	"	G	G		G	G			G
103	Greenline Ltd	61060	Nairobi	"	G	G		G	G			G
104	Damatek Building Contr. Ltd	612	E/Ravine	"				G	G			G
105	Jomida Associates Ltd	343	Karatina	"	G	G		G	G			G
106	Rako Ass. Gen. Merchant Ltd	14190	Nakuru	"	G	G		G	G			G
107	Libex Company Ltd	13165	"	"	G	G		G	G			G
108	Fallow Construction Co. Ltd	54712	"	"	G	G		G	G			G
109	Timbo Construction Ltd	9792	"	"	G	G		G	G			G
110	Highpick Construction Co. Ltd	3716	"	"	G	G		G	G			G
111	Dimken (k) Ltd	1739	Thika	"	E	E		E	E			E
112	Kijani Enterprises	168	Lamu	"	H	H		H	H			H
113	Rabmas Enterprises	9079	Kisumu	"	G	G		G	G			G
114	Siberkei Investment Co. Ltd	153	E/Ravine	"	G	G		G	G			G
115	Kitho Civil Eng. Co.Ltd	19851	Nairobi	"	G	G		G	G			G
116	Centriva Technical Servi. Ltd	2986	Nakuru	"	G	G		G	G			G
117	Casuanna Enterprises Ltd	122	Malindi	"	G	G		G	G			G

(Cont'd)

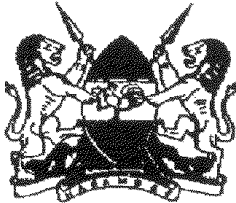
NO	NAME	ADDRESS	TOWN	NATIONALITY	REGISTRATION CATEGORY									
					PAVED	BRIDGES	LABOUR	GRAVELLING	RESEAL	ROUTINE	REMARKS			
119	Corridor General Construction Ltd	11987	Nairobi	Kenya	E	G	G	E	E	E	G	G		
120	Kalibawang Engineering Serv. Ltd	63485	"	"	G	G	G	G	G	G	G	G		
121	Sanober Ltd	13639	"	"	C	E	C	C	C	C	D	G		
122	Diacons (k) Ltd	30459	"	"	C	G	G	C	D	D	D	G		
123	Centriva Technical Services Ltd	2986	Nakuru	"	-	-	H	-	-	-	-	H		
124	Elem Investment Ltd	43889	Nairobi	"	G	G	G	G	G	G	G	G		
125	Dekings Traders Ltd	67156	"	"	G	G	G	G	G	G	G	G		
126	Plutos Hardware Ltd	15196	Nakuru	"	G	G	G	G	G	G	G	G		
127	Shaben Contractors Ltd	432	Kaliado	"	G	G	G	G	G	G	G	G		

**APPENDIX 7.6.1 LIST OF MODEL CONTRACT DOCUMENTS**

**CONTENTS**

	Source	Title
1	Ministry of Public Works & Housing, Roads Department	Labour-Based Routine Maintenance ‘Draft’
2	Ministry of Local Government, Kenya Urban Transport Infrastructure Project (KUTIP)	Hire of Labour for Road Maintenance during the Year ‘Draft’
3	Ministry of Local Government, Kenya Urban Transport Infrastructure Project (KUTIP)	Hire of Road Maintenance Equipment for the Year ‘Draft’
4	Ministry of Local Government, Kenya Urban Transport Infrastructure Project (KUTIP)	Supply of Road Maintenance Materials for the Year ‘Draft’
5	Ministry of Local Government, Kenya Urban Transport Infrastructure Project (KUTIP)	Drawings
6	United Republic of Tanzania	Contract Document for a Term Maintenance Contract

(1) Ministry of Public Works and Housing, Roads Department; Labour-Based Routine Maintenance ‘Draft’


<b>REPUBLIC OF KENYA</b>	
	
<b>MINISTRY OF PUBLIC WORKS &amp; HOUSING ROADS DEPARTMENT</b>	
 <b>LABOUR – BASED ROUTINE MAINTENANCE</b>  	
CONTRACT NO: .....	
FOR MAINTENANCE OF .....	
<b>“DRAFT”</b>	
Chief Engineer Ministry of Public Works & Housing P.O. Box 30260 Nairobi	Permanent Secretary Ministry of Public Works & Housing P.O. Box 30260 Nairobi



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5.	Article 4 - Commencement, Duration, Termination	6, 7
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(2) Kenya Urban Transport Infrastructure Project (KUTIP); Hire of Labour for Road Maintenance during the Year 'Draft'

<p><b>REPUBLIC OF KENYA</b></p>  <p><b>MINISTRY OF LOCAL GOVERNMENT</b></p> <p><b>KENYA URBAN TRANSPORT INFRASTRUCTURE PROJECT (KUTIP)</b></p> <p><b>&lt;NAME OF LOCAL AUTHORITY&gt;</b></p> <p><b>&lt;DRAFT&gt;</b></p> <p><b>CONTRACT NO. &lt;CONTRACT No.&gt;</b></p> <p><b>HIRE OF LABOUR FOR ROAD MAINTENANCE DURING THE YEAR &lt;YEAR&gt;</b></p> <p><b>&lt;DATE&gt;</b></p>	
<p><b>THE TOWN CLERK</b> <b>&lt;NAME OF LOCAL AUTHORITY&gt;</b> <b>&lt;ADDRESS OF LOCAL AUTHORITY&gt;</b></p>	<p><b>THE PERMANENT SECRETARY</b> <b>MINISTRY OF LOCAL GOVERNMENT</b> <b>P. O. BOX 30004</b> <b>NAIROBI</b></p>

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(3) Kenya Urban Transport Infrastructure Project (KUTIP); Hire of Road Maintenance Equipment for the Year 'Draft'

<p><b>REPUBLIC OF KENYA</b></p>  <p><b>MINISTRY OF LOCAL GOVERNMENT</b></p> <p><b>KENYA URBAN TRANSPORT INFRASTRUCTURE PROJECT (KUTIP)</b></p> <p><b>&lt;NAME OF LOCAL AUTHORITY&gt;</b></p> <p><b>&lt;DRAFT&gt;</b></p> <p><b>CONTRACT NO. &lt;CONTRACT No.&gt;</b> <b>HIRE OF ROAD MAINTENANCE EQUIPMENT FOR THE YEAR</b> <b>&lt;YEAR&gt;</b></p> <p><b>&lt;DATE&gt;</b></p>	
<p><b>THE TOWN CLERK</b> <b>&lt;NAME OF LOCAL AUTHORITY&gt;</b> <b>&lt;ADDRESS OF LOCAL AUTHORITY&gt;</b></p>	<p><b>THE PERMANENT SECRETARY</b> <b>MINISTRY OF LOCAL GOVERNMENT</b> <b>P. O. BOX 30004</b> <b>NAIROBI</b></p>

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(4) Kenya Urban Transport Infrastructure Project (KUTIP); Supply of Road Maintenance Materials for the Year 'Draft'

<p><b>REPUBLIC OF KENYA</b></p>  <p><b>MINISTRY OF LOCAL GOVERNMENT</b></p> <p><b>KENYA URBAN TRANSPORT INFRASTRUCTURE PROJECT (KUTIP)</b></p> <p><b>&lt;NAME OF LOCAL AUTHORITY&gt;</b></p> <p><b>&lt;DRAFT&gt;</b></p> <p><b>CONTRACT NO. &lt;CONTRACT No.&gt;</b></p> <p><b>SUPPLY OF ROAD MAINTENANCE MATERIALS FOR THE YEAR &lt;YEAR&gt;</b></p> <p><b>&lt;DATE&gt;</b></p>	
<p><b>THE TOWN CLERK</b> <b>&lt;NAME OF LOCAL AUTHORITY&gt;</b> <b>&lt;ADDRESS OF LOCAL AUTHORITY&gt;</b></p>	<p><b>THE PERMANENT SECRETARY</b> <b>MINISTRY OF LOCAL GOVERNMENT</b> <b>P. O. BOX 30004</b> <b>NAIROBI</b></p>

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(5) Kenya Urban Transport Infrastructure Project (KUTIP); Drawings ‘Draft’

<p><b>REPUBLIC OF KENYA</b></p>  <p><b>MINISTRY OF LOCAL GOVERNMENT</b></p> <p><b>KENYA URBAN TRANSPORT INFRASTRUCTURE PROJECT (KUTIP)</b></p> <p><b>&lt;NAME OF LOCAL AUTHORITY&gt;</b></p> <p><b>&lt;DRAFT&gt;</b></p> <p><b>CONTRACT NO. &lt;CONTRACT No.&gt;</b> <b>&lt;CONTRACT NAME&gt;</b></p> <p><b>DRAWINGS</b></p> <p><b>&lt;DATE&gt;</b></p>	
<p><b>THE TOWN CLERK</b> <b>&lt;NAME OF LOCAL AUTHORITY&gt;</b> <b>&lt;ADDRESS OF LOCAL AUTHORITY&gt;</b></p>	<p><b>THE PERMANENT SECRETARY</b> <b>MINISTRY OF LOCAL GOVERNMENT</b> <b>P. O. BOX 30004</b> <b>NAIROBI</b></p>



(6) United Republic of Tanzania; Contract Document for a Term Maintenance Contract

ATU

UNITED REPUBLIC OF TANZANIA



United Nations Development Programme (UNDP)  
United Nations Capital Development Fund (UNCDF)  
District Council of  District

**CONTRACT DOCUMENT**

FOR THE MAINTENANCE OF ROAD FROM

TO

DURING THE PERIOD OF

TO

Prepared by:

Based on format developed by  
Norconsult A.S. Nairobi, Kenya

Contractor:

© UNDP, Tanzania

TECHNICAL MANUAL

SUMMARY OF CONTENTS

ATU

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B	SPECIFICATIONS
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APPENDIX 7.7.1 BREAKDOWN OF COST ESTIMATED EXPENSES FOR 2000 PIECES OF EQUIPMENT

(unit: Ksh. million)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Estimation for Salvage Value									Year-1													
	Serviceable		Under Repair		Unserviceable						SV			UR			US			Total			Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacemen	Total Cost
	No.	%	No.	%	No.	%					No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total				
Flat bed	50	26.0	37	19.3	105	54.7	192	97	63	0	0	0.51	0.00	24	0.26	6.05	105	0.09	9.45	15.50	0	3.40	0.00	50	0.41	20.50	4	0.83	3.67	14.34	38.51		
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	150	42	0	0.56	0.00	0	0.28	0.00	90	0.10	9.00	9.00	14	3.70	51.84	63	0.45	28.35	15	0.90	13.50	37.01	130.70		
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	264	30	0	0.29	0.00	0	0.14	0.00	194	0.05	9.70	9.70	10	1.90	18.71	138	0.25	34.50	32	0.45	14.40	33.38	100.99		
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	91	91	0	0.35	0.00	0	0.17	0.00	0	0.06	0.00	0.00	30	2.30	70.02	0	0.28	0.00	0	0.55	0.00	14.00	84.02		
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	253	21	0	0.29	0.00	0	0.14	0.00	401	0.05	20.05	20.05	7	1.90	13.36	164	0.25	41.00	23	0.45	10.20	32.06	96.62		
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	29	0	0	3.45	0.00	10	1.73	16.64	43	0.35	15.05	31.69	0	23.00	0.00	10	3.05	30.50	6	5.50	35.48	45.01	110.99		
Motor grader	67	19.1	70	20.0	213	60.9	350	248	162	25	0	2.85	0.00	0	1.43	0.00	213	0.35	74.55	74.55	8	19.00	156.90	67	2.55	170.85	23	4.50	105.00	204.91	637.67		
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	91	55	0	0.17	0.00	0	0.08	0.00	37	0.03	1.11	1.11	18	1.10	20.29	15	0.15	2.25	7	0.27	1.89	6.70	31.12		
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	46	17	0	1.20	0.00	0	0.60	0.00	32	0.23	7.36	7.36	6	8.00	44.43	11	1.15	12.65	6	2.00	12.00	24.35	93.44		
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	17	7	0	0.90	0.00	0	0.45	0.00	17	0.16	2.72	2.72	2	6.00	13.92	3	0.80	2.40	2	1.60	3.73	6.78	26.84		
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	17	7	0	0.98	0.00	0	0.49	0.00	8	0.18	1.44	1.44	2	6.50	15.08	6	0.85	5.10	1	1.70	2.27	7.35	29.80		
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	5	0	0	4.35	0.00	1	2.18	1.70	9	0.30	2.70	4.40	0	29.00	0.00	3	3.85	11.55	1	7.20	5.32	10.09	26.96		
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	3	3	0	2.85	0.00	0	1.43	0.00	0	0.30	0.00	0.00	1	19.00	16.53	0	2.55	0.00	0	4.60	0.00	3.31	19.83		
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	5	2	0	0.68	0.00	0	0.34	0.00	1	0.13	0.13	0.13	1	4.50	2.35	2	0.58	1.16	0	1.10	0.37	1.37	5.25		
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	46	27	0	0.05	0.00	0	0.02	0.00	31	0.01	0.31	0.31	9	0.30	2.67	18	0.04	0.72	0	0.08	0.03	0.91	4.33		
Generator	1	33.3	1	33.3	1	33.3	3	70	46	44	0	0.08	0.00	0	0.04	0.00	1	0.01	0.01	0.01	15	0.50	7.28	1	0.07	0.07	0	0.13	0.04	1.52	8.91		
Compressor	0	0.0	3	33.3	6	66.7	9	18	12	9	0	0.45	0.00	0	0.23	0.00	6	0.09	0.54	0.54	3	3.00	8.74	0	0.45	0.00	1	0.83	0.83	2.35	11.92		
Water tanker	2	8.0	4	16.0	19	76.0	25	70	46	40	0	0.53	0.00	0	0.26	0.00	19	0.10	1.90	1.90	13	3.50	46.27	2	0.50	1.00	1	0.90	1.20	10.65	59.13		
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	46	29	0	0.05	0.00	0	0.02	0.00	12	0.01	0.12	0.12	10	0.30	2.87	11	0.04	0.44	2	0.08	0.16	0.91	4.38		
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	18	18	0	0.04	0.00	0	0.02	0.00	0	0.01	0.00	0.00	6	0.25	1.47	0	0.03	0.00	0	0.06	0.00	0.29	1.76		
Water trailer	37	29.6	33	26.4	55	44.0	125	70	46	0	0	0.04	0.00	24	0.02	0.46	55	0.01	0.55	1.01	0	0.25	0.00	37	0.03	1.11	3	0.06	0.17	0.76	2.04		
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	6	0	0	1.35	0.00	0	0.68	0.09	9	0.25	2.25	2.34	0	9.00	0.00	3	1.25	3.75	1	2.20	2.11	3.52	9.38		
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	281	0	0	0.04	0.00	83	0.02	1.55	383	0.01	3.83	5.38	0	0.25	0.00	186	0.03	5.58	32	0.06	1.90	4.69	12.17		
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	46	10	0	2.40	0.00	0	1.20	0.00	48	0.43	20.64	20.64	3	16.00	51.53	16	2.18	34.88	7	4.00	26.67	48.71	161.78		
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	6	6	0	2.40	0.00	0	1.20	0.00	0	0.43	0.00	0.00	2	16.00	31.31	0	2.18	0.00	0	4.00	0.00	6.26	37.57		
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	46	24	0	0.53	0.00	0	0.26	0.00	17	0.10	1.70	1.70	8	3.50	27.61	12	0.50	6.00	3	0.90	3.00	10.65	47.26		
Towed roller	6	33.3	4	22.2	8	44.4	18	70	46	36	0	0.38	0.00	0	0.19	0.00	8	0.06	0.48	0.48	12	2.50	29.72	6	0.30	1.80	1	0.58	0.77	7.61	39.90		
Water pump	6	26.1	6	26.1	11	47.8	23	70	46	34	0	0.03	0.00	0	0.02	0.00	11	0.01	0.11	0.11	11	0.20	2.24	6	0.03	0.18	2	0.05	0.10	0.61	3.13		
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	2	2	0	2.10	0.00	0	1.05	0.00	0	0.38	0.00	0.00	1	14.00	9.13	0	1.91	0.00	0	3.50	0.00	1.83	10.96		
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	46	13	0	0.60	0.00	0	0.30	0.00	12	0.11	1.32	1.32	4	4.00	16.88	23	0.57	13.11	3	1.05	3.50	12.18	45.67		
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	12	0	0	0.30	0.00	2	0.15	0.34	3	0.05	0.15	0.49	0	2.00	0.00	9	0.25	2.25	1	0.45	0.41	1.57	4.23		
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	12	5	0	0.38	0.00	0	0.19	0.00	8	0.06	0.48	0.48	2	2.50	3.95	3	0.31	0.93	1	0.58	0.77	1.96	7.61		
Total	865	26.0	687	20.7	1773	53.3	3325	3066	2000	592	0	0.00	0.00	144	0.00	26.82	1773	0.00	187.65	214.47	197	665.09	865	432.63	181	249.50	557.65	1904.87					



(Cont'd)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Grand Total					Total Cost	Total Cost- Salvage Value
	Serviceable		Under Repair		Unserviceable						Cost of Purchase	Cost of Maintenance	Cost of Rehabilitation	Provision for Replacement			
	No.	%	No.	%	No.	%											
Flat bed	50	26.0	37	19.3	105	54.7	192	97	63	0	0.00	70.53	11.58	43.03	125.14	109.64	
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	150	42	163.43	131.87	42.56	111.02	448.88	439.88	
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	264	30	58.97	142.81	45.40	100.14	347.32	337.62	
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	91	91	220.72	27.74	0.00	42.01	290.48	290.48	
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	253	21	42.12	153.42	32.16	96.18	323.88	303.83	
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	29	0	0.00	160.20	111.86	135.03	407.09	375.40	
Motor grader	67	19.1	70	20.0	213	60.9	350	248	162	25	494.64	800.82	331.01	614.74	2241.22	2166.67	
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	91	55	63.95	19.51	5.96	20.09	109.51	108.40	
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	46	17	140.07	83.13	37.83	73.06	334.09	326.73	
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	17	7	43.88	19.68	11.77	20.35	95.69	92.97	
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	17	7	47.54	26.19	7.15	22.05	102.92	101.48	
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	5	0	0.00	45.68	16.79	30.27	92.73	88.33	
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	3	3	52.10	7.22	0.00	9.92	69.23	69.23	
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	5	2	7.41	5.27	1.16	4.11	17.94	17.81	
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	46	27	8.41	3.47	0.08	2.74	14.70	14.39	
Generator	1	33.3	1	33.3	1	33.3	3	70	46	44	22.94	3.61	0.14	4.57	31.26	31.25	
Compressor	0	0.0	3	33.3	6	66.7	9	18	12	9	27.56	5.73	2.62	7.05	42.95	42.41	
Water tanker	2	8.0	4	16.0	19	76.0	25	70	46	40	145.87	26.84	3.78	31.96	208.46	206.56	
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	46	29	9.04	2.89	0.50	2.74	15.17	15.05	
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	18	18	4.63	0.57	0.00	0.88	6.08	6.08	
Water trailer	37	29.6	33	26.4	55	44.0	125	70	46	0	0.00	3.78	0.55	2.28	6.61	5.60	
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	6	0	0.00	15.72	6.64	10.57	32.92	30.58	
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	281	0	0.00	20.69	6.00	14.06	40.74	35.36	
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	46	10	162.45	180.12	84.07	146.12	572.76	552.12	
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	6	6	98.71	13.89	0.00	18.79	131.38	131.38	
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	46	24	87.03	37.18	9.46	31.96	165.62	163.92	
Towed roller	6	33.3	4	22.2	8	44.4	18	70	46	36	93.69	18.58	2.44	22.83	137.54	137.06	
Water pump	6	26.1	6	26.1	11	47.8	23	70	46	34	7.07	1.86	0.32	1.83	11.07	10.96	
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	2	2	28.79	4.06	0.00	5.48	38.32	38.32	
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	46	13	53.22	55.34	11.03	36.53	156.13	154.81	
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	12	0	0.00	7.84	1.30	4.70	13.83	13.34	
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	12	5	12.46	5.87	2.44	5.87	26.64	26.16	
Total	865	26.0	687	20.7	1773	53.3	3325	3066	2000	592	2096.69	2102.12	786.56	1672.94	6658.31	6443.84	

APPENDIX 7.7.2 BREAKDOWN OF COST ESTIMATED EXPENSES FOR 1500 PIECES OF EQUIPMENT

(unit: Ksh. million)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Estimation for Salvage Value							Year-1																	
	Serviceable		Under Repair		Unserviceable						SV			UR			US			Total Value			Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacement	Total Cost		
	No.	%	No.	%	No.	%					No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total							
Flat bed	50	26.0	37	19.3	105	54.7	192	97	47	0	3	0.51	1.30	37	0.26	9.44	105	0.09	9.45	20.18	0	3.40	0.00	47	0.41	19.27	0	0.83	0.00	10.76	30.03				
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	113	5	0	0.56	0.00	0	0.28	0.00	90	0.10	9.00	9.00	2	3.70	5.58	63	0.45	28.35	15	0.90	13.50	27.76	75.19				
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	198	0	0	0.29	0.00	36	0.14	5.13	194	0.05	9.70	14.83	0	1.90	0.00	138	0.25	34.50	20	0.45	8.95	25.04	68.48				
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	68	68	0	0.35	0.00	0	0.17	0.00	0	0.06	0.00	0.00	23	2.30	52.51	0	0.28	0.00	0	0.55	0.00	10.50	63.01				
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	190	0	0	0.29	0.00	42	0.14	5.99	401	0.05	20.05	26.04	0	1.90	0.00	164	0.25	41.00	9	0.45	3.87	24.04	68.92				
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	22	0	0	3.45	0.00	17	1.73	29.33	43	0.35	15.05	44.38	0	23.00	0.00	10	3.05	30.50	4	5.50	22.03	33.76	86.29				
Motor grader	67	19.1	70	20.0	213	60.9	350	248	121	0	0	2.85	0.00	16	1.43	22.80	213	0.35	74.55	97.35	0	19.00	0.00	67	2.55	170.85	18	4.50	81.50	153.69	406.03				
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	68	32	0	0.17	0.00	0	0.08	0.00	37	0.03	1.11	1.11	11	1.10	11.91	15	0.15	2.25	7	0.27	1.89	5.02	21.08				
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	34	5	0	1.20	0.00	0	0.60	0.00	32	0.23	7.36	7.36	2	8.00	13.99	11	1.15	12.65	6	2.00	12.00	18.26	56.91				
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	13	3	0	0.90	0.00	0	0.45	0.00	17	0.16	2.72	2.72	1	6.00	5.44	3	0.80	2.40	2	1.60	3.73	5.09	16.66				
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	13	3	0	0.98	0.00	0	0.49	0.00	8	0.18	1.44	1.44	1	6.50	5.89	6	0.85	5.10	1	1.70	2.27	5.51	18.77				
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	4	0	0	4.35	0.00	2	2.18	4.35	9	0.30	2.70	7.05	0	29.00	0.00	3	3.85	11.55	0	7.20	2.19	7.57	21.31				
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	2	2	0	2.85	0.00	0	1.43	0.00	0	0.30	0.00	0.00	1	19.00	12.39	0	2.55	0.00	0	4.60	0.00	2.48	14.87				
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	3	0	0	0.68	0.00	0	0.34	0.00	1	0.13	0.13	0.13	0	4.50	0.64	2	0.58	1.16	0	1.10	0.37	1.03	3.19				
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	34	15	0	0.05	0.00	0	0.02	0.00	31	0.01	0.31	0.31	5	0.30	1.52	18	0.04	0.72	0	0.08	0.03	0.68	2.96				
Generator	1	33.3	1	33.3	1	33.3	3	70	34	32	0	0.08	0.00	0	0.04	0.00	1	0.01	0.01	0.01	11	0.50	5.37	1	0.07	0.07	0	0.13	0.04	1.14	6.63				
Compressor	0	0.0	3	33.3	6	66.7	9	18	9	6	0	0.45	0.00	0	0.23	0.00	6	0.09	0.54	0.54	2	3.00	5.81	0	0.45	0.00	1	0.83	0.83	1.76	8.40				
Water tanker	2	8.0	4	16.0	19	76.0	25	70	34	28	0	0.53	0.00	0	0.26	0.00	19	0.10	1.90	1.90	9	3.50	32.95	2	0.50	1.00	1	0.90	1.20	7.99	43.15				
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	34	17	0	0.05	0.00	0	0.02	0.00	12	0.01	0.12	0.12	6	0.30	1.72	11	0.04	0.44	2	0.08	0.16	0.68	3.01				
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	13	13	0	0.04	0.00	0	0.02	0.00	0	0.01	0.00	0.00	4	0.25	1.10	0	0.03	0.00	0	0.06	0.00	0.22	1.32				
Water trailer	37	29.6	33	26.4	55	44.0	125	70	34	0	3	0.04	0.10	33	0.02	0.62	55	0.01	0.55	1.27	0	0.25	0.00	34	0.03	1.02	0	0.06	0.00	0.57	1.59				
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	4	0	0	1.35	0.00	2	0.68	1.35	9	0.25	2.25	3.60	0	9.00	0.00	3	1.25	3.75	0	2.20	1.03	2.64	7.42				
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	211	0	0	0.04	0.00	153	0.02	2.87	383	0.01	3.83	6.70	0	0.25	0.00	186	0.03	5.58	8	0.06	0.50	3.51	9.59				
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	34	0	0	2.40	0.00	2	1.20	2.40	48	0.43	20.64	23.04	0	16.00	0.00	16	2.18	34.88	6	4.00	24.33	36.53	95.74				
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	4	4	0	2.40	0.00	0	1.20	0.00	0	0.43	0.00	0.00	1	16.00	23.48	0	2.18	0.00	0	4.00	0.00	4.70	28.18				
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	34	12	0	0.53	0.00	0	0.26	0.00	17	0.10	1.70	1.70	4	3.50	14.29	12	0.50	6.00	3	0.90	3.00	7.99	31.28				
Towed roller	6	33.3	4	22.2	8	44.4	18	70	34	24	0	0.38	0.00	0	0.19	0.00	8	0.06	0.48	0.48	8	2.50	20.21	6	0.30	1.80	1	0.58	0.77	5.71	28.49				
Water pump	6	26.1	6	26.1	11	47.8	23	70	34	22	0	0.03	0.00	0	0.02	0.00	11	0.01	0.11	0.11	7	0.20	1.48	6	0.03	0.18	2	0.05	0.10	0.46	2.22				
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	1	1	0	2.10	0.00	0	1.05	0.00	0	0.38	0.00	0.00	0	14.00	6.85	0	1.91	0.00	0	3.50	0.00	1.37	8.22				
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	34	1	0	0.60	0.00	0	0.30	0.00	12	0.11	1.32	1.32	0	4.00	1.66	23	0.57	13.11	3	1.05	3.50	9.13	27.40				
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	9	0	0	0.30	0.06	5	0.15	0.75	3	0.05	0.15	0.96	0	2.00	0.00	9	0.25	2.25	0	0.45	0.00	1.17	3.42				
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	9	2	0	0.38	0.00	0	0.19	0.00	8	0.06	0.48	0.48	1	2.50	1.51	3	0.31	0.93	1	0.58	0.77	1.47	4.68				
Total	865	26.0	687	20.7	1773	53.3	3325	3066	1500	298	5	1.46	1.46	345	0.26	85.01	1773	0.06	187.65	274.12	99	226.32	859	431.31	114	188.56	418.24	1264.43							

(Cont'd)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Year-2							Year-3															
	Serviceable		Under Repair		Unserviceable						Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacement	Total Cost	Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacement	Total Cost	
	No.	%	No.	%	No.	%					No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total			No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total			
Flat bed	50	26.0	37	19.3	105	54.7	192	97	47	0	0	3.57	0.00	47	0.43	20.23	0	0.87	0.00	10.76	30.99	0	3.75	0.00	47	0.45	21.25	0	0.92	0.00	10.76	32.00	
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	113	5	2	3.89	5.86	80	0.47	37.57	15	0.95	14.18	27.76	85.36	2	4.08	6.15	96	0.50	47.64	15	0.99	14.88	27.76	96.43	
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	198	0	0	2.00	0.00	158	0.26	41.44	20	0.47	9.40	25.04	75.88	0	2.09	0.00	178	0.28	49.00	20	0.50	9.86	25.04	83.90	
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	68	68	23	2.42	55.14	23	0.29	6.71	0	0.58	0.00	10.50	72.35	23	2.54	57.89	46	0.31	14.10	0	0.61	0.00	10.50	82.49	
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	190	0	0	2.00	0.00	173	0.26	45.31	9	0.47	4.07	24.04	73.42	0	2.09	0.00	181	0.28	49.95	9	0.50	4.27	24.04	78.26	
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	22	0	0	24.15	0.00	14	3.20	44.85	4	5.78	23.13	33.76	101.74	0	25.36	0.00	18	3.36	60.56	4	6.06	24.29	33.76	118.61	
Motor grader	67	19.1	70	20.0	213	60.9	350	248	121	0	0	19.95	0.00	85	2.68	227.88	18	4.73	85.57	153.69	467.14	0	20.95	0.00	103	2.81	290.19	18	4.96	89.85	153.69	533.73	
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	68	32	11	1.16	12.51	33	0.16	5.17	7	0.28	1.98	5.02	24.69	11	1.21	13.14	51	0.17	8.38	7	0.30	2.08	5.02	28.62	
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	34	5	2	8.40	14.69	19	1.21	22.64	6	2.10	12.60	18.26	68.19	2	8.82	15.42	26	1.27	33.60	6	2.21	13.23	18.26	80.52	
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	13	3	1	6.30	5.71	6	0.84	5.24	2	1.68	3.92	5.09	19.96	1	6.62	6.00	9	0.88	8.36	2	1.76	4.12	5.09	23.56	
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	13	3	1	6.83	6.19	8	0.89	7.35	1	1.79	2.38	5.51	21.43	1	7.17	6.50	10	0.94	9.82	1	1.87	2.50	5.51	24.33	
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	4	0	0	30.45	0.00	3	4.04	13.36	0	7.56	2.30	7.57	23.23	0	31.97	0.00	4	4.24	15.32	0	7.94	2.42	7.57	25.30	
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	2	2	1	19.95	13.01	1	2.68	1.75	0	4.83	0.00	2.48	17.24	1	20.95	13.66	1	2.81	3.67	0	5.07	0.00	2.48	19.81	
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	3	0	0	4.73	0.67	2	0.61	1.51	0	1.16	0.39	1.03	3.59	0	4.96	0.70	3	0.64	1.89	0	1.21	0.40	1.03	4.02	
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	34	15	5	0.32	1.60	23	0.04	0.98	0	0.08	0.03	0.68	3.30	5	0.33	1.68	29	0.04	1.27	0	0.09	0.03	0.68	3.67	
Generator	1	33.3	1	33.3	1	33.3	3	70	34	32	11	0.53	5.64	12	0.07	0.89	0	0.14	0.05	1.14	7.72	11	0.55	5.93	23	0.08	1.79	0	0.14	0.05	1.14	8.90	
Compressor	0	0.0	3	33.3	6	66.7	9	18	9	6	2	3.15	6.10	3	0.47	1.39	1	0.87	0.87	1.76	10.12	2	3.31	6.40	6	0.50	2.91	1	0.92	0.92	1.76	11.99	
Water tanker	2	8.0	4	16.0	19	76.0	25	70	34	28	9	3.68	34.60	13	0.53	6.69	1	0.95	1.26	7.99	50.55	9	3.86	36.33	23	0.55	12.95	1	0.99	1.32	7.99	58.60	
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	34	17	6	0.32	1.81	19	0.04	0.79	2	0.08	0.17	0.68	3.45	6	0.33	1.90	26	0.04	1.17	2	0.09	0.18	0.68	3.93	
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	13	13	4	0.26	1.16	4	0.03	0.14	0	0.06	0.00	0.22	1.51	4	0.28	1.21	9	0.03	0.29	0	0.07	0.00	0.22	1.73	
Water trailer	37	29.6	33	26.4	55	44.0	125	70	34	0	0	0.26	0.00	34	0.03	1.07	0	0.06	0.00	0.57	1.64	0	0.28	0.00	34	0.03	1.12	0	0.07	0.00	0.57	1.70	
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	4	0	0	9.45	0.00	3	1.31	4.55	0	2.31	1.08	2.64	8.27	0	9.92	0.00	4	1.38	5.42	0	2.43	1.13	2.64	9.20	
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	211	0	0	0.26	0.00	194	0.03	6.12	8	0.06	0.52	3.51	10.16	0	0.28	0.00	203	0.03	6.70	8	0.07	0.55	3.51	10.76	
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	34	0	0	16.80	0.00	22	2.29	50.55	6	4.20	25.55	36.53	112.62	0	17.64	0.00	28	2.40	67.69	6	4.41	26.82	36.53	131.04	
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	4	4	1	16.80	24.66	1	2.29	3.36	0	4.20	0.00	4.70	32.71	1	17.64	25.89	3	2.40	7.06	0	4.41	0.00	4.70	37.64	
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	34	12	4	3.68	15.00	19	0.53	10.19	3	0.95	3.15	7.99	36.34	4	3.86	15.75	27	0.55	14.79	3	0.99	3.31	7.99	41.84	
Towed roller	6	33.3	4	22.2	8	44.4	18	70	34	24	8	2.63	21.22	15	0.32	4.86	1	0.61	0.81	5.71	32.59	8	2.76	22.28	25	0.33	8.21	1	0.64	0.85	5.71	37.05	
Water pump	6	26.1	6	26.1	11	47.8	23	70	34	22	7	0.21	1.56	15	0.03	0.49	2	0.05	0.11	0.46	2.60	7	0.22	1.64	25	0.03	0.82	2	0.06	0.11	0.46	3.02	
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	1	1	0	14.70	7.19	0	2.01	0.98	0	3.68	0.00	1.37	9.54	0	15.44	7.55	1	2.11	2.06	0	3.86	0.00	1.37	10.98	
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	34	1	0	4.20	1.75	27	0.60	16.01	3	1.10	3.68	9.13	30.56	0	4.41	1.83	30	0.63	19.17	3	1.16	3.86	9.13	33.99	
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	9	0	0	2.10	0.00	9	0.26	2.36	0	0.47	0.00	1.17	3.54	0	2.21	0.00	9	0.28	2.48	0	0.50	0.00	1.17	3.65	
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	9	2	1	2.63	1.58	5	0.33	1.61	1	0.61	0.81	1.47	5.47	1	2.76	1.66	7	0.34	2.35	1	0.64	0.85	1.47	6.33	
Total	865	26.0	687	20.7	1773	53.3	3325	3066	1500	298	99		237.64	1072		594.04	114		197.99	418.24	1447.90		99		249.52	1286		771.97	114		207.88	418.24	1647.61

(Cont'd)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Grand Total					
	Serviceable		Under Repair		Unserviceable						Cost of Purchase	Cost of Maintenance	Cost of Rehabilitation	Provision for Replacement	Total Cost	Total Cost-Salvage Value
	No.	%	No.	%	No.	%										
Flat bed	50	26.0	37	19.3	105	54.7	192	97	47	0	0.00	60.75	0.00	32.27	93.02	72.84
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	113	5	17.59	113.55	42.56	83.27	256.97	247.97
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	198	0	0.00	124.94	28.21	75.11	228.26	213.43
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	68	68	165.54	20.81	0.00	31.51	217.86	217.86
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	190	0	0.00	136.26	12.21	72.13	220.60	194.57
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	22	0	0.00	135.91	69.45	101.27	306.63	262.26
Motor grader	67	19.1	70	20.0	213	60.9	350	248	121	0	0.00	688.92	256.92	461.06	1406.90	1309.55
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	68	32	37.56	15.80	5.96	15.07	74.39	73.28
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	34	5	44.11	68.89	37.83	54.79	205.62	198.26
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	13	3	17.15	16.00	11.77	15.26	60.19	57.47
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	13	3	18.58	22.28	7.15	16.54	64.54	63.10
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	4	0	0.00	40.23	6.91	22.70	69.84	62.79
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	2	2	39.07	5.41	0.00	7.44	51.92	51.92
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	3	0	2.01	4.55	1.16	3.08	10.80	10.67
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	34	15	4.81	2.97	0.08	2.05	9.92	9.61
Generator	1	33.3	1	33.3	1	33.3	3	70	34	32	16.94	2.75	0.14	3.42	23.25	23.24
Compressor	0	0.0	3	33.3	6	66.7	9	18	9	6	18.30	4.30	2.62	5.28	30.50	29.96
Water tanker	2	8.0	4	16.0	19	76.0	25	70	34	28	103.89	20.65	3.78	23.97	152.29	150.39
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	34	17	5.44	2.40	0.50	2.05	10.39	10.27
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	13	13	3.47	0.43	0.00	0.66	4.56	4.56
Water trailer	37	29.6	33	26.4	55	44.0	125	70	34	0	0.00	3.22	0.00	1.71	4.93	3.66
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	4	0	0.00	13.72	3.24	7.93	24.89	21.29
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	211	0	0.00	18.40	1.57	10.54	30.51	23.81
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	34	0	0.00	153.12	76.70	109.59	339.40	316.36
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	4	4	74.03	10.41	0.00	14.09	98.54	98.54
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	34	12	45.04	30.98	9.46	23.97	109.46	107.76
Towed roller	6	33.3	4	22.2	8	44.4	18	70	34	24	63.70	14.87	2.44	17.12	98.13	97.65
Water pump	6	26.1	6	26.1	11	47.8	23	70	34	22	4.68	1.49	0.32	1.37	7.85	7.74
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	1	1	21.59	3.04	0.00	4.11	28.74	28.74
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	34	1	5.24	48.28	11.03	27.40	91.96	90.64
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	9	0	0.00	7.09	0.00	3.52	10.62	9.66
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	9	2	4.75	4.88	2.44	4.40	16.47	15.99
Total	865	26.0	687	20.7	1773	53.3	3325	3066	1500	298	713.48	1797.32	594.43	1254.71	4359.93	4085.81



APPENDIX 7.7.3 BREAKDOWN OF COST ESTIMATED EXPENSES FOR 1000 PIECES OF EQUIPMENT

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Estimation for Salvage Value										Year-1									Provision for Replacement	Total Cost
	Serviceable		Under Repair		Unserviceable						SV			UR			US			Total Value	Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation				
	No.	%	No.	%	No.	%					No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total		No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total		
Flat bed	50	26.0	37	19.3	105	54.7	192	97	32	0	18	0.51	9.36	37	0.26	9.44	105	0.09	9.45	28.25	0	3.40	0.00	32	0.41	13.12	0	0.83	0.00	7.17	20.29
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	75	0	0	0.56	0.00	33	0.28	9.16	90	0.10	9.00	18.16	0	3.70	0.00	63	0.45	28.35	4	0.90	3.60	18.50	50.46
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	132	0	6	0.29	1.78	96	0.14	13.68	194	0.05	9.70	25.16	0	1.90	0.00	132	0.25	33.00	0	0.45	0.00	16.69	49.69
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	46	46	0	0.35	0.00	0	0.17	0.00	0	0.06	0.00	0.00	15	2.30	35.01	0	0.28	0.00	0	0.55	0.00	7.00	42.01
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	127	0	37	0.29	10.67	68	0.14	9.69	401	0.05	20.05	40.41	0	1.90	0.00	127	0.25	31.75	0	0.45	0.00	16.03	47.78
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	15	0	0	3.45	0.00	24	1.73	41.40	43	0.35	15.05	56.45	0	23.00	0.00	10	3.05	30.50	2	5.50	9.17	22.50	62.17
Motor grader	67	19.1	70	20.0	213	60.9	350	248	81	0	0	2.85	0.00	56	1.43	79.80	213	0.35	74.55	154.35	0	19.00	0.00	67	2.55	170.85	5	4.50	21.00	102.46	294.31
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	46	10	0	0.17	0.00	0	0.08	0.00	37	0.03	1.11	1.11	3	1.10	3.54	15	0.15	2.25	7	0.27	1.89	3.35	11.03
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	23	0	0	1.20	0.00	6	0.60	3.60	32	0.23	7.36	10.96	0	8.00	0.00	11	1.15	12.65	4	2.00	8.00	12.18	32.83
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	8	0	0	0.90	0.00	2	0.45	0.90	17	0.16	2.72	3.62	0	6.00	0.00	3	0.80	2.40	2	1.60	2.92	3.39	8.71
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	8	0	0	0.98	0.00	2	0.49	0.98	8	0.18	1.44	2.42	0	6.50	0.00	6	0.85	5.10	1	1.70	1.41	3.67	10.18
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	3	0	0	4.35	1.70	3	2.18	6.53	9	0.30	2.70	10.92	0	29.00	0.00	3	3.85	11.55	0	7.20	0.00	5.04	16.59
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	1	1	0	2.85	0.00	0	1.43	0.00	0	0.30	0.00	0.00	0	19.00	8.26	0	2.55	0.00	0	4.60	0.00	1.65	9.92
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	2	0	0	0.68	0.00	1	0.34	0.34	1	0.13	0.13	0.47	0	4.50	0.00	2	0.58	1.16	0	1.10	0.10	0.68	1.95
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	23	4	0	0.05	0.00	0	0.02	0.00	31	0.01	0.31	0.31	1	0.30	0.38	18	0.04	0.72	0	0.08	0.03	0.46	1.59
Generator	1	33.3	1	33.3	1	33.3	3	70	23	21	0	0.08	0.00	0	0.04	0.00	1	0.01	0.01	0.01	7	0.50	3.47	1	0.07	0.07	0	0.13	0.04	0.76	4.35
Compressor	0	0.0	3	33.3	6	66.7	9	18	6	3	0	0.45	0.00	0	0.23	0.00	6	0.09	0.54	0.54	1	3.00	2.87	0	0.45	0.00	1	0.83	0.83	1.17	4.88
Water tanker	2	8.0	4	16.0	19	76.0	25	70	23	17	0	0.53	0.00	0	0.26	0.00	19	0.10	1.90	1.90	6	3.50	19.64	2	0.50	1.00	1	0.90	1.20	5.33	27.16
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	23	6	0	0.05	0.00	0	0.02	0.00	12	0.01	0.12	0.12	2	0.30	0.58	11	0.04	0.44	2	0.08	0.16	0.46	1.64
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	9	9	0	0.04	0.00	0	0.02	0.00	0	0.01	0.00	0.00	3	0.25	0.73	0	0.03	0.00	0	0.06	0.00	0.15	0.88
Water trailer	37	29.6	33	26.4	55	44.0	125	70	23	0	14	0.04	0.53	33	0.02	0.62	55	0.01	0.55	1.70	0	0.25	0.00	23	0.03	0.69	0	0.06	0.00	0.38	1.07
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	3	0	0	1.35	0.09	3	0.68	2.03	9	0.25	2.25	4.36	0	9.00	0.00	3	1.25	3.75	0	2.20	0.00	1.76	5.51
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	141	0	45	0.04	1.70	178	0.02	3.34	383	0.01	3.83	8.87	0	0.25	0.00	141	0.03	4.23	0	0.06	0.00	2.34	6.57
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	23	0	0	2.40	0.00	13	1.20	15.60	48	0.43	20.64	36.24	0	16.00	0.00	16	2.18	34.88	2	4.00	9.11	24.35	68.34
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	3	3	0	2.40	0.00	0	1.20	0.00	0	0.43	0.00	0.00	1	16.00	15.66	0	2.18	0.00	0	4.00	0.00	3.13	18.79
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	23	1	0	0.53	0.00	0	0.26	0.00	17	0.10	1.70	1.70	0	3.50	0.97	12	0.50	6.00	3	0.90	3.00	5.33	15.30
Towed roller	6	33.3	4	22.2	8	44.4	18	70	23	13	0	0.38	0.00	0	0.19	0.00	8	0.06	0.48	0.48	4	2.50	10.69	6	0.30	1.80	1	0.58	0.77	3.81	17.07
Water pump	6	26.1	6	26.1	11	47.8	23	70	23	11	0	0.03	0.00	0	0.02	0.00	11	0.01	0.11	0.11	4	0.20	0.72	6	0.03	0.18	2	0.05	0.10	0.30	1.31
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	1	1	0	2.10	0.00	0	1.05	0.00	0	0.38	0.00	0.00	0	14.00	4.57	0	1.91	0.00	0	3.50	0.00	0.91	5.48
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	23	0	0	0.60	0.10	10	0.30	3.00	12	0.11	1.32	4.42	0	4.00	0.00	23	0.57	13.11	0	1.05	0.00	6.09	19.20
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	6	0	3	0.30	0.94	5	0.15	0.75	3	0.05	0.15	1.84	0	2.00	0.00	6	0.25	1.50	0	0.45	0.00	0.78	2.28
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	6	0	0	0.38	0.00	1	0.19	0.19	8	0.06	0.48	0.67	0	2.50	0.00	3	0.31	0.93	1	0.58	0.56	0.98	2.46
Total	865	26.0	687	20.7	1773	53.3	3325	3066	1000	144	125		26.88	571		201.02	1773		187.65	415.55	48		107.10	742		411.98	39		63.89	278.82	861.79

(Cont'd)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Year-2										Year-3											
	Serviceable		Under Repair		Unserviceable						Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacement	Total Cost	Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacement	Total Cost
	No.	%	No.	%	No.	%					No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total			No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total		
Flat bed	50	26.0	37	19.3	105	54.7	192	97	32	0	0	3.57	0.00	32	0.43	13.78	0	0.87	0.00	7.17	20.95	0	3.75	0.00	32	0.45	14.46	0	0.92	0.00	7.17	21.64
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	75	0	0	3.89	0.00	67	0.47	31.66	4	0.95	3.79	18.50	53.95	0	4.08	0.00	71	0.50	35.23	4	0.99	3.97	18.50	57.71
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	132	0	0	2.00	0.00	132	0.26	34.65	0	0.47	0.00	16.69	51.34	0	2.09	0.00	132	0.28	36.38	0	0.50	0.00	16.69	53.07
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	46	46	15	2.42	36.76	15	0.29	4.47	0	0.58	0.00	7.00	48.23	15	2.54	38.60	30	0.31	9.40	0	0.61	0.00	7.00	54.99
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	127	0	0	2.00	0.00	127	0.26	33.34	0	0.47	0.00	16.03	49.37	0	2.09	0.00	127	0.28	35.00	0	0.50	0.00	16.03	51.03
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	15	0	0	24.15	0.00	12	3.20	37.36	2	5.78	9.63	22.50	69.49	0	25.36	0.00	13	3.36	44.84	2	6.06	10.11	22.50	77.45
Motor grader	67	19.1	70	20.0	213	60.9	350	248	81	0	0	19.95	0.00	72	2.68	191.89	5	4.73	22.05	102.46	316.39	0	20.95	0.00	76	2.81	214.60	5	4.96	23.15	102.46	340.21
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	46	10	3	1.16	3.72	25	0.16	3.97	7	0.28	1.98	3.35	13.03	3	1.21	3.91	35	0.17	5.86	7	0.30	2.08	3.35	15.20
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	23	0	0	8.40	0.00	15	1.21	18.11	4	2.10	8.40	12.18	38.69	0	8.82	0.00	19	1.27	24.09	4	2.21	8.82	12.18	45.09
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	8	0	0	6.30	0.00	5	0.84	4.05	2	1.68	3.07	3.39	10.52	0	6.62	0.00	7	0.88	5.87	2	1.76	3.22	3.39	12.48
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	8	0	0	6.83	0.00	7	0.89	6.09	1	1.79	1.48	3.67	11.24	0	7.17	0.00	8	0.94	7.17	1	1.87	1.55	3.67	12.40
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	3	0	0	30.45	0.00	3	4.04	12.13	0	7.56	0.00	5.04	17.17	0	31.97	0.00	3	4.24	12.73	0	7.94	0.00	5.04	17.78
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	1	1	0	19.95	8.68	0	2.68	1.16	0	4.83	0.00	1.65	11.49	0	20.95	9.11	1	2.81	2.45	0	5.07	0.00	1.65	13.21
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	2	0	0	4.73	0.00	2	0.61	1.28	0	1.16	0.11	0.68	2.07	0	4.96	0.00	2	0.64	1.40	0	1.21	0.11	0.68	2.20
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	23	4	1	0.32	0.40	20	0.04	0.82	0	0.08	0.03	0.46	1.71	1	0.33	0.42	21	0.04	0.94	0	0.09	0.03	0.46	1.84
Generator	1	33.3	1	33.3	1	33.3	3	70	23	21	7	0.53	3.65	8	0.07	0.61	0	0.14	0.05	0.76	5.06	7	0.55	3.83	16	0.08	1.20	0	0.14	0.05	0.76	5.84
Compressor	0	0.0	3	33.3	6	66.7	9	18	6	3	1	3.15	3.01	2	0.47	0.92	1	0.87	0.87	1.17	5.98	1	3.31	3.17	4	0.50	1.94	1	0.92	0.92	1.17	7.20
Water tanker	2	8.0	4	16.0	19	76.0	25	70	23	17	6	3.68	20.62	9	0.53	4.70	1	0.95	1.26	5.33	31.90	6	3.86	21.65	16	0.55	8.76	1	0.99	1.32	5.33	37.06
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	23	6	2	0.32	0.61	15	0.04	0.63	2	0.08	0.17	0.46	1.86	2	0.33	0.64	19	0.04	0.83	2	0.09	0.18	0.46	2.11
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	9	9	3	0.26	0.77	3	0.03	0.09	0	0.06	0.00	0.15	1.01	3	0.28	0.81	6	0.03	0.19	0	0.07	0.00	0.15	1.15
Water trailer	37	29.6	33	26.4	55	44.0	125	70	23	0	0	0.26	0.00	23	0.03	0.72	0	0.06	0.00	0.38	1.11	0	0.28	0.00	23	0.03	0.76	0	0.07	0.00	0.38	1.14
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	3	0	0	9.45	0.00	3	1.31	3.94	0	2.31	0.00	1.76	5.70	0	9.92	0.00	3	1.38	4.13	0	2.43	0.00	1.76	5.90
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	141	0	0	0.26	0.00	141	0.03	4.44	0	0.06	0.00	2.34	6.78	0	0.28	0.00	141	0.03	4.66	0	0.07	0.00	2.34	7.01
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	23	0	0	16.80	0.00	18	2.29	41.84	2	4.20	9.56	24.35	75.75	0	17.64	0.00	21	2.40	49.40	2	4.41	10.04	24.35	83.80
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	3	3	1	16.80	16.44	1	2.29	2.24	0	4.20	0.00	3.13	21.81	1	17.64	17.26	2	2.40	4.70	0	4.41	0.00	3.13	25.09
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	23	1	0	3.68	1.02	16	0.53	8.20	3	0.95	3.15	5.33	17.69	0	3.86	1.07	19	0.55	10.60	3	0.99	3.31	5.33	20.30
Towed roller	6	33.3	4	22.2	8	44.4	18	70	23	13	4	2.63	11.23	12	0.32	3.66	1	0.61	0.81	3.81	19.50	4	2.76	11.79	17	0.33	5.70	1	0.64	0.85	3.81	22.14
Water pump	6	26.1	6	26.1	11	47.8	23	70	23	11	4	0.21	0.76	12	0.03	0.37	2	0.05	0.11	0.30	1.53	4	0.22	0.80	17	0.03	0.57	2	0.06	0.11	0.30	1.78
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	1	1	0	14.70	4.79	0	2.01	0.65	0	3.68	0.00	0.91	6.36	0	15.44	5.03	1	2.11	1.37	0	3.86	0.00	0.91	7.32
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	23	0	0	4.20	0.00	23	0.60	13.77	0	1.10	0.00	6.09	19.85	0	4.41	0.00	23	0.63	14.45	0	1.16	0.00	6.09	20.54
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	6	0	0	2.10	0.00	6	0.26	1.58	0	0.47	0.00	0.78	2.36	0	2.21	0.00	6	0.28	1.65	0	0.50	0.00	0.78	2.44
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	6	0	0	2.63	0.00	4	0.33	1.29	1	0.61	0.58	0.98	2.85	0	2.76	0.00	5	0.34	1.68	1	0.64	0.61	0.98	3.27
Total	865	26.0	687	20.7	1773	53.3	3325	3066	1000	144	48		112.45	829		484.40	39		67.08	278.82	942.76	48		118.08	916		563.03	39		70.44	278.82	1030.37

(Cont'd)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Grand Total					
	Serviceable		Under Repair		Unserviceable						Cost of Purchase	Cost of Maintenance	Cost of Rehabilitation	Provision for Replacement	Total Cost	Total Cost-Salvage Value
	No.	%	No.	%	No.	%										
Flat bed	50	26.0	37	19.3	105	54.7	192	97	32	0	0.00	41.36	0.00	21.51	62.87	0.00
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	75	0	0.00	95.24	11.36	55.51	162.12	143.96
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	132	0	0.00	104.03	0.00	50.07	154.10	128.95
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	46	46	110.36	13.87	0.00	21.00	145.24	145.24
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	127	0	0.00	100.09	0.00	48.09	148.18	107.77
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	15	0	0.00	112.70	28.90	67.51	209.11	152.66
Motor grader	67	19.1	70	20.0	213	60.9	350	248	81	0	0.00	577.34	66.20	307.37	950.91	796.56
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	46	10	11.17	12.08	5.96	10.05	39.26	38.15
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	23	0	0.00	54.85	25.22	36.53	116.60	105.64
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	8	0	0.00	12.32	9.21	10.18	31.71	28.09
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	8	0	0.00	18.37	4.43	11.02	33.82	31.40
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	3	0	0.00	36.41	0.00	15.13	51.55	40.62
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	1	1	26.05	3.61	0.00	4.96	34.62	34.62
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	2	0	0.00	3.84	0.33	2.05	6.22	5.75
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	23	4	1.21	2.48	0.08	1.37	5.14	4.83
Generator	1	33.3	1	33.3	1	33.3	3	70	23	21	10.94	1.88	0.14	2.28	15.24	15.23
Compressor	0	0.0	3	33.3	6	66.7	9	18	6	3	9.05	2.87	2.62	3.52	18.06	17.52
Water tanker	2	8.0	4	16.0	19	76.0	25	70	23	17	61.90	14.45	3.78	15.98	96.12	94.22
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	23	6	1.84	1.90	0.50	1.37	5.61	5.49
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	9	9	2.31	0.29	0.00	0.44	3.04	3.04
Water trailer	37	29.6	33	26.4	55	44.0	125	70	23	0	0.00	2.18	0.00	1.14	3.32	0.00
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	3	0	0.00	11.82	0.00	5.28	17.11	12.74
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	141	0	0.00	13.34	0.00	7.03	20.36	11.49
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	23	0	0.00	126.12	28.71	73.06	227.89	191.65
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	3	3	49.35	6.94	0.00	9.39	65.69	65.69
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	23	1	3.06	24.79	9.46	15.98	53.29	51.59
Towed roller	6	33.3	4	22.2	8	44.4	18	70	23	13	33.71	11.15	2.44	11.42	58.71	58.23
Water pump	6	26.1	6	26.1	11	47.8	23	70	23	11	2.28	1.12	0.32	0.91	4.62	4.51
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	1	1	14.39	2.03	0.00	2.74	19.16	19.16
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	23	0	0.00	41.33	0.00	18.26	59.59	55.17
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	6	0	0.00	4.73	0.00	2.35	7.08	5.24
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	6	0	0.00	3.90	1.75	2.94	8.58	7.92
Total	865	26.0	687	20.7	1773	53.3	3325	3066	1000	144	337.63	1459.41	201.41	836.47	2834.92	2383.14

APPENDIX 7.7.4 BREAKDOWN OF COST ESTIMATED EXPENSES FOR 500 PIECES OF EQUIPMENT

(unit: Ksh. million)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Estimation for Salvage Value									Year-1											
	Serviceable		Under Repair		Unserviceable						SV			UR			US			Total Value	Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacement	Total Cost
	No.	%	No.	%	No.	%					No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total		No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total		
	No.	%	No.	%	No.	%					No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total
Flat bed	50	26.0	37	19.3	105	54.7	192	97	16	0	34	0.51	17.43	37	0.26	9.44	105	0.09	9.45	36.32	0	3.40	0.00	16	0.41	6.56	0	0.83	0.00	3.59	10.15
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	38	0	25	0.56	14.15	45	0.28	12.49	90	0.10	9.00	35.64	0	3.70	0.00	38	0.45	17.10	0	0.90	0.00	9.25	26.35
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	66	0	72	0.29	20.55	96	0.14	13.68	194	0.05	9.70	43.93	0	1.90	0.00	66	0.25	16.50	0	0.45	0.00	8.35	24.85
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	23	23	0	0.35	0.00	0	0.17	0.00	0	0.06	0.00	0.00	8	2.30	17.50	0	0.28	0.00	0	0.55	0.00	3.50	21.00
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	63	0	101	0.29	28.71	68	0.14	9.69	401	0.05	20.05	58.45	0	1.90	0.00	63	0.25	15.75	0	0.45	0.00	8.01	23.76
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	7	0	3	3.45	9.18	29	1.73	50.03	43	0.35	15.05	74.26	0	23.00	0.00	7	3.05	21.35	0	5.50	1.83	11.25	34.44
Motor grader	67	19.1	70	20.0	213	60.9	350	248	40	0	27	2.85	75.69	70	1.43	99.75	213	0.35	74.55	249.99	0	19.00	0.00	40	2.55	102.00	0	4.50	0.00	51.23	153.23
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	23	0	0	0.17	0.00	13	0.08	1.07	37	0.03	1.11	2.18	0	1.10	0.00	15	0.15	2.25	3	0.27	0.72	1.67	4.64
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	11	0	0	1.20	0.00	18	0.60	10.80	32	0.23	7.36	18.16	0	8.00	0.00	11	1.15	12.65	0	2.00	0.00	6.09	18.74
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	4	0	0	0.90	0.00	6	0.45	2.70	17	0.16	2.72	5.42	0	6.00	0.00	3	0.80	2.40	0	1.60	0.53	1.70	4.63
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	4	0	2	0.98	1.72	4	0.49	1.95	8	0.18	1.44	5.11	0	6.50	0.00	4	0.85	3.40	0	1.70	0.00	1.84	5.24
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	1	0	2	4.35	7.37	3	2.18	6.53	9	0.30	2.70	16.60	0	29.00	0.00	1	3.85	3.85	0	7.20	0.00	2.52	6.37
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	1	1	0	2.85	0.00	0	1.43	0.00	0	0.30	0.00	0.00	0	19.00	4.13	0	2.55	0.00	0	4.60	0.00	0.83	4.96
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	1	0	1	0.68	0.58	1	0.34	0.34	1	0.13	0.13	1.05	0	4.50	0.00	1	0.58	0.58	0	1.10	0.00	0.34	0.92
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	11	0	7	0.05	0.30	1	0.02	0.02	31	0.01	0.31	0.63	0	0.30	0.00	11	0.04	0.44	0	0.08	0.00	0.23	0.67
Generator	1	33.3	1	33.3	1	33.3	3	70	11	9	0	0.08	0.00	0	0.04	0.00	1	0.01	0.01	0.01	3	0.50	1.57	1	0.07	0.07	0	0.13	0.04	0.38	2.06
Compressor	0	0.0	3	33.3	6	66.7	9	18	3	0	0	0.45	0.00	0	0.23	0.00	6	0.09	0.54	0.54	0	3.00	0.00	0	0.45	0.00	1	0.83	0.81	0.59	1.40
Water tanker	2	8.0	4	16.0	19	76.0	25	70	11	5	0	0.53	0.00	0	0.26	0.00	19	0.10	1.90	1.90	2	3.50	6.32	2	0.50	1.00	1	0.90	1.20	2.66	11.18
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	11	0	0	0.05	0.00	6	0.02	0.14	12	0.01	0.12	0.26	0	0.30	0.00	11	0.04	0.44	0	0.08	0.01	0.23	0.68
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	4	4	0	0.04	0.00	0	0.02	0.00	0	0.01	0.00	0.00	1	0.25	0.37	0	0.03	0.00	0	0.06	0.00	0.07	0.44
Water trailer	37	29.6	33	26.4	55	44.0	125	70	11	0	26	0.04	0.96	33	0.02	0.62	55	0.01	0.55	2.13	0	0.25	0.00	11	0.03	0.33	0	0.06	0.00	0.19	0.52
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	1	0	2	1.35	2.07	3	0.68	2.03	9	0.25	2.25	6.34	0	9.00	0.00	1	1.25	1.25	0	2.20	0.00	0.88	2.13
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	70	0	116	0.04	4.34	178	0.02	3.34	383	0.01	3.83	11.51	0	0.25	0.00	70	0.03	2.10	0	0.06	0.00	1.17	3.27
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	11	0	5	2.40	11.00	20	1.20	24.00	48	0.43	20.64	55.64	0	16.00	0.00	11	2.18	23.98	0	4.00	0.00	12.18	36.16
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	1	1	0	2.40	0.00	0	1.20	0.00	0	0.43	0.00	0.00	0	16.00	7.83	0	2.18	0.00	0	4.00	0.00	1.57	9.39
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	11	0	1	0.53	0.31	10	0.26	2.63	17	0.10	1.70	4.63	0	3.50	0.00	11	0.50	5.50	0	0.90	0.00	2.66	8.16
Towed roller	6	33.3	4	22.2	8	44.4	18	70	11	1	0	0.38	0.00	0	0.19	0.00	8	0.06	0.48	0.48	0	2.50	1.18	6	0.30	1.80	1	0.58	0.77	1.90	5.66
Water pump	6	26.1	6	26.1	11	47.8	23	70	11	0	0	0.03	0.00	1	0.02	0.02	11	0.01	0.11	0.13	0	0.20	0.00	6	0.03	0.18	2	0.05	0.09	0.15	0.42
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	0	0	0	2.10	0.00	0	1.05	0.00	0	0.38	0.00	0.00	0	14.00	2.28	0	1.91	0.00	0	3.50	0.00	0.46	2.74
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	11	0	12	0.60	6.95	10	0.30	3.00	12	0.11	1.32	11.27	0	4.00	0.00	11	0.57	6.27	0	1.05	0.00	3.04	9.31
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	3	0	6	0.30	1.82	5	0.15	0.75	3	0.05	0.15	2.72	0	2.00	0.00	3	0.25	0.75	0	0.45	0.00	0.39	1.14
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	3	0	0	0.38	0.02	4	0.19	0.75	8	0.06	0.48	1.25	0	2.50	0.00	3	0.31	0.93	0	0.58	0.00	0.49	1.42
Total	865	26.0	687	20.7	1773	53.3	3325	3066	500	46	438		203.15	661		255.73	1773		187.65	646.53	15		41.18	423		249.43	9		6.02	139.41	436.04

(Cont'd)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Year-2										Year-3											
	Serviceable		Under Repair		Unserviceable						Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacement	Total Cost	Cost of Purchase			Cost of Maintenance			Cost of Rehabilitation			Provision for Replacement	Total Cost
	No.	%	No.	%	No.	%					No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total			No.	Unit Cost	Total	No.	Unit Cost	Total	No.	Unit Cost	Total		
Flat bed	50	26.0	37	19.3	105	54.7	192	97	16	0	0	3.57	0.00	16	0.43	6.89	0	0.87	0.00	3.59	10.47	0	3.75	0.00	16	0.45	7.23	0	0.92	0.00	3.59	10.82
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	38	0	0	3.89	0.00	38	0.47	17.96	0	0.95	0.00	9.25	27.21	0	4.08	0.00	38	0.50	18.85	0	0.99	0.00	9.25	28.10
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	66	0	0	2.00	0.00	66	0.26	17.33	0	0.47	0.00	8.35	25.67	0	2.09	0.00	66	0.28	18.19	0	0.50	0.00	8.35	26.54
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	23	23	8	2.42	18.38	8	0.29	2.24	0	0.58	0.00	3.50	24.12	8	2.54	19.30	15	0.31	4.70	0	0.61	0.00	3.50	27.50
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	63	0	0	2.00	0.00	63	0.26	16.54	0	0.47	0.00	8.01	24.55	0	2.09	0.00	63	0.28	17.36	0	0.50	0.00	8.01	25.38
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	7	0	0	24.15	0.00	7	3.20	23.49	0	5.78	1.93	11.25	36.66	0	25.36	0.00	8	3.36	25.78	0	6.06	2.02	11.25	39.05
Motor grader	67	19.1	70	20.0	213	60.9	350	248	40	0	0	19.95	0.00	40	2.68	107.10	0	4.73	0.00	51.23	158.33	0	20.95	0.00	40	2.81	112.46	0	4.96	0.00	51.23	163.68
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	23	0	0	1.16	0.00	18	0.16	2.78	3	0.28	0.76	1.67	5.21	0	1.21	0.00	20	0.17	3.36	3	0.30	0.79	1.67	5.83
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	11	0	0	8.40	0.00	11	1.21	13.28	0	2.10	0.00	6.09	19.37	0	8.82	0.00	11	1.27	13.95	0	2.21	0.00	6.09	20.03
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	4	0	0	6.30	0.00	3	0.84	2.80	0	1.68	0.56	1.70	5.06	0	6.62	0.00	4	0.88	3.23	0	1.76	0.59	1.70	5.52
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	4	0	0	6.83	0.00	4	0.89	3.57	0	1.79	0.00	1.84	5.41	0	7.17	0.00	4	0.94	3.75	0	1.87	0.00	1.84	5.59
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	1	0	0	30.45	0.00	1	4.04	4.04	0	7.56	0.00	2.52	6.56	0	31.97	0.00	1	4.24	4.24	0	7.94	0.00	2.52	6.77
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	1	1	0	19.95	4.34	0	2.68	0.58	0	4.83	0.00	0.83	5.75	0	20.95	4.55	0	2.81	1.22	0	5.07	0.00	0.83	6.60
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	1	0	0	4.73	0.00	1	0.61	0.61	0	1.16	0.00	0.34	0.95	0	4.96	0.00	1	0.64	0.64	0	1.21	0.00	0.34	0.98
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	11	0	0	0.32	0.00	11	0.04	0.46	0	0.08	0.00	0.23	0.69	0	0.33	0.00	11	0.04	0.49	0	0.09	0.00	0.23	0.71
Generator	1	33.3	1	33.3	1	33.3	3	70	11	9	3	0.53	1.65	4	0.07	0.33	0	0.14	0.05	0.38	2.40	3	0.55	1.73	8	0.08	0.61	0	0.14	0.05	0.38	2.77
Compressor	0	0.0	3	33.3	6	66.7	9	18	3	0	0	3.15	0.00	1	0.47	0.46	1	0.87	0.85	0.59	1.90	0	3.31	0.00	2	0.50	0.97	1	0.92	0.90	0.59	2.45
Water tanker	2	8.0	4	16.0	19	76.0	25	70	11	5	2	3.68	6.63	5	0.53	2.70	1	0.95	1.26	2.66	13.26	2	3.86	6.97	8	0.55	4.56	1	0.99	1.32	2.66	15.52
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	11	0	0	0.32	0.00	11	0.04	0.47	0	0.08	0.01	0.23	0.71	0	0.33	0.00	11	0.04	0.50	0	0.09	0.01	0.23	0.74
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	4	4	1	0.26	0.39	1	0.03	0.05	0	0.06	0.00	0.07	0.50	1	0.28	0.40	3	0.03	0.10	0	0.07	0.00	0.07	0.58
Water trailer	37	29.6	33	26.4	55	44.0	125	70	11	0	0	0.26	0.00	11	0.03	0.35	0	0.06	0.00	0.19	0.54	0	0.28	0.00	11	0.03	0.36	0	0.07	0.00	0.19	0.55
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	1	0	0	9.45	0.00	1	1.31	1.31	0	2.31	0.00	0.88	2.19	0	9.92	0.00	1	1.38	1.38	0	2.43	0.00	0.88	2.26
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	70	0	0	0.26	0.00	70	0.03	2.21	0	0.06	0.00	1.17	3.38	0	0.28	0.00	70	0.03	2.32	0	0.07	0.00	1.17	3.49
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	11	0	0	16.80	0.00	11	2.29	25.18	0	4.20	0.00	12.18	37.36	0	17.64	0.00	11	2.40	26.44	0	4.41	0.00	12.18	38.61
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	1	1	0	16.80	8.22	0	2.29	1.12	0	4.20	0.00	1.57	10.90	0	17.64	8.63	1	2.40	2.35	0	4.41	0.00	1.57	12.55
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	11	0	0	3.68	0.00	11	0.53	5.78	0	0.95	0.00	2.66	8.44	0	3.86	0.00	11	0.55	6.06	0	0.99	0.00	2.66	8.73
Towed roller	6	33.3	4	22.2	8	44.4	18	70	11	1	0	2.63	1.24	8	0.32	2.46	1	0.61	0.81	1.90	6.41	0	2.76	1.30	10	0.33	3.18	1	0.64	0.85	1.90	7.23
Water pump	6	26.1	6	26.1	11	47.8	23	70	11	0	0	0.21	0.00	8	0.03	0.25	2	0.05	0.09	0.15	0.49	0	0.22	0.00	10	0.03	0.32	2	0.06	0.10	0.15	0.57
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	0	0	0	14.70	2.40	0	2.01	0.33	0	3.68	0.00	0.46	3.18	0	15.44	2.52	0	2.11	0.69	0	3.86	0.00	0.46	3.66
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	11	0	0	4.20	0.00	11	0.60	6.58	0	1.10	0.00	3.04	9.63	0	4.41	0.00	11	0.63	6.91	0	1.16	0.00	3.04	9.96
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	3	0	0	2.10	0.00	3	0.26	0.79	0	0.47	0.00	0.39	1.18	0	2.21	0.00	3	0.28	0.83	0	0.50	0.00	0.39	1.22
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	3	0	0	2.63	0.00	3	0.33	0.98	0	0.61	0.00	0.49	1.47	0	2.76	0.00	3	0.34	1.03	0	0.64	0.00	0.49	1.51
<b>Total</b>	<b>865</b>	<b>26.0</b>	<b>687</b>	<b>20.7</b>	<b>1773</b>	<b>53.3</b>	<b>3325</b>	<b>3066</b>	<b>500</b>	<b>46</b>	<b>15</b>		<b>43.24</b>	<b>448</b>		<b>270.98</b>	<b>9</b>		<b>6.32</b>	<b>139.41</b>	<b>459.95</b>	<b>15</b>		<b>45.40</b>	<b>472</b>		<b>294.06</b>	<b>9</b>		<b>6.63</b>	<b>139.41</b>	<b>485.50</b>

(Cont'd)

Item	Status						Total	Original Desirable No.	New Desirable No.	New Required No.	Grand Total					
	Serviceable		Under Repair		Unserviceable						Cost of Purchase	Cost of Maintenance	Cost of Rehabilitation	Provision for Replacement	Total Cost	Total Cost-Salvage Value
	No.	%	No.	%	No.	%										
Flat bed	50	26.0	37	19.3	105	54.7	192	97	16	0	0.00	20.68	0.00	10.76	31.44	(4.88)
Tipper truck	63	31.8	45	22.7	90	45.5	198	230	38	0	0.00	53.91	0.00	27.76	81.66	46.03
Agricultural tractor (4x2)	138	32.2	96	22.4	194	45.3	428	404	66	0	0.00	52.02	0.00	25.04	77.05	33.12
Agricultural tractor (4x4)	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	140	23	23	55.18	6.94	0.00	10.50	72.62	72.62
Supervision vehicle	164	25.9	68	10.7	401	63.3	633	388	63	0	0.00	49.65	0.00	24.04	73.70	15.25
Crawler tractor	10	12.2	29	35.4	43	52.4	82	45	7	0	0.00	70.62	5.78	33.76	110.15	35.90
Motor grader	67	19.1	70	20.0	213	60.9	350	248	40	0	0.00	321.56	0.00	153.69	475.24	225.25
Pedestrian roller	15	20.5	21	28.8	37	50.7	73	140	23	0	0.00	8.40	2.27	5.02	15.69	13.51
Steel wheel roller	11	18.0	18	29.5	32	52.5	61	70	11	0	0.00	39.88	0.00	18.26	58.14	39.98
Pneumatic roller	3	11.1	7	25.9	17	63.0	27	26	4	0	0.00	8.43	1.68	5.09	15.20	9.78
Bitumen distributor	6	33.3	4	22.2	8	44.4	18	26	4	0	0.00	10.72	0.00	5.51	16.23	11.12
Bitumen premix	3	20.0	3	20.0	9	60.0	15	8	1	0	0.00	12.14	0.00	7.57	19.70	3.10
Asphalt paver/finisher	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	4	1	1	13.02	1.80	0.00	2.48	17.31	17.31
Road marking machine	2	50.0	1	25.0	1	25.0	4	7	1	0	0.00	1.83	0.00	1.03	2.86	1.81
Concrete mixer	18	36.0	1	2.0	31	62.0	50	70	11	0	0.00	1.39	0.00	0.68	2.07	1.44
Generator	1	33.3	1	33.3	1	33.3	3	70	11	9	4.95	1.01	0.14	1.14	7.24	7.23
Compressor	0	0.0	3	33.3	6	66.7	9	18	3	0	0.00	1.43	2.56	1.76	5.75	5.21
Water tanker	2	8.0	4	16.0	19	76.0	25	70	11	5	19.92	8.26	3.78	7.99	39.95	38.05
Bitumen hand sprayer	11	37.9	6	20.7	12	41.4	29	70	11	0	0.00	1.41	0.03	0.68	2.12	1.87
Mechanical broom	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	27	4	4	1.16	0.14	0.00	0.22	1.52	1.52
Water trailer	37	29.6	33	26.4	55	44.0	125	70	11	0	0.00	1.04	0.00	0.57	1.61	(0.52)
Prime mover/Tractor	3	20.0	3	20.0	9	60.0	15	9	1	0	0.00	3.94	0.00	2.64	6.58	0.24
Towed trailer	186	24.9	178	23.8	383	51.3	747	431	70	0	0.00	6.62	0.00	3.51	10.13	(1.37)
Wheel loader	16	19.0	20	23.8	48	57.1	84	70	11	0	0.00	75.60	0.00	36.53	112.13	56.48
Excavator	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	9	1	1	24.68	3.47	0.00	4.70	32.85	32.85
Fuel tanker	12	30.8	10	25.6	17	43.6	39	70	11	0	0.00	17.34	0.00	7.99	25.33	20.70
Towed roller	6	33.3	4	22.2	8	44.4	18	70	11	1	3.72	7.44	2.44	5.71	19.30	18.82
Water pump	6	26.1	6	26.1	11	47.8	23	70	11	0	0.00	0.74	0.28	0.46	1.48	1.36
Mobile crane	0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	3	0	0	7.20	1.01	0.00	1.37	9.58	9.58
Mobile workshop	23	51.1	10	22.2	12	26.7	45	70	11	0	0.00	19.77	0.00	9.13	28.90	17.63
Service vehicle	9	52.9	5	29.4	3	17.6	17	18	3	0	0.00	2.36	0.00	1.17	3.54	0.82
Heavy trailer	3	20.0	4	26.7	8	53.3	15	18	3	0	0.00	2.93	0.00	1.47	4.40	3.15
Total	865	26.0	687	20.7	1773	53.3	3325	3066	500	46	129.82	814.47	18.97	418.24	1381.49	734.96

APPENDIX 7.7.5 BREAKDOWN OF LEASING REVENUE

(unit: Ksh.)

Item	Unit Rate								Province														Total				
	unit	Renewal	Insurance	Repair & Maintenance	Fuel	Lubricant	Overhead (10%)	Total	Nairobi		Central		Coast		Eastern		North Eastern		Western		Rift Valley		Nyanza		Record	Amount	
									Record	Amount	Record	Amount	Record	Amount	Record	Amount	Record	Amount	Record	Amount	Record	Amount	Record	Amount			Record
Flat bed	km	34.12	3.44	20.78	13.98	2.80	8.20	83.32	77,227	6,434,554	158,556	13,210,886	44,800	3,732,736	51,982	4,331,140	69,736	5,810,404	115,739	9,643,373	73,215	6,100,274	1,225,405	102,100,745	1,816,660	151,364,111	
Tipper truck	km	36.88	4.12	24.95	15.58	3.13	9.16	93.81	49,269	4,621,802	134,910	12,655,570	43,690	4,098,450	45,178	4,238,035	54,688	5,130,145	101,418	9,513,769	157,599	14,783,968	138,274	12,971,138	725,026	68,012,876	
Agricultural tractor (4x2)	hr	375.70	34.85	205.00	315.00	63.00	113.74	1,107.29	0	0	11,199	12,400,541	3,260	3,609,765	2,243	2,483,651	0	0	9,232	10,222,501	4,293	4,753,596	4,927	5,455,618	35,154	38,925,673	
Agricultural tractor (4x4)	hr	516.85	51.80	308.83	441.00	88.20	154.65	1,561.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Supervision vehicle	km	21.20	2.13	9.45	7.78	1.56	4.84	46.95	0	0	8,707	408,811	0	0	0	1,187	55,732	0	0	0	0	0	0	0	9,894	464,543	
Crawler tractor	hr	2,627.62	330.12	2,040.00	1,562.40	312.44	705.28	7,577.86	438	3,319,103	0	0	0	0	0	694	5,259,035	0	0	1,113	8,434,158	3,943	29,879,502	6,188	46,891,798		
Motor grader	hr	1,725.00	189.75	1,150.00	556.50	111.30	391.26	4,123.81	542	2,235,102	7,987	32,936,831	951	3,921,739	4,130	17,031,315	3,520	14,515,794	5,886	24,272,716	8,337	34,380,162	6,140	25,320,163	37,493	154,613,821	
Pedestrian roller	hr	281.30	20.30	112.50	126.00	25.20	65.50	630.80	0	0	95	59,926	0	0	0	23	14,508	49	30,909	0	0	117	73,804	284	179,147		
Steel wheel roller	hr	1,218.80	134.10	812.50	504.00	100.80	295.00	3,065.20	0	0	0	0	0	0	0	0	0	0	0	0	40	122,608	40	122,608	0	0	
Pneumatic roller	hr	1,218.80	134.10	812.80	504.00	100.80	295.00	3,065.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bitumen distributor	hr							249.68	0	0	0	0	0	0	0	0	0	0	0	2,090	521,831	0	0	2,090	521,831	0	0
Bitumen premix	hr							0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Asphalt paver/finisher	hr							0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Road marking machine	hr	171.40	18.90	114.30	0.00	30.00	43.70	378.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Concrete mixer	hr	102.40	8.30	47.25	136.50	27.30	42.98	364.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Generator	hr	333.90	35.27	212.23	462.00	92.40	122.54	1,258.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Compressor	hr	412.75	38.40	225.82	168.00	33.60	96.87	975.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Water tanker	km	25.55	2.90	17.60	12.25	2.45	6.65	67.40	0	0	9,791	659,913	0	0	0	0	0	0	0	0	0	6,493	437,628	16,284	1,097,542		
Bitumen hand sprayer	hr	93.80	6.80	37.50	0.00	10.00	23.80	171.90	0	0	18	3,094	0	0	0	0	0	0	0	0	0	0	0	18	3,094		
Mechanical broom	hr							0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Water trailer	hr	79.80	7.70	45.60	0.00	15.00	26.35	174.45	0	0	0	0	0	0	0	0	0	0	0	0	0	4,500	785,025	4,500	785,025		
Tractor	hr	1,235.75	148.50	907.50	819.00	163.80	344.80	3,619.35	275	995,321	11	39,813	16	57,910	0	0	0	422	1,527,366	0	0	0	0	724	2,620,409		
Recovery vehicle	hr	556.80	81.05	431.15	447.00	89.40	197.74	1,803.14	0	0	1,521	2,742,576	0	0	0	0	0	0	0	0	1,579	2,847,158	3,100	5,589,734			
Towed trailer	km	15.60	1.80	11.20	0.00	5.00	5.93	39.53	0	0	2,657	105,031	0	0	0	0	0	0	13,179	520,966	6,116	241,765	21,952	867,763			
Wheel loader	hr	1,627.50	204.75	1,260.00	462.00	92.40	386.28	4,032.93	582	2,347,162	160	645,268	0	0	0	996	4,016,793	947	3,819,180	3,080	12,421,409	4,847	19,547,587	10,612	42,797,400		
Excavator	hr	1,627.50	204.75	1,260.00	462.00	92.40	386.28	4,032.93	0	0	0	0	0	0	0	0	120	483,951	0	0	0	0	120	483,951			
Fuel tanker	km	25.60	2.90	17.60	12.25	2.45	6.40	67.20	0	0	25,584	1,719,245	0	0	7,638	513,274	18,657	1,253,750	4,255	285,936	0	6,439	432,701	62,573	4,204,906		
Towed roller	hr							0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Water pump	hr	23.00	1.80	10.00	104.00	20.80	15.96	175.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Mobile crane	hr							0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Mobile workshop	hr							290.85	0	0	5,705	1,659,299	0	0	0	949	276,017	495	143,971	920	267,582	249	72,422	8,318	2,419,290		
Service vehicle	hr							0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Heavy trailer	hr							194.18	0	0	0	0	0	0	0	0	2,614	507,587	0	0	0	0	0	2,614	507,587		
<b>Total</b>										19,953,044		79,246,804		15,420,599		28,597,415		36,332,177		60,451,259		82,183,946		200,287,864		522,473,109	

**APPENDIX. 7.7.6 THE RESOURCE REQUIRED FOR EACH ROAD MAINTENANCE ACTIVITY**

**(1) Contents of the Activity and the Resources**

The resources required for each road maintenance activity are described below.

**1) Unpaved Road**

**(a) Grading**

**(i) Heavy Equipment-Based Method (Periodic)**

**Task**

The task is to improve earth and gravel roads by grading the existing surface material. It is carried out with heavy equipment (e.g., motor grader, tractor, towed grader and motorized roller, etc.). The object is to restore the camber by returning material from the sides and shoulders towards the center of a road.

**Table AP7.7.1 Personnel and Equipment (1) for Work: 20 – 50pass-km / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Operator for motor grader	1	No
	Driver for tractor	2	No
	Operator for towed grader	2	No
	Supervision vehicle driver	1	No
	Operator for motorized roller	1	No
	Driver for water tanker	1	No
	Machine attendant	9	No
	Mechanic	1	No
	Traffic controller	2	No
	Plant & Tools	Motor grader	1
Heavy tractor		1	No
Light tractor		1	No
Heavy towed grader		1	No
Light towed grader		1	No
Motorized roller		1	No
Towed roller		1	No
Water tanker		1	No
Water pump		1	No
Supervision vehicle		1	No
Caravan		1	No
Camber board		1	No
Hand rammer with metal shoe		2	No
Hand tools		-	Set
Safety tools		-	Set



(ii) **Light Equipment-Based Dragging (Routine)**

**Task**

The task is to improve earth and gravel roads by dragging the existing surface material. It is carried out with a tractor and several types of dragging equipment. The object is to smooth out minor defects in the road surface and to remove loose material from the surface.

**Table AP7.7.2 Personnel and Equipment (2) for Work: 20 – 50pass-km / day**

Category	Item	No.	Unit
Personnel	Tractor driver	1	No
	Machine attendant	1	No
Plant & Tools	Tractor	1	No
	Drag	1	No
	(Brushwood drag)	-	-
	(Tyre sledge)	-	-
	(Cable drag)	-	-
	(Beam drag)	-	-
	(Frame drag)	-	-
	(Tolard)	-	-
	Safety tools	-	Set

(b) **Spot Gravelling**

(i) **Light Equipment-Based Method (Routine)**

**Task**

Spot gravelling is required before grading when the potholes or depressions are large. The task is to repair worn or eroded areas or to restore areas that become soft when wet. This activity consists of replacing or adding new gravel surfacing material over relatively small areas. It is carried out with small truck, hand vibrating roller and hand rammer.

**Table AP7.7.3 Personnel and Equipment (3) for Work: 1.2 – 7.2m<sup>3</sup> / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Driver	1	No
	Workforce	2 to 6	No
	Traffic controller	2	No
Plant & Tools	Small truck or	1	No
	Tractor & Trailer	1 & 1	No
	Hand vibrating roller or	1	No
	Hand rammer	2 to 6	No
	Hand tools	-	Set
	Safety tools	-	Set

**(ii) Labor-Based Equipment Supported Method (Routine)**

**Task**

On low traffic volume roads (less than 50 vehicles per day), it is often appropriate to carry out work via labor-based methods.

**Table AP7.7.4 Personnel and Equipment (4) for Work: 5 – 10 working points / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Supervision vehicle driver	1	No
	Small truck driver	1	No
	Workforce	10	No
	Traffic controller	2	No
Plant & Tools	Supervision vehicle	1	No
	Small truck	1	No
	Hand rammer	10	No
	Hand tools	-	Set
	Safety tools	-	Set

(c) **Gravelling**

(i) **Heavy Equipment-Based Method (Periodic)**

**Task**

The surfacing material of unpaved roads is worn away by traffic, and then eroded by rain or blown away as dust. Before all the gravel surface has worn away, it is important to regravell. This is carried out with heavy equipment (e.g., bulldozer, wheeled loader, motor grader and motorized roller, etc.).

**Table AP.7.7.5 Personnel and Equipment (5) for Work: 300 – 350 m<sup>3</sup> / day**

Category	Item	No.	Unit
Personnel	Foreman	2	No
	Bulldozer operator	1	No
	Loader operator	1	No
	Tipper truck driver	4 to 6	No
	Motor grader operator	1	No
	Roller operator	1	No
	Water tanker driver	1	No
	Supervision vehicle driver	2	No
	Tractor driver	1	No
	Machine attendant	10 to 12	No
	Mechanic	1	No
	Traffic controller	2	No
	Plant & Tools	Bulldozer	1
Wheeled loader		1	No
Tipper truck		4 to 6	No
Motor grader		1	No
Motorized roller		1	No
Water tanker		1	No
Water pump		1	No
Supervision vehicle		2	No
Tractor		1	No
Caravan		1	No
Camber board		1	No
Hand rammer		5 to 6	No
Hand tools		-	Set
Safety tools		-	Set

**(ii) Labor-Based Equipment Supported Method (Periodic)**

**Task**

In some circumstances, the high cost or non-availability of special equipment makes the labor-based method at work a more appropriate option. In this case, use is made of local labor to excavate and load gravel at the quarry, and then unload and spread the material at the road site. Haulage is carried out with a tractor and a trailer. Tractors and towed rollers are used for compaction.

**Table AP7.7.6 Personnel and Equipment (6) for Work: 96 – 216m<sup>3</sup> / day**

Category	Item	No.	Unit
Personnel	Foreman	2	No
	Tractor driver	3	No
	Supervision vehicle driver	2	No
	Workforce	54 to 77	No
	Mechanic	1	No
	Traffic controller	2	No
Plant & Tools	Tractor	3	No
	Trailer	4	No
	Towed roller or	1	No
	Hand vibrating roller	1	No
	Towed water bowser	1	No
	Towed fuel bowser	1	No
	Supervision vehicle	2	No
	Camber board	1	No
	Hand rammer	6 to 8	No
	Hand tools	-	Set
	Safety tools	-	Set

2) Paved Road

(a) Overlay / Heavy Equipment-Based Method (Periodic)

**Task**

Overlay is usually carried out on important roads having heavy traffic and high speeds. It is usually more durable than surface dressing, but must be executed during dry weather.

**Table AP7.7.7 Personnel and Equipment (7) for Work: 0.5 – 0.6 lane-km / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Overseer for traffic control	1	No
	Overseer for the works	1	No
	Spray bar operator	1	No
	Paver attendant	1	No
	Laborer for spreading	2	No
	Laborer for finishing	2	No
	Mechanical broom operator	1	No
	Bitumen distributor operator	1	No
	Paver operator	1	No
	Steel wheeled roller operator	1	No
	Rubber tyred roller operator	1	No
	Tipper truck driver	3	No
	Night watchman	1	No
	Supervision vehicle driver	1	No
	Mechanic	1	No
Traffic controller	2	No	
Plant & Tools	Mechanical broom	1	No
	Binder distributor with thermometer	1	No
	Paver/Finisher	1	No
	Steel wheeled roller	1	No
	Rubber tyred roller	1	No
	Tipper truck	3	No
	Supervision vehicle	1	No
	Bitumen thermometer	1	No
	Tarpaulins	-	No
	Hand tools	-	Set
	Safety tools	-	Set

**(b) Patching / Labor-Based Equipment Supported Method (Routine)**

**Task**

The main causes of potholes are poor materials, infiltration of water, pavement cracking from traffic loads, etc. The task is the local restoration of the pavement structure. This is carried out using labor-based work methods with light equipment.

**Table AP7.7.8 Personnel and Equipment (8) for Work: 1.0 – 3.2 m<sup>3</sup> / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Bitumen spray lance operator	1	No
	Tractor driver	1	No
	Tipper/Flat bed truck driver	1	No
	Hand vibrating roller operator	1	No
	Supervision vehicle driver	1	No
	Workforce	2 to 4	No
	Mechanic	1	No
	Traffic controller	2	No
Plant & Tools	Bitumen heater/distributor	1	No
	Tractor	1	No
	Tipper/Flat bed truck	1	No
	Hand vibrating roller	1	No
	Bitumen thermometer	1	No
	Spray lance	1	No
	Hand rammer	2	No
	Hand tools	-	Set
Safety tools	-	Set	

(c) **Resealing**

(i) **Heavy Equipment-Based Method**

**Task**

Resealing is for dealing with large road surface areas for the following problems:

- wearing away of the surface layer,
- surface cracking,
- migration of binder to the surface.

Resealing can sometimes prevent increases in the deformation of the pavement structure, and is carried out with heavy equipment.

**Table AP7.7.9 Personnel and Equipment (9) for Work: 2.5 – 4.0 lane-km / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Overseer	1	No
	Spray bar operator	1	No
	Attendant for aggregate trucks	1	No
	Chip spreading labor	2 to 4	No
	Mechanical broom operator	1	No
	Bitumen distributor driver	1	No
	Aggregate truck driver	3 to 4	No
	Roller operator	2	No
	Loader operator	1	No
	Truck driver	1	No
	Supervision vehicle driver	1	No
	Mechanic	1	No
	Traffic controller	2	No
Plant & Tools	Mechanical broom	1	No
	Bitumen distributor	1	No
	Aggregate truck	3 to 4	No
	Rubber tyred roller	2	No
	Wheeled loader	1	No
	Tipper truck	1	No
	Supervision vehicle	1	No
	Hand tools	-	Set
	Safety tools	-	Set

(ii) **Labor-Based Equipment Supported Method (Periodic)**

**Task**

Labor-based work for resealing with bitumen emulsion or cut-back bitumen will require the resources as shown in Table AP7.7.10.

**Table AP7.7.10 Personnel and Equipment (10) for Work: max. 800m<sup>2</sup> / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Bitumen heater operator	1	No
	Bitumen spray lance operator	1 to 2	No
	Squeegee operator	2	No
	Towing vehicle driver	1	No
	Supervision vehicle driver	1	No
	Truck driver	1	No
	Workforce	4 to 6	No
	Mechanic	1	No
	Traffic controller	2	No
Plant & Tools	Bitumen heater	1	No
	Towing vehicle (e.g. tractor and truck)	1	No
	Supervision vehicle	1	No
	Bitumen thermometer	1	No
	Spray lance	1	No
	Truck (Aggregate transport)	1	No
	Hand tools	-	Set
	Safety tools	-	Set



**3) Off Pavement**

**(a) Bush Clearing**

**(i) Labor-Based Equipment Supported Method (1) (Routine)**

**Task**

The task is vegetation control. This is carried out with a tractor equipped with a sickle mower, flail mower or rotary brush cutters. A hand-guided mower could also be used.

**Table AP7.7.11 Personnel and Equipment (11) for Work: 10 – 20 km / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Headman	1	No
	Tractor driver	1	No
	Supervision vehicle driver	1	No
	Workforce	10 to 20	No
	Traffic controller	2	No
Plant & Tools	Tractor	1	No
	Trailer	1	No
	Mower or rotary brush cutter	1	No
	Hand-guided power mower	1	No
	Supervision vehicle	1	No
	Hand tools	-	Set
	Safety tools	-	Set

**(ii) Labor-Based Equipment Supported Method (2) (Routine)**

**Task**

An alternative to mechanical mowing for areas inaccessible to power equipment, (especially ditch side-slopes or on other steep slopes), could be manual tools such as scythes, slashers, bushknives, axes, and saws.

**Table AP7.7.12 Personnel and Equipment (12) for Work: 3,000 – 16,000m<sup>2</sup> / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Headman	1	No
	Truck driver	1	No
	Supervision vehicle driver	1	No
	Workforce	10 to 20	No
	Traffic controller	2	No
Plant & Tools	Truck	1	No
	Supervision vehicle	1	No
	Hand tools	-	Set
	Safety tools	-	Set

**(b) Ditch and Culvert Cleaning / Labor-Based Equipment Supported Method (Routine)  
Task**

The task is to ensure that drainage systems remain free of obstructions (e.g., soil, high vegetation, etc.) and to retain their intended cross sections and grades.

**Table AP7.7.13 Personnel and Equipment (13) for Work: 300 – 1,200m / day**

Category	Item	No.	Unit
Personnel	Foreman	1	No
	Headman	1	No
	Tipper/flat bed truck driver	1	No
	Supervision vehicle driver	1	No
	Workforce	10 to 20	No
	Traffic controller	2	No
Plant & Tools	Tipper/flat bed truck	1	No
	Supervision vehicle	1	No
	Water pump	1	No
	Hand winch	1	No
	Hand tools	-	Set
	Safety tools	-	Set

References for Table AP7.7.1 to 7.7.13 are as follows:

- International Road Maintenance Handbook, Issued by Permanent International Association of Road Congresses (PIARC)
- Road Maintenance Handbook, Issued by United Nation Economic Commission for Africa
- Overseas Road Note 1, Issued by Overseas Unit, Transport and Road Research Laboratory, Crowthorne Berkshire, United Kingdom

**APPENDIX 8.3.1 EXAMPLES OF EXISTING TRAINING MODULES**

PARTICIPANTS: CONTRACT SUPERVISORS

MODULE: ROUTINE MAINTENANCE TECHNOLOGY

NO.	LEARNING ELEMENT/TOPIC	SPECIFIC OBJECTIVE(S) The participants should be able to:-	KEY POINTS
1	TYPES OF MAINTENANCE	<ul style="list-style-type: none"> <li>- Define maintenance</li> <li>- Identify and list different types of maintenance correctly.</li> </ul>	<ul style="list-style-type: none"> <li>- Definitions</li> <li>- Routine maintenance</li> <li>- Urgent maintenance</li> <li>- Periodic maintenance</li> </ul>
2	ROUTINE MAINTENANCE ACTIVITIES	<ul style="list-style-type: none"> <li>- Define different activities.</li> <li>- Carry out different activities to the required standards and specifications.</li> </ul>	<ul style="list-style-type: none"> <li>- Activities</li> <li>R1 - General inspection and removal of obstructing</li> <li>R2 - Clean culvert inlets and outfalls</li> <li>R3 - Repair culvert stone head walls</li> <li>R4 - Clean mitre drains and side drains.</li> <li>R5 - Repair scour checks and side drains erosion.</li> <li>R6 - Repair erosion on shoulders and plant grass.</li> <li>R7 - Fill potholes in carriage way.</li> <li>R8 - Grub edge and reshape carriageway</li> <li>R9 - Cut grass in the side drains</li> <li>R10- Clear bush</li> <li>R11- Clean side drains</li> <li>R12- Reshape carriageway only using towed grader.</li> </ul>

NO.	LEARNING ELEMENT/TOPIC	SPECIFIC OBJECTIVE(S) The participants should be able to:-	KEY POINTS
3	ROUTINE MAINTENANCE ORGANISATION	<ul style="list-style-type: none"> <li>- Organise routine maintenance activities to the correct standard.</li> <li>- Co-ordinate labour and other resources effectively.</li> </ul>	<ul style="list-style-type: none"> <li>- Seasonal allocation of tasks</li> <li>- Quality control</li> <li>- Labour allocation</li> </ul>
4	TOOLS AND EQUIPMENT	<ul style="list-style-type: none"> <li>- Identify different tools used in maintenance.</li> <li>- Identify cost effectiveness of good quality tools</li> </ul>	<ul style="list-style-type: none"> <li>- Tools</li> <li>- Cost effectiveness</li> <li>- Definition according to activities.</li> <li>- Good quality tools</li> </ul>
5	ROUTINE MAINTENANCE MANAGEMENT	<ul style="list-style-type: none"> <li>- Identify different types of forms used in maintenance.</li> <li>- Fill correctly forms used in maintenance</li> </ul>	<ul style="list-style-type: none"> <li>- Roads defect rating forms.</li> <li>- Annual work plan</li> <li>- Routine maintenance</li> <li>- Plan and achievement forms</li> <li>- Monthly report forms</li> <li>- Other forms used in maintenance</li> <li>- Road inventory forms.</li> </ul>
6	SPECIFICATIONS AND STANDARDS FOR ROUTINE MAINTENANCE	<ul style="list-style-type: none"> <li>- Identify different road cross-sections correctly</li> <li>- Identify different road alignment standards correctly.</li> <li>- Identify different standards of running surfaces</li> </ul>	<ul style="list-style-type: none"> <li>- Cross section alignment.</li> </ul>
7	QUALITY CONTROL	<ul style="list-style-type: none"> <li>- Identify and list templates used in road maintenance.</li> <li>- Use the templates effectively in accordance to specifications and standards.</li> </ul>	<ul style="list-style-type: none"> <li>- Templates</li> <li>- Measurement techniques</li> <li>- Standards</li> <li>- Remedial measures</li> </ul>

PARTICIPANTS: ROUTINE MAINTENANCE CONTRACT SUPERVISORS

MODULE: ROUTINE MAINTENANCE CONTRACT ADMINISTRATION

NO.	LEARNING ELEMENT/TOPIC	SPECIFIC OBJECTIVE(S) <b>The participants should be able to:-</b>	KEY POINTS
1	ROUTINE MAINTENANCE CONTRACT	- List and explain types of contract.	- Lumpsum contract. - Build item rate - Cost plus fixed fee - Cost plus incentive fee - Inception of contract works - Works method and measurements - Preparation of tender documents - Pre-qualification of tenders - Award of tenders - Contract supervision - Payments procedures
2	PARTIES INVOLVED AND THEIR OBLIGATIONS	- List all parties involved in Road Maintenance Contract. - Explain the duties and responsibilities of the involved parties.	- Client contractor, arbitrator - Clients representative - Contractor representative foreman - Consultant
3	DRAFTING AND ISSUING OF CONTRACT	- Identify and fill tender documents correctly. - Follow correctly sequence of tendering - Follow site instructions correctly - Identify the procedures involved in contract works	- Conditions of tender - Instructions to tender - Form of agreement - Conditions of contract - Specifications - Construction drawings - Bill of quantities - Standard working drawings - Quality control - Progress and progress reports - Instructional procedures

NO.	LEARNING ELEMENT/TOPIC	SPECIFIC OBJECTIVE(S) <b>The participants should be able to:-</b>	KEY POINTS
4	CONTRACT SUPERVISION	- Explain methods of measuring completed works. - Carry out measurements of works correctly. - Arrangements for payments and issue payment certificate.	- Method of measurements - Work to be measured - Quantities - Progress/Productivity - Measuring tools - Specifications - Certificate of completion - Retention period - Find certificate - Time for payment - Penalties - Mode of payment

PARTICIPANTS: ROUTINE MAINTENANCE CONTRACTORS

MODULE: ROUTINE MAINTENANCE CONTRACT MANAGEMENT

NO.	LEARNING ELEMENT/TOPIC	SPECIFIC OBJECTIVE(S) The participants should be able to:-	KEY POINTS
1	TENDERING PROCEDURE	<ul style="list-style-type: none"> <li>- Define tender</li> <li>- Differentiate various tendering procedures</li> <li>- Follow the tendering procedure.</li> </ul>	<ul style="list-style-type: none"> <li>- Tendering</li> <li>- Conditions of tender</li> <li>- Tender forms</li> <li>- Schedules</li> <li>- Certification</li> <li>- Drawing and specification</li> <li>- Bills of quantities</li> </ul>
2	ROUTINE MAINTENANCE CONTRACT	<ul style="list-style-type: none"> <li>- Define road maintenance contract</li> <li>- Describe routine maintenance activities</li> <li>- Follow methods of routine maintenance</li> <li>- Follow standards and specifications of routine maintenance</li> </ul>	<ul style="list-style-type: none"> <li>- Activities (R1 to R12)</li> <li>- Task distribution</li> <li>- Standards</li> <li>- Contract terms</li> </ul>
3	COSTING ROUTINE MAINTENANCE ITEMS	<ul style="list-style-type: none"> <li>- To build up unit item cost for routine maintenance.</li> <li>- To analyse costs to enable him generate profits. (agreeable profit)</li> </ul>	<ul style="list-style-type: none"> <li>- Mobilisation</li> <li>- Direct costs</li> <li>- Indirect costs</li> </ul>
4	MEASUREMENT AND PAYMENT	<ul style="list-style-type: none"> <li>- Able to relate measurements and payment rates.</li> <li>- Able to carry out measurements and calculate the relevant payments as per bills.</li> <li>- Able to sequence the bills</li> </ul>	<ul style="list-style-type: none"> <li>- Measurements</li> <li>- Standard measurements</li> <li>- Profit/losses</li> <li>- Bill sequencing</li> </ul>
5	PARTIES INVOLVED IN ROAD MAINTENANCE	<ul style="list-style-type: none"> <li>- Identify the parties involved in the road maintenance</li> <li>- Identify and carry out their responsibilities and obligations.</li> </ul>	<ul style="list-style-type: none"> <li>- Contractor/proprietor</li> <li>- Client and his team</li> <li>- Consultant and his team</li> <li>- Local administrators</li> <li>- Suppliers</li> </ul>

PARTICIPANTS: ROUTINE MAINTENANCE CONTRACTORS

MODULE: ROUTINE MAINTENANCE OPERATIONS FOR CONTRACTORS

NO.	LEARNING ELEMENT/TOPIC	SPECIFIC OBJECTIVE(S) <b>The participants should be able to:-</b>	KEY POINTS
1	TYPES OF MAINTENANCE	- Define maintenance - Identify and list different types of maintenance correctly	- Definitions - Routine maintenance - urgent maintenance - Periodic maintenance
2	ROUTINE MAINTENANCE ACTIVITIES	- Define different activities - Carry out different activities to the required standards and specifications	Activities R1-R12 *general inspection and removal of obstruction *clean culverts inlets and outfalls *repair culvert stone headwalls etc.
3	METHODS OF CARRYING OUT ROUTINE MAINTENANCE	- Carry out maintenance work to standards	- Labour intensive method - Capital intensive method - Combination of labour plus equipment
4	ROUTINE MAINTENANCE ORGANISATION	- Formulate an organisation structure. - Carry out duties and responsibilities as necessary.	- Organisation structure -contractor -foreman -site supervisor -labour -general obligations
5	SPECIFICATIONS AND STANDARDS	- Carry out work in accordance to specifications and standards.	- General conditions of contract - Design standards - Work measurement
6	QUALITY CONTROL	- Carry out quality control checks in every stage of the contract.	- Control tools and equipment - Site supervision - Inspection - Measurements
7	TOOLS AND EQUIPMENT	- Identify good quality tools and their requirements - Identify and acquire good quality tools and equipment. - Maintain and manage tools and equipment.	- Nature and extent of works - Choice of tools and equipment - Availability of tools and equipment - Care and maintenance

PARTICIPANTS: CONTRACTORS SITE SUPERVISORS

MODULE: SITE MANAGEMENT

NO.	LEARNING ELEMENT/TOPIC	SPECIFIC OBJECTIVE(S) <b>The participants should be able to:-</b>	KEY POINTS
1	ROUTINE MAINTENANCE ACTIVITIES	<ul style="list-style-type: none"> <li>- Identify and list different routine maintenance activities.</li> <li>- To supervise and monitor routine maintenance activities at site level.</li> </ul>	<ul style="list-style-type: none"> <li>- Routine maintenance activities</li> <li>- Supervision</li> <li>- The sites</li> <li>- Monitoring</li> </ul>
2	CONTRACT MANAGEMENT PRINCIPLES	<ul style="list-style-type: none"> <li>- Manage resources at site level</li> <li>- Differentiate roles of each contract team.</li> <li>- Follow work Programme within specified cost and time limits.</li> <li>- Meet contracts specified standards</li> </ul>	<ul style="list-style-type: none"> <li>- Managing resources</li> <li>- Management rules</li> <li>- Work output</li> <li>- Quality</li> <li>- Daily Work Programme</li> </ul>
3	PLANNING AND REPORTING	<ul style="list-style-type: none"> <li>- To plan and monitor all site activities for routine maintenance.</li> <li>- Carry out necessary reporting</li> </ul>	<ul style="list-style-type: none"> <li>- Planning</li> <li>- Monitoring</li> <li>- Reporting</li> </ul>
4	MEASUREMENT AND PAYMENT	<ul style="list-style-type: none"> <li>- Carry out measurement of completed works.</li> <li>- Prepare claims and requests for variation of prices.</li> <li>- Interpret contract specifications, special conditions and working drawings of contract.</li> </ul>	<ul style="list-style-type: none"> <li>- Certificate of completion</li> <li>- Contract variations</li> <li>- Claims</li> <li>- Conditions of contract</li> <li>- Methods of measurement</li> </ul>
5	COSTING OF ROUTINE MAINTENANCE ITEMS	<ul style="list-style-type: none"> <li>- Build up item costs</li> <li>- Relate contract item rates versus actual costs.</li> </ul>	<ul style="list-style-type: none"> <li>- Rates</li> <li>- Costs</li> <li>  *direct</li> <li>  *indirect</li> <li>  *profit margin</li> </ul>