



REPUBLIC OF KENYA



MINISTRY OF ROADS

Cost Estimation Manual For Road Maintenance Works



November, 2011



in association with



JAPAN INTERNATIONAL COOPERATION AGENCY

Strengthening of Capacity on Road Maintenance Management through Contracting

FOREWORD

Roads are among the most valuable public assets in the country. This investment therefore requires an organized and balanced maintenance program to realize the maximum service life of the road-network. The approach is based on maintenance of road network in fair or good condition rather than adopting a “worst-first” methodology which means spending huge amounts of the road budget on full reconstruction.

This manual provides roads Authorities a scientific index on the approximate price of maintenance works for the tendered works by factoring in input components comprising labour, salaries and wages, materials, plant and equipment. This is derived from a survey that evaluates the condition of the segment of the road in need of preventive maintenance to protect capital investments.

The development of this manual is indicative of the serious attention the government is paying to the road maintenance works in the country. The government now has laid emphasize on preventive maintenance of road network to allow it live its lifespan and provide the intended utility of improved access to schools, markets, health facilities, improved comfort and travel time and safety, and lower cost of vehicle operating expenses.

The government has continued to make a lot of capital investment in the construction of roads in all geographical regions of the country which have different topographical setup. The various regions have varied source of materials and climatic condition that may affect road maintenance pricing. This manual will allow tender participants to use the document to construct their own bidding price while considering unique cost settings.

Cognizant that the market trends are dynamic, the government will monitor price movements of inputs to road maintenance for appropriate review to reflect the prevailing situation.

It is therefore instructive that compliance with this manual is mandatory for all cost estimates prepared for preventive road maintenance programs by project engineers, project managers, technical officers and consultants. All parties must follow these procedures when preparing cost estimates to minimize escalation of cost and provide value for money for the tax payer.

HON. FRANKLIN BETT, EBS, MP

MINISTER FOR ROADS

MESSAGE BY THE PERMANENT SECRETARY; MINISTRY OF ROADS

The Ministry of Roads has undergone major reforms in the last few years, all geared towards improving service delivery and realising value for money.

Roads infrastructure is a critical component to our economy which is expected to experience rapid growth that would stimulate and enable the country achieve middle level income status.

It is therefore prudent for our country to invest heavily in its roads sector among other infrastructure that will catalyse growth of all other sectors such as trade, industry, Agriculture, Transport, Health among others.

By recognising this importance, the government has invested heavily in the road sector steadily increasing the budgetary allocation to roads to Ksh 100 billion in the current financial year-2010/2011 representing an increase of 8 fold over the last eight years.

To achieve value for money in our roads construction and maintenance, it is found necessary to standardise the cost estimation of road maintenance countrywide.

The introduction of this manual is noble since it will contain instructions for estimating price of maintenance works for bidding price in any part of the country. This manual will also guide the respective Authorities formulate the annual work plans and serve as a tool for auditing the various maintenance works that have been awarded.

In this regard, the Government with the technical and financial assistance from Japanese International Cooperation Agency (JICA) has developed cost estimation manuals for road maintenance works.

Thank You.

ENG. M. S. M. KAMAU, CBS, HSC

PERMANENT SECRETARY

MESSAGE BY THE CHIEF REPRESENTATIVE; JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

The road sector reforms have progressed steadfastly with first the introduction of the Road Maintenance Levy Fund and the establishment of Kenya Roads Board (KRB) . This was followed by the establishment of Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KeRRA) and Kenya Urban Roads Authority (KURA). Throughout this sector reform process, the Ministry of Roads (MoR) has shown great commitment and leadership. The ministry has emphasised on road maintenance in order to safeguard the on-going heavy investment in transport infrastructure in line with Kenya Vision2030. This is laudable.

Currently, there is need to have the road management system work smoothly and effectively. Therefore, the development of this Cost Estimation Manual (CEM) is a milestone in the “next generation” road maintenance administration system in Kenya. The CEM assist the Road Authorities to develop the Engineers’ Estimates and formulate annual Work Plans. The contractors can use the Manual to prepare their bids. It is an indispensable management tool for all.

I call upon all practitioners in the road sector to start using this manual and later review it objectively in order to make it a dynamic road management tool.

I appreciate the continued cooperation between JICA and Ministry of Roads. It is a model in our international development work.

MASAAKI KATO

CHIEF REPRESENTATIVE, JICA KENYA OFFICE

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Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
AC	Asphalt Concrete
CBR	California Bearing Ratio
JICA	Japan International Cooperation Agency
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KNBS	Kenya National Bureau of Statistics
KRB	Kenya Roads Board
KURA	Kenya Urban Road Authority
KWS	Kenya Wildlife Service
M&T	Mechanical and Transport Department, Ministry of Roads
MDD	Maximum Dry Density
MoR	Ministry of Roads
PPOA	Public Procurement Oversight Authority
PVC	Polyvinyl Chloride
RMMS	Road Maintenance Management System
VAT	Value-added Tax

1. Introduction

1.1 Purpose of the Manual

This manual gives instructions for estimating the cost of road maintenance works, by considering all inputs. This is to provide a standardized procedure of pricing road activities in Kenya, to ensure uniformity in public and private procurement practice.

1.2 Application of the Manual

This manual is to be applied in the preparation of Engineer's Estimate for tender documentation by procurement entities and provides a benchmark for evaluation of bidding prices.

The manual shall also be used for the formulation of annual work plans by the roads authorities and as an auditing tool for ongoing road works.

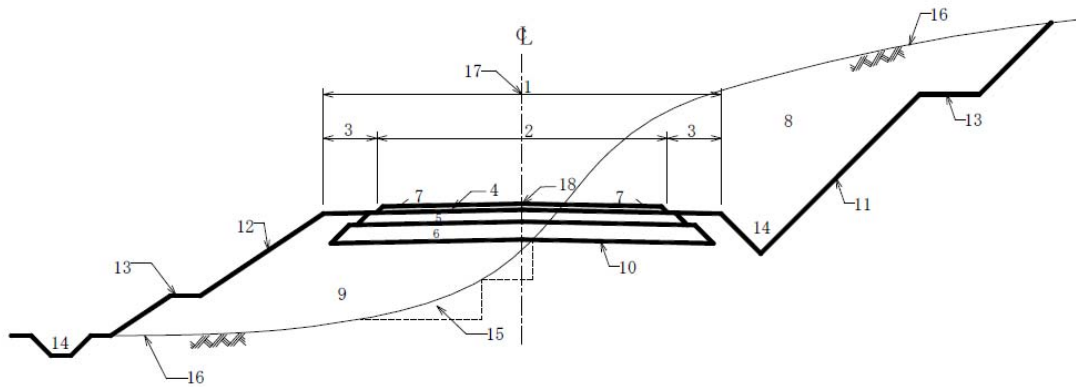
It can also be used as a reference for bidders to prepare their bidding documents while considering their unique cost settings.

2. Glossary of Terms

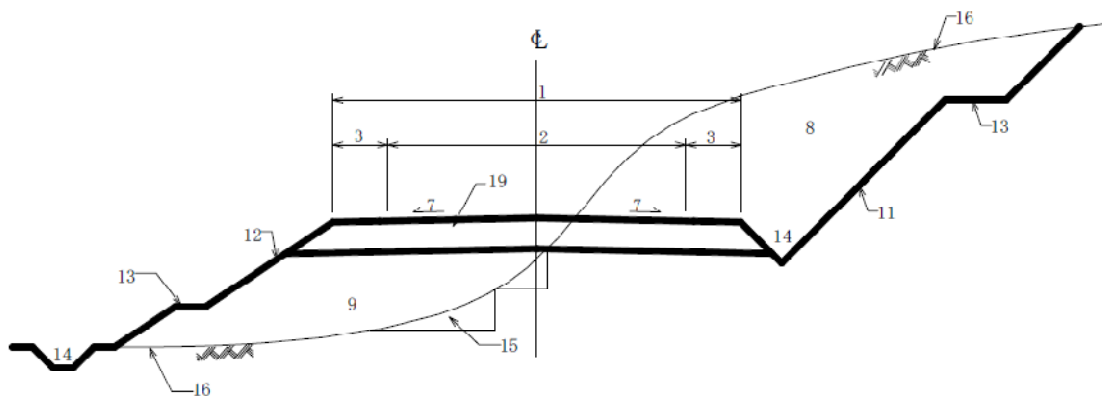
This chapter contains a glossary of terms that are used in this manual.

Cross Section

The typical cross sections of paved, unpaved and urban roads are as follows;



Paved Road



Unpaved Road

1. Roadway 2. Carriageway 3. Shoulder 4. Surfacing 5. Base 6. Subbase 7. Camber (Cross Fall)
8. Cut 9. Embankment 10. Subgrade 11. Cut Slope 12. Embankment Slope 13. Berm 14. Side Ditch
15. Benching 16. Natural Ground Level 17. Centre-line 18. Marking 19. Grave 20. Footpath
21. Road Reserve 22. Pavement 23. Side Ditch 24. Boundary Stone

Glossary of Terms

Abutment

Structure support to bridge deck and retains the road embankment

Adhesion

Sticking quality, for example, holding aggregate to the binder in chip sealing

Aggregate

Crushed local rock or stone

Apron

Floor of concrete, masonry or stone at the inlet or outlet of a culvert or waterway to prevent scour.

Asphalt Concrete

Road construction material usually comprising a mixture of bitumen and aggregate, also known as hot-mix or hot-rolled asphalt.

Base Course

The main structural element of the pavement, between surface course and subbase.

Benching

A stepped platform cut in an embankment to prevent earth slipping. Can also be used as stepping to provide a level base for additional fill material.

Berm

A low ridge or bund of soil to collect or redirect surface water.

Binder

An adhesive material, usually bitumen or bitumen emulsion, used to seal the road surface, also providing a waterproof layer to receive and hold aggregate. The most common binders are bitumen based. A binder is also used to hold aggregate together in bituminous mixtures.

Binder Course

The layer forming part of the bituminous surfacing immediately below the wearing course.

Bitumen

Bitumen (called asphalt cement in the US) is a black to dark brown sticky material composed principally of high-molecular-weight hydrocarbons. Most bitumen is derived from the distillation of crude oil. Bitumen is a thermoplastic material that gradually liquefies when heated.

Borrow Pit

An excavation outside the road limits from which suitable material is obtained, usually for earthwork or regravelling operations.

Box Culvert

A culvert of rectangular cross-section, usually constructed in reinforced concrete.

Bridge

A structure with a span of 6 metres or more providing a means of transit above land and/or water or above an obstruction, whether natural or artificial.

Camber (Cross Fall)

The transverse slope applied to the carriageway on a section of straight alignment.

Causeway

Low-level structure constructed across streams or rivers with openings to permit water to pass below road level.

Carriageway

The part of the road used by vehicular traffic.

Catchment Area

The area from which water runs off by gravity to a collecting point.

Catchpit

A covered, accessible chamber with a sump for collection of silt forming part of the drainage system and permitting inspection and maintenance of underground drainage pipes.

Centre-line

The middle of the carriageway, normally marked with a yellow dashed line on a paved road.

Compaction

Compacting embankment by roller to increase density of soil what composes embankment body. It causes to improve mechanical properties of soil.

Cross-fall

The transverse gradient or fall across a formation or pavement.

Cross-section

Section through the road construction at right angles to the centre-line.

Crown

The highest part of a cambered surface, usually on or near the centreline.

Culvert

A duct, usually rectangular or circular, for carrying surface water under the road.

Cut (Cutting)

Excavation in natural ground usually with graded slopes.

Cut-off Drain

A drain cut to intercept surface water flowing from adjacent land and to prevent it reaching a pavement or other prepared surface.

Cut Slope

A soil plane constructed at an angle to the horizontal.

Cycleway

The track which is mainly used for bicycle traffic. The track is separated with other parts of road by kerb stone or its similar structures.

Ditch (Drain)

A long narrow excavation designed or intended to collect and drain off surface water.

Drainage

The interception and removal of ground and surface water by artificial or natural means.

Drainage Channel

A waterway or gutter to carry away surface water.

Drift or Ford

A stream or river crossing at bed level over which the stream or river water can flow.

Earthworks

General term of construction works involving soil and rocks(e.g. excavation, loading, hauling, spreading and compaction).

Embankment Slope

An artificially constructed soil plane at an angle to the horizontal.

Fill (Embankment)

Earthworks constructed below the pavement raising the road above the surrounding natural ground level.

Footbridge

The overpass bridge crossing carriageway/railway to ensure the safety of pedestrian and smooth vehicle traffic.

Footpath

The track which is mainly used for pedestrian. The track is separated with other parts of road by kerb stone or its similar structures.

Gabion

The steel mesh cage filled with cobble stone or crushed stone. This is mainly used for revetment and foot protection.

Gravel

A non-cohesive, coarse granular material, resulting from natural disintegration of rock with or without finer material. In general the particles are irregular or flaky. It is used as material of surface course and to correct loss of shape, ruts, potholes and erosion gullies.

Guardrail

A safety barrier on embankment or river crossing

Gutter

A shallow waterway provided at the edge of the road to carry surface water longitudinally.

Headwalls

The walls located on the top of outlet/inlet of culvert. The walls of inlet direct the flow into the culvert, while the walls of outlet provide a transition from the culvert to the outlet channel. Headwalls also protect the embankment from erosion by flood waters.

Inlet

The point at which surface water enters a pipe culvert or box culvert.

Invert

The lowest point of the internal cross section of a ditch or culvert.

Lane

The width of carriageway required to accommodate one line of traffic.

Manhole

Accessible chamber with a cover forming part of the drainage system and permitting inspection and maintenance of underground drainage pipes.

Mitre Drain

Short, open, skew ditches used to remove water from the roadside ditches or gutters. Use of this reduces the necessary size of the side ditches and minimizes the velocity of water and thereby the risk of erosion.

Original Ground Level

Line of natural ground.

Outfall

The point at which water discharges from a pipe or box culvert.

Paved Road

For the purpose of this manual a paved road is a road with a concrete surface, concrete block, bituminous surface or surface dressing.

Pavement

The road structure above the formation, designed to spread the loading over the base and subbase.

Pipe Culvert

A culvert of circular cross-section, usually constructed in pre-cast concrete.

Premix

Premix is a paving material manufactured by mixing aggregates, filler and bitumen. Most premix is mixed and placed hot. Premix is used in the construction of wearing course, binder courses and base courses.

Prime Coat

A coating of low viscosity binder applied to a surface of stabilised or naturally compacted soil before sealing or paving.

Road Reserve (Right-of-way)

The area within the road limits over which members of the public have the right to pass and re-pass.

Road Furniture

Road or street furniture e.g. traffic sign, traffic board, traffic signal, lane marking, guardrail, street light, etc.

Roadway

The portion of a road including shoulders for vehicular use.

Scour Checks

The structures to prevent scouring of drains. Simple scour checks may be constructed of wood pegs or stones. All scour checks should have an apron downstream built of stones or grass turves pinned to the ditch invert with wooden pegs.

Shoulder

Paved or unpaved part of the road next to the outer edge of the pavement. The shoulder provides side support for the pavement and allows vehicles to stop or pass in an emergency.

Side Drain

Drain beyond the shoulders, parallel to the centerline, to take the run-off from the road surface.

Slope

A natural or artificially constructed soil plane at an angle to the horizontal.

Sub-base

The layer of material between the base course and the subgrade.

Subgrade

Upper layer of the soil that supports the pavement

Superelevation

The raising of the outside level of the road on curves to reduce the effect of centrifugal forces and improve road-holding qualities.

Surfacing

Top layer of the pavement. Consists of wearing course, and sometimes a base course or binder course.

Surface Dressing

A sprayed or hand applied film of bitumen followed by the application of a layer of stone chippings, which is then rolled.

Tack Coat

Asphalt material to bond lower layer (asphalt material or cement) and upper layer (asphalt mixture). It is sprayed on surface of lower layer.

Traffic Lane

The portion of the carriageway defined by road marking for the movement of a single line of vehicles.

Transverse Joint

Joint at right angles to the road centreline.

Transverse Joint Taper

Slope or ramp of asphalt mix at the end of a freshly laid asphalt course.

Unpaved Road

For the purpose of this manual an unpaved road is a road with a gravel or earth surface

Wearing Course

The part of the road surface in contact with traffic wheels.

Wing-wall

Retaining wall at a bridge abutment to retain and protect the embankment fill behind the abutment.

3. Contents of the Manual

3.1 Work items and coding

Work items covered in this manual are shown in Table 1. These are the common types of works which are widely implemented in road maintenance works in Kenya.

The coding for each work item is derived from the Road Maintenance Management System (RMMS), and categorized in accordance with the Standard Specifications for Road and Bridge Construction (1986).

Table 1 Work Items

4. Site Clearance and Topsoil Stripping

No	Work Category	Code	Work Item Name	Unit	Description
1	Bush Clearing	04.50.001	Mechanical mowing	m2	Cut grass by machine along the side of the road or on slopes.
2		04.50.002	Grass cutting (manual)	m2	Cut grass manually along the side of the road or on slopes.
3		04.50.003	Heavy bush clearing	m2	Cut, remove and dispose bushes along the side of the road, slopes or alongside ditches.
4		04.50.004	Light bush clearing	m2	Cut grass by hand from shoulders, slopes, inlet ditches, and side ditches including back slopes, turnouts and culvert outlet.
5		04.50.005	Pruning of tree branches	m2	Cut, remove and dispose branches of trees along the side of the road,
6		04.50.006	Tree cutting and stump removal (200 -450 mm)	No	Cut, remove and dispose whole trees of 200 - 450mm in girth including
7		04.50.007	Tree cutting and stump removal (>450 mm)	No	Cut, remove and dispose whole trees of above 450mm in girth including
8	Site Clearing and Backfill	04.50.080	Clearing obstructions (mechanical)	m2	Mechanically clear any obstruction including boulders and debris out of
9		04.50.085	Clearing obstructions (manual)	m3	Manually clear any obstruction including boulders and debris out of road
10		04.50.090	Stripping and grubbing (mechanical)	m2	Clear site on road reserve mechanically by stripping and grubbing roots.
11		04.50.095	Stripping and grubbing (manual)	m2	Clear site on road reserve manually by stripping and grubbing roots.
12		04.50.110	Clearing trees, hedges, bushes, vegetation and deleterious materials (mechanical)	m2	Clear site on road reserve mechanically by removal of trees, hedges, bushes, vegetation and other deleterious materials.
13		04.50.115	Clearing trees, hedges, bushes, vegetation and deleterious materials (manual)	m2	Clear site on road reserve manually by removal of trees, hedges, bushes, vegetation and other deleterious materials.
14	Concrete Demolition	04.50.010	Excavate remove & disposal of concrete structures	m3	Demolish reinforced or mass concrete structures and cart to spoil or stockpile for re-use.
15	Top Soil Stripping	10.80.002	Removal of overburden	m3	Remove topsoil to a maximum depth of 200mm.
16	Pipe Culvert Removal	04.50.120	Removal of cracked small pipe culverts below 600mm	m	Excavate, remove and dispose cracked pipe culverts below 600mm in diameter.
17		04.50.125	Removal of cracked large pipe culverts above 600mm	m	Excavate, remove and dispose cracked pipe culverts above 600mm in diameter.

5. Earth Works

No	Work Category	Code	Work Item Name	Unit	Description
18	Material Filling	05.50.006	Fill in soft material and compact	m3	Provide, place and compact soft patching material to surface defects or gravel road. It is assumed that soil to be filled is on the site or provided from cut area.
19		05.50.006a	Fill in soft material and compact (soil purchased)	m3	Provide, place and compact soft purchased patching material to surface defects or gravel road.
20		05.50.007	Fill in hard material and compact	m3	Provide, place and compact hard patching material to surface defects or gravel road. It is assumed that soil to be filled is on the site or provided from cut area.
21		05.50.007a	Fill in hard material and compact (soil purchased)	m3	Provide, place and compact hard purchased patching material to surface defects or gravel road.
22	Material Cutting	05.50.008	Cut to spoil in soft	m3	Cut manually soft material to spoil
23		07.50.008a	Cut to spoil in soft (mechanical)	m3	Cut mechanically soft material to spoil
24		05.50.009	Cut to spoil in hard	m3	Cut manually hard material to spoil
25		07.50.009a	Cut to spoil in hard (mechanical)	m3	Cut mechanically hard material to spoil
26	Rock filling	05.50.120	Rock fill to swamp	m3	Manually provide and place rock fill to swamp
27		05.50.125	Rock fill to embankment construction	m3	Manually provide and place rock fill to construct embankment.
28	Planting	05.50.014	Grassing	m2	Plant grass on the slope and inverts of ditches to reduce scour effects, or on slopes to reduce soil erosion and to improve stability.
29	Compaction	05.60.012	Compaction of subgrade in cut	m2	Grading and compaction of subgrade in cut
30		05.60.014	Compaction of subgrade in fill	m3	Grading and compaction of subgrade in fill
31		05.60.016	Compaction of original ground level	m2	Compact the top 150 mm layer of existing ground below fills and cuts to 95% MDD (AASHTO T99)

7. Excavation and Filling for Structure

No	Work Category	Code	Work Item Name	Unit	Description
32		07.50.001	Excavate for structure in soft material (manual)	m3	Excavate manually soft material for structures.
33	Material Excavation for Structures	07.50.001a	Excavate for structure in soft material (mechanical)	m3	Excavate mechanically soft material for structures.
34		07.50.002	Excavate for structure in hard material (manual)	m3	Excavate manually in hard material for structures.
35		07.50.002a	Excavate for structure in hard material (mechanical)	m3	Excavate mechanically in hard material for structures.
36	Gabion	08.70.004	Gabion Installation	m2	Provide and place Macaferri or equivalent gabion boxes (2m * 1m * 1m).
37		08.70.005	Rock fill to Gabions	m3	Provide and place rock fill to gabions.
38	Stone Pitching	08.70.001	Stone pitching	m2	Provide stone pitching including grouting of ratio 1:4 cement to mortar.

8. Culverts and Drainage Works

No	Work Category	Code	Work Item Name	Unit	Description
39	Ditch Cleaning	08.50.001	Ditch cleaning - mechanical	m	Mechanically excavate/desilt, grade to shape inlets outfalls, side drains to free flow conditions
40		08.50.002	Ditch cleaning - manual	m	Manually excavate/desilt, grade to shape inlets outfalls, side drains to free flow conditions.
41	Culvert Cleaning	08.60.001a	Small culvert cleaning-partially blocked-below 450mm	m	Clean culverts of below 450mm in diameter to free flow conditions
42		08.60.001b	Medium culvert cleaning-partially blocked-600mm	m	Clean culverts of below 600mm in diameter to free flow conditions
43		08.60.003c	Large culvert cleaning-partially blocked-900 mm and above	m	Clean culverts of below 900mm in diameter to free flow conditions
44		08.50.025	Manhole cleaning	No	Remove all silt and debris and wash out manhole to free flow conditions.
45		08.50.016	Gulley pot cleaning	No	Clean siltation and debris from gulley pot to good impoundment conditions.
46		08.50.009	Covered (slotted) lined drain cleaning	m	Remove all silt and debris and wash out covered lined drain to free flow conditions
47		08.50.050	Ditch/mitre drain excavation in soft (mechanical)	m3	Excavate mechanically for inlet, outfall, mitre and catchwater drains in soft material
48		08.50.052	Ditch/mitre drain excavation in soft (manual)	m3	Excavate manually for inlet, outfall, mitre and catchwater drains in soft material
49		08.50.054	Ditch/mitre drain excavation in hard (mechanical)	m3	Excavate mechanically in hard material for inlet, outfall, mitre and catchwater drains.
50		08.50.056	Ditch/mitre drain excavation in hard (manual)	m3	Excavate manually in hard material for inlet, outfall, mitre and catchwater drains
51	Pipe Culvert Installation	08.60.020	Culvert installation-300mm with surround	m	Provide, lay and joint pipe culvert of 300mm in diameter with surround
52		08.60.021	Culvert installation-300mm without surround	m	Provide, lay and joint unhounched pipe culvert of 300mm in diameter without surround
53		08.60.022	Culvert installation-450mm with surround	m	Provide, lay and joint pipe culvert of 450mm in diameter with surround.
54		08.60.023	Culvert installation-450mm without surround	m	Provide, lay and joint pipe culvert of 450mm in diameter without surround.
55		08.60.024	Culvert installation-600mm with surround	m	Provide, lay and joint pipe culvert of 600mm in diameter with surround
56		08.60.025	Culvert installation-600mm without surround	m	Provide, lay and joint pipe culvert of 600mm in diameter without surround
57		08.60.026	Culvert installation-900mm with surround	m	Provide, lay and joint pipe culvert of 900mm in diameter with surround.
58		08.60.027	Culvert installation-900mm without surround	m	Provide, lay and joint pipe culvert of 900mm in diameter without surround
59		08.60.028	Culvert installation-1200mm with surround	m	Provide, lay and joint pipe culvert of 1200mm in diameter with surround
60		08.60.029	Culvert installation-1200mm without surround	m	Provide, lay and joint culvert of 1200mm in diameter without surround
61		08.60.030	Excavate in soft material for culverts	m3	Excavation manually in soft material for culvert in any size.
62		08.60.031	Excavate in hard material for culverts	m3	Excavation manually in hard material for culvert in any size.
63	Headwall Construction	08.60.190	Headwall construction for 450mm pipe culvert	No	Reconstruct or repair damaged headwall (wingwall and apron) for 450mm pipe culvert to prevent the collapse and the potential slippage of the material and pavement above the culvert.
64		08.60.192	Headwall construction for 600mm pipe culvert	No	Reconstruct or repair damaged headwall (wingwall and apron) for 600mm pipe culvert to prevent the collapse and the potential slip of the material and pavement above the culvert.
65		08.60.194	Headwall construction for 900mm pipe culvert	No	Reconstruct or repair damaged headwall (wingwall and apron) for 900mm pipe culvert to prevent the collapse and the potential slip of the material and pavement above the culvert.
66		08.60.196	Headwall construction for 1200mm pipe culvert	No	Reconstruct or repair damaged headwall (wingwall and apron) for 1200mm pipe culvert to prevent the collapse and the potential slip of the material and pavement above the culvert.
67	Manhole installation	08.50.240	Manhole construction less than 1m	No	Install new small manhole of less than 1m in depth (900-1200mm in inner diameter)
68		08.50.245	Manhole construction more than 1m	No	Install new large manhole of more than 1m in depth (900-1200mm in inner diameter)
69	Gulley Pot installation	08.50.015	Gulley pot construction	No	Provide and place gulley pots including grating (H=900mm) for inlet structures as directed by the Engineer.
70	Drain Lining	08.50.140	Lay drain lining with concrete	m2	Place concrete lining to the slopes and invert of the ditch to prevent the scour.
71		08.50.220	Laying of dressed stones	m2	Place dressed stone lining to the slopes and invert of the ditch to prevent the scour.
72		08.50.225	Laying of side slabs	m2	Place side slab lining to the slopes and invert of the ditch to prevent the scour.
73		08.60.050	Laying of 300mm invert block drain	m	Provide, lay and joint invert block drain of 300mm in diameter
74		08.60.051	Laying of 750mm invert block drain	m	Provide, lay and joint invert block drain of 750mm in width

9. Passage of Traffic

No	Work Category	Code	Work Item Name	Unit	Description
75	Traffic Control	09.50.004	Traffic Control	Day	Place warning signs, barriers and cones around the working lane on the carriageway and guide the passage of traffic through the works
76		09.50.005	Watchman	No	Provide watchman for all round surveillance.
77		09.50.006	Watering	m2	Sprinkle water to control dust for passage of traffic through the works or compaction at earth works

10. Grading and Graveling Works

No	Work Category	Code	Work Item Name	Unit	Description
78	Grading	10.50.001	Heavy grading without watering or compaction	m2	Trim with Motor Grader or heavy towed grader existing carriageway surface to camber, including slopes and ditches without providing watering and compaction
79		10.50.002	Heavy grading with watering and compaction	m2	Trim with Motor Grader or heavy towed grader existing carriageway surface to camber, including slopes and ditches providing watering and compaction
80		10.50.003	Light grading	m2	Trim with motor grader existing carriageway to camber, including slopes and ditches.
81		10.50.004	Reshaping	m2	Restore manually the camber on earth or gravel roads by returning material from road sides and shoulder toward road centre.
82		10.50.005	Dragging	m2	Remove manually loose material from the surface to delay the formation of corrugations
83	Gravelling	10.60.001	Regravelling	m3	Prepare for road formation and provide, place spread, shape and compact with watering gravel of not less than CBR 20%
84		10.60.001a	Regravelling without watering	m3	Prepare for road formation and provide, place spread, shape and compact without watering gravel of not less than CBR 20%

11. Paved Roads - Shoulder Maintenance and Repairs

No	Work Category	Code	Work Item Name	Unit	Description
85	Shoulder Rebuilding	11.50.001	Shoulder grading	m2	Prepare surface of existing shoulders, accesses and bus bays, including benching where necessary, water process and compact
86		11.50.002	Shoulder repairing	m2	Prepare surface of existing shoulders, accesses and bus bays, water process and compact
87	Shoulder Gravelling	11.50.030	Shoulder gravelling with natural gravel	m3	Provide, place, spread, shape and compact 150mm of natural gravel of CBR 30% to shoulders, accesses and bus bays
88		11.50.035	Shoulder gravelling with quarry waste	m3	Provide, place and compact quarry waste material to shoulders, accesses and bus bays

12. Natural Material Base and Subbase

No	Work Category	Code	Work Item Name	Unit	Description
89	Pavement Removal	12.70.001	Scarify existing pavement to form subbase	m3	Break or scarify mechanically the existing pavement layer, and compact.
90	Subbase Rebuilding	12.50.001	Handpacked stone paving	m3	Provide, lay, and compact hand packed stone material including filling of voids with stone dust
91		12.50.020	Provide, place and compact quarry waste	m3	Provide, spread, shape and compact approved quarry waste of CBR 30% and above for 5cm in thickness.
92	Base Rebuilding	12.50.002	Provide, place, spread and compact natural gravel	m3	Provide, spread, shape and compact approved natural gravel of CBR 30% and above for 15cm in thickness.

13. Graded Crushed Stone Base and Subbase

No	Work Category	Code	Work Item Name	Unit	Description
93	Graded Crushed Stone	13.50.002	Graded Crushed Stone for subbase	m3	Provide, place and spread approved graded crushed stone for subbase.
94		13.50.003	Graded Crushed Stone for base	m3	Provide, place and spread approved graded crushed stone for base.

14. Cement and Lime Treated Subgrade, Subbase and Base

No	Work Category	Code	Work Item Name	Unit	Description
95	Cement/Lime Stabilization	14.50.001	Cement stabilization	m3	Provide, spread cement on natural gravel or graded crushed stone
96		14.50.002	Lime stabilization	m3	Provide, spread lime on natural gravel or graded crushed stone
97		14.50.003	Cement/lime mixing	m3	Mixing in cement/lime into natural gravel or graded crushed stone
98		14.50.004	Curing and protection of treated layers	m2	Cure and protect layers treated with cement or lime stabilizers

15. Bituminous Surface Treatment & Surface Dressing

No	Work Category	Code	Work Item Name	Unit	Description
99	Prime Coat	15.50.002	Prime Coat (MC-30 cutback bitumen)	litre	Prepare surface of carriageway, bus bays and repair areas, provide and spray MC-30 cutback bitumen at a rate of 0.8-1.2 litre/m2 as prime coat
100	Tack Coat	15.50.030	Tack Coat (grade bitumen cutback)	litre	Prepare surface of carriageway and bus bays, provide and spray 80/100 penetration grade bitumen cut back using 5-15% kerosene as tack coat for asphalt concrete wearing course at a spray rate of 0.5-0.7 litre/m2
101		15.50.035	Tack Coat (bitumen emulsion)	litre	Prepare surface of repair areas provide and spray K1-60 bitumen emulsion as tack coat or seal to repair areas at a spray rate of 0.8-1.0 litre/m2
102	Surface Dressing	15.70.001	Seal coat	litre	Cover a large worn surface area with aggregate distributed over spread bitumen to seal cracks and to recover adequate surface texture
103		15.60.002	Provide and roll 3/6 mm precoated chipping	m3	Treat worn surface with graded aggregates of 3 to 6mm precoated with bitumen to recover adequate surface texture
104		15.60.003	Provide and roll 6/10 mm precoated chipping	m3	Treat worn surface with graded aggregates of 6 to 10mm precoated with bitumen to recover adequate surface texture
105		15.60.004	Provide and roll 10/14 mm precoated chipping	m3	Treat worn surface with graded aggregates of 10 to 14mm precoated with bitumen to recover adequate surface texture
106		15.60.005	Provide and roll 14/20 mm precoated chipping	m3	Treat worn surface with graded aggregates of 14 to 20mm precoated with bitumen to recover adequate surface texture

16. Bituminous Mixes

No	Work Category	Code	Work Item Name	Unit	Description
107	Pavement Repairing	16.50.001	Pothole patching - hot mix	m3	Repair defects on bituminous surface by hot bituminous mixture
108		16.50.002	Pothole patching - cold mix	m3	Repair defects on bituminous surface by cold bituminous mixture
109		16.50.004	Crack sealing	m	Repair transverse or longitudinal cracking on surface dressed or asphalt concrete
110		16.60.001	Asphalt concrete for surfacing - hot mix.	m3	Overlay or continuously repave surface by hot bituminous mixture
111		16.70.001	Base repair - Dense Bitumen Macadam (DBM)	m3	Place dense bitumen macadam for base material and roll
112	Milling and Paving	16.80.010	Milling the existing bituminous layer to spoil	m3	Mill mechanically the existing bituminous layer to spoil
113		16.80.015	Milling the existing bituminous layer for reuse	m3	Mill mechanically the existing bituminous layer and stockpile for reuse or recycle

17. Concrete Works

No	Work Category	Code	Work Item Name	Unit	Description
114	Concrete Work	17.60.010	Concrete work (class 15/20)	m3	Provide, place and compact class 15/20 concrete mixture for blinding.
115		17.60.015	Concrete work (class 20/20)	m3	Provide, place and compact class 20/20 concrete mixture for blinding.
116		17.60.002	Concrete work (class 25/20)	m3	Provide, place and compact class 25/20 concrete mixture for blinding.
117	Formwork	17.60.003	Vertical formwork class F2 finish	m2	Provide and erect formwork of class F2 finish to the vertical direction
118		17.60.004	Horizontal formwork class F2 finish	m2	Provide and erect formwork of class F2 finish to the horizontal direction
119	Reinforcement	17.60.050	Reinforcement work (below 16mm)	ton	Provide, cut bend and fix into position high yield reinforcement bar below 16mm
120		17.60.055	Reinforcement work (above 16mm)	ton	Provide, cut bend and fix into position high yield reinforcement bar above 16mm

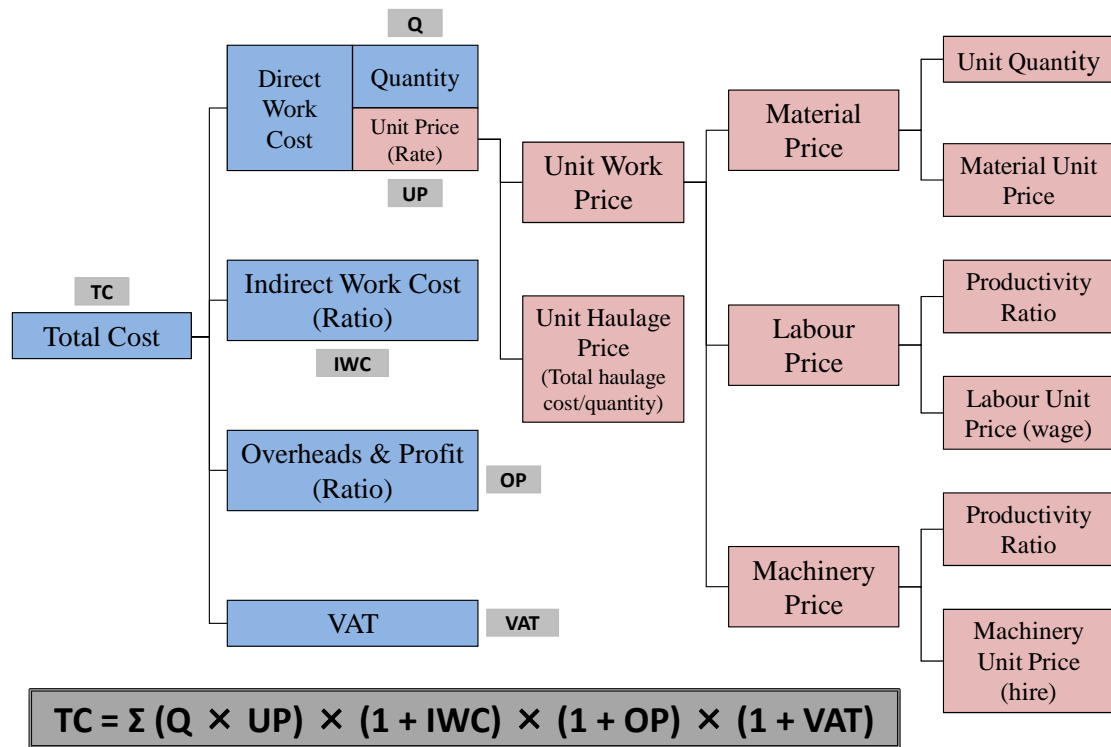
20. Road Furniture Repair and Maintenance

No	Work Category	Code	Work Item Name	Unit	Description
121	Boundary posts	20.50.001	Road reserve boundary posts	No	Provide and erect road reserve boundary posts (size 1.2 x 0.2 x 0.2)
122		20.50.004	Edge marker posts	No	Provide and erect edge marker posts
123	Road Marking	20.50.060	Roads markings - white paint	m	Provide reflectorized white paint for road markings (w = 10cm)
124		20.50.065	Road markings - white thermoplastic material	m	Renew faded or missing white road markings (w = 10cm) with thermoplastic material
125		20.50.070	Road markings - yellow paint	m	Provide reflectorized yellow paint for road markings (w = 10cm)
126		20.50.075	Road markings - yellow thermoplastic material	m	Upgrade faded or missing yellow road markings (w = 10cm) with thermoplastic material
127		20.50.107	Road marking black paint	m	Provide reflectorized black paint for road markings (w = 10cm)
128	Road Sign Erection	20.50.050	Warning signs	No	Provide and erect priority, prohibitory or mandatory signs
129		20.50.052	Priority, prohibitory or mandatory signs	No	Priority, prohibitory or mandatory signs
130		20.50.054	Standard informatory signs	No	Provide and erect informatory signs
131		20.50.056	Non-standard informatory signs	No	Provide and erect non-standard warning signs
132	Kerb Installation	20.50.012	Kerbs	m	Provide lay and joint concrete class 20/20 kerbs in support to carriageway, bus bays and junctions
133	Kilometre marker post Installation	20.50.013	Kilometre marker posts	No	Kilometre marker post Installation.
134	Bollard Installation	20.50.170	Concrete bollards	No	Concrete bollard Installation (diameter 0.2m, length 0.9m, embedded depth 0.45m)
135		20.50.175	Steel bollards	No	Place and provide gauge 16 steel pipe Bollards of diameter 150 mm and 1.05m above above the ground embedded to a depth of 0.45m at place
136	Reflective Stud Installation	20.50.019	Reflective studs	No	Install reflective studs along the centre line
137	Microtunneling	20.60.010	Microtunneling for a 150mm diameter PVC (polyvinyl chloride) duct	m	Conduct microtunneling with a 150mm dia PVC duct (under silt or sand condition)
138		20.60.015	Horizontal drilling	m	Conduct horizontal drilling for 150mm hole in diameter (under gravel condition)
139	Street light Installation	20.60.030	Street lighting pole (7.6m)	No	Provide and install 7.6m street lighting pole including cables accessories and lamp.
140		20.60.035	Street lighting pole (10m)	No	Provide and install 10.0m street lighting pole including cables accessories and lamp.
141		20.60.310	Street lighting control panel	No	Provide and install 10.0m street lighting pole including cables accessories and lamp.
142		20.60.315	Electric cable	m	Provide and install supply cables between the street lighting poles.

3.2 Cost configuration

Road works consist of various work items that are aggregated into a work package. The total cost of any work package is structured in the formula shown in Figure 1;

Figure 1 Cost Configuration



Direct work cost is the accumulation of all necessary input costs for the execution of each work item. This is the product of the quantity by its unit price, while unit haulage price is considered separately. The combination of unit work price (a pure work price assuming that all the resources are on site) and unit haulage prices constitute the unit price. This takes care of the transportation costs of work items.

Indirect work cost is costs related to management and administration. It is given by the ratio of direct work cost.

Overheads and profits are given by the ratio of direct and indirect work costs.

Value-added tax (VAT) is a percentage determined by taxation regulations.

3.3 Price list and source

Material, labour and machinery unit prices used for cost estimation by procurement entities are basically derived from official price indices given by government entities. They are open for public and based on nation-wide market surveys. Hence they can be assumed to be the average prices in Kenya.

The official prices are revised periodically. The prices may be updated in an ad-hoc basis when substantial change takes place during the fiscal year (e.g. case of high inflation or embargo).

Users of this Manual may choose to apply their own quotation prices.

All prices are also coded based on RMMS coding system. The types of material, labour and machinery used in the manual is shown in the Table 3;

Table 2 Price List (Labour, Machinery, Material)

Item	Code	Name	Type	Unit	Unit Price	Source
Labour	22.50.001	Support Staff		Person Day	0	
	22.50.002	Unskilled labour		Person Day	0	
	22.50.005	Artisans G2		Person Day	0	
	22.50.007	Skilled Labour: Overseer		Person Day	0	
	22.50.101	Skilled Labour: Operator		Person Day	0	
Machinery	22.61.101	Truck Flat bed : 2.5 - 5 Tonnes		Hour	0	
	22.61.102	Truck with crane	4t	Hour	0	
	22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	0	
	22.63.012	Motor Grader (e.g. CAT 112F):		Hour	0	
	22.63.101	Bulldozer	BD65EX	Hour	0	
	22.63.102	Excavator	130-150hp	Hour	0	
	22.63.103	Backhoe loader	130-150hp	Hour	0	
	22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	
	22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		Hour	0	
	22.64.005	Pneumatic Roller: 10T, 130 HP		Hour	0	
	22.65.008	Road Marking Machine		Hour	0	
	22.65.101	Melting pod (for paint)	200 - 350kg	Hour	0	
	22.67.001	Grass cutter	150cm, 35hp	Hour	0	
	22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	
	22.67.005	Vibrator P/Tamper		Hour	0	
	22.67.101	Milling machine	197hp	Hour	0	
	22.67.102	Resurface machine	120hp	Hour	0	
	22.67.103	Road heater	63hp	Hour	0	
	22.67.104	Asphalt finisher	37H	Hour	0	

Machinery (cont'd)	Code	Name	Type	Unit	Unit Price	Source
	22.67.105	Power suction car	4t	Hour	0	
	22.67.106	Muddy water processing machine		Day	0	
	22.67.107	Boring machine	81kw	Day	0	
	22.67.108	Air compressor	150CFM, 4250LPM	Day	0	
	22.67.109	Asphalt cutter		Hour	0	
	22.67.110	Chip spreader		Hour	0	

Item	Code	Name	Type	Unit	Unit Price	Source
Material	22.69.009	Fine aggregates(sand)		m3	0	
	22.70.001	Fine aggregates(stone dust)		m3	0	
	22.70.002	Graded aggregates (ballast)		m3	0	
	22.70.003	water		m3	0	
	22.70.004	Cement (ordinary portland)		Kg	0	
	22.70.006	Hydrated lime		Kg	0	
	22.71.012	Square twisted bars 16mm		t	0	
	22.72.001	Precast concrete culvert - 450mm		m	0	
	22.72.002	Precast concrete culvert - 600mm		m	0	
	22.72.003	Precast concrete culvert - 900mm		m	0	
	22.72.004	Precast concrete culvert - 1200mm		m	0	
	22.72.016	Coarse aggregates(chippings) - 3/6mm		m3	0	
	22.72.017	Coarse aggregates(chippings) - 6/10mm		m3	0	
	22.72.018	Coarse aggregates(chippings) - 10/14mm		m3	0	
	22.72.019	Coarse aggregates(chippings) - 14/20mm		m3	0	
	22.72.020	Stone dust		m3	0	
	22.72.021	Gravel material (murrum)		m3	0	
	22.72.022	Hardcore		m3	0	
	22.72.023	Crusher run material (Graded crushed stone)		m3	0	
	22.72.024	Quarry waste material		m3	0	
	22.72.101	Precast concrete culvert - 300mm		m	0	
	22.72.102	Stone		m3	0	
	22.72.103	Gully pot with grating		Set	0	
	22.72.104	Invert block drain	600*330*355	No.	0	
	22.72.105	Invert block drain	600*760*190	No.	0	
	22.72.106	Side Slab concrete block	3"*9"*24"	No.	0	
	22.72.107	Manhole cover slab	1220*150	No.	0	
	22.72.108	Soil (soft)		m3	0	
	22.72.109	Soil (hard)		m3	0	
	22.73.002	Premix - AC Type I (cold)		m3	0	
	22.73.003	Premix - AC Type I (hot)		m3	0	
	22.73.004	Dense Bitumen Macadam		m3	0	
	22.73.006	Bituminous sealant		m3	0	
	22.73.012	MC 30 Bitumen		litre	0	
	22.73.013	80/100 Pen grade bitumen		litre	0	
	22.74.002	Fuel	Diesel	litre	0	
	22.77.001	Mesh wire 8' x 4' gauge 18		m2	0	
	22.77.101	Gabion mesh	2m*1m = 2m2	No.	0	
	22.77.102	Mattress	10mm	m2	0	
	22.77.103	Flat metal plate	1/16-1/18	m2	0	
	22.77.104	Steel pipe	2inch	m	0	
	22.77.105	Bolts with nuts	8cm	Set	0	
	22.77.106	Brackets		No	0	
	22.77.107	Steel angle	125*5mm	kg	0	
	22.77.108	Steel plate	450*3mm	kg	0	
	22.77.109	Steel bollard	SGP. 5B. 125A	kg	0	
	22.77.110	Mesh wire	A142	m2	0	

Item	Code	Name	Type	Unit	Unit Price	Source
Material (cont'd)	22.77.111	Cast iron manhole cover	600*450 heavy duty with frame	No.	0	
	22.78.101	Cypress	for fixed deck	m3	0	
	22.78.102	Wooden formwork panel		m2	0	
	22.79.003	Road making paint yellow		litre	0	
	22.79.004	Road making paint white		litre	0	
	22.79.005	Thermoplastic paint yellow	premixed with primer and glass beads	Kg	0	
	22.79.006	Thermoplastic paint white	premixed with primer and glass beads	Kg	0	
	22.79.012	Reflective 'cat' eyes		No	0	
	22.79.013	Reflective mark posts	White PVC post 1400	No.	0	
	22.79.101	Road making paint black		litre	0	
	22.79.104	Reflective paint		litre	0	
	22.79.105	White paint		litre	0	
	22.79.106	Black paint		litre	0	
	22.79.107	Road Kerb	12.25*24.5	No.	0	
	22.79.108	Road channel	9.8*12.25	No.	0	
	22.79.109	Duct Pipe (PVC150)		m	0	
	22.79.110	Equipment for lead pipe jacking	196kN	Day	0	
	22.79.111	Equipment for lead pipe jacking (fixing part)		Day	0	
	22.79.112	Equipment for lead pipe jacking (moving part)		m	0	
	22.79.113	Equipment for Underground pipe jacking	196kN	Day	0	
	22.79.114	Equipment for Underground pipe jacking (fixing part)		Day	0	
	22.79.115	Equipment for Underground pipe jacking (moving part)		m	0	
	22.79.116	Water stopper		No.	0	
	22.79.117	Concrete anchor		No.	0	
	22.79.118	Water stop cement		Kg	0	
	22.79.119	Aggregation(jacking)		kg	0	
	22.79.120	Aggregation(washing)		kg	0	
	22.79.121	Shank-rod	90mm	No.	0	
	22.79.122	Driving-adapter		No.	0	
	22.79.123	drilling-pipe		No.	0	
	22.79.124	Ring-bit		No.	0	
	22.79.125	Water-swivel		No.	0	
	22.79.126	Cutter-set		No.	0	
	22.79.127	Core-tube		No.	0	
	22.79.128	Magnifying-bit		No.	0	
	22.79.129	Earth bar	10*1500mm	No.	0	
	22.79.130	Lighting pole	7.6m	No.	0	
	22.79.131	Lighting pole	10.0m	No.	0	
	22.79.132	Cable	for light	m	0	
	22.79.133	Accessories	for light	Set	0	
	22.79.134	Lamp		No.	0	
	22.79.135	Control panel		No.	0	
	22.79.136	Cable	for control panel	m	0	
	22.79.137	Accessories	for control panel	Set	0	
	22.79.138	Meter		No.	0	
22.79.139	Grass		m2	0		
22.79.140	Red soil		m3	0		
22.79.141	Manure		m3	0		
22.79.142	Warning triangular sign	600mm	No.	0		
22.79.143	Priority triangular sign	600mm	No.	0		
22.79.144	Standard informatory sign		No.	0		
22.79.145	Non-standard informatory sign	less than 1m2	No.	0		

3.4 Haulage cost

Site location is a major parameter to determine the unit price so that haulage cost to transport material or equipment should be carefully estimated. In this manual, haulage cost is calculated by the Table 3;

Table 3 Estimation Equation of Haulage Price

Type of Vehicle:	(specify)	
Vehicle price per hour (or dry hire rate)=A		Ksh/hr
Fuel price per hour B=C/D*E		Ksh/hr
Fuel cost per litter=C		Ksh/litre
Fuel consumption rate=D		km/litre
Average speed during transport=E		km/hr
Driver wage per hour F=G/8hr		Ksh/hr
Wage per day =G		Ksh/day
Turnboy wage per hour H=I/8hr		Ksh/hr
Wage per day =I		Ksh/day
Total price per hour of transport J=A+B+F+H		Ksh/hr
Distance of transport (one way) =K		km
Frequency of transport (no. of round trip) =L		times
Distance of transport (by round trip) M=2*K		km
Total Distance of transport N=L*M		km
Total time of Transport O=N/E		hr
Total Haulage Price P=J*O		Ksh

The calculated total haulage cost is divided by given quantity of the work item and added to unit work price to make a unit price of the work.

If a different quotation for haulage is available, it may be used regardless of the aforementioned equation.

3.5 Unit quantity and productivity

Unit quantity of material (the amount of material used per unit of work), labour productivity (the number of people worked per unit of work), and machinery productivity (the number hours/days of machinery operation needed per unit of work) are determined with the following references;

- Ministry of Transport and Communications, Standard Specification for Road and Bridge Construction, 1986
- Standard drawings
- Average productivity rates from site surveys and the engineers' past experiences with input from JICA

3.6 Indirect work costs

Indirect work costs include the following items;

- Human Resource Management costs (e.g. recruiting, staff welfare, transportation, insurance, uniforms)
- Site staff allowances
- Site management cost (e.g. site office maintenance, office equipments, communication, transportation)
- Safety measures
- Social charges (e.g. local taxes and public charges, welfare)

Since the precise estimation of the above is difficult, the costs are provided as a ratio of the total direct work cost.

3.7 Overheads and Profit

Overheads and Profit include the following items;

- Head office staff salaries and allowances
- Head office management costs (e.g. office maintenance, office equipments, communication, transportation)

- Corporate Social charges (e.g. insurance, tax and public charges, welfare)
- Research and Development
- Advertisement and publicity
- Depreciation costs for fixed assets
- Profit margin (bonuses, dividends to shareholders, internal reserves)

Since the precise estimation of the above is difficult, the costs are provided as a ratio of summation of direct work cost and indirect work cost.

Appendix 1. Unit Calculation Tables

Unit Price Calculation Table

No. 1

Work Category Bush Clearing
Code 04.50.001
Work Item Name Mechanical mowing

Description Cut grass by machine along the side of the road or on slopes.

Unit m2
Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.07	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	1	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.67.001	Grass cutter	150cm, 35hp	Hour	0	8	0	Two machines half a day each 2 * 4 = 8
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0.0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
 4. the mower is operated by artisans and fuel includes in miscellaneous cost.

Unit Price Calculation Table

No. 2

Work Category Bush Clearing
 Code 04.50.002
 Work Item Name Grass cutting (manual)

Description Cut grass manually along the side of the road or on slopes.

Unit m2
 Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.3	0	
22.50.005	Artisans G2		Person Day	0		0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0.0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 3

Work Category Bush Clearing
 Code 04.50.003
 Work Item Name Heavy bush clearing

Description Cut, remove and dispose bushes along the side of the road, slopes or alongside ditches.

Unit m2
 Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	20	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0.0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 4

Work Category Bush Clearing
 Code 04.50.004
 Work Item Name Light bush clearing

Description Cut grass by hand from shoulders, slopes, inlet ditches, and side ditches including back slopes, turnouts and culvert outlet.

Unit m2
 Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0.0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 5

Work Category Bush Clearing
 Code 04.50.005
 Work Item Name Pruning of tree branches

Description Cut, remove and dispose branches of trees along the side of the road, slopes or alongside ditches.

Unit No.
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	1	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 6

Work Category Bush Clearing
 Code 04.50.006
 Work Item Name Tree cutting and stump removal (200 –450 mm)

Description Cut, remove and dispose whole trees of 200 – 450mm in girth including their stumps along the side of the road, slopes or alongside ditches.

Unit No.
 Quantity 50

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 7

Work Category Bush Clearing
 Code 04.50.007
 Work Item Name Tree cutting and stump removal (>450 mm)

Description Cut, remove and dispose whole trees of above 450mm in girth including their stumps along the side of the road, slopes or alongside ditches.

Unit No.
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	total					0	
	Per unit					0	Total/Quantity0

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 8

Work Category Site Clearing and Backfill
 Code 04.50.080
 Work Item Name Clearing obstructions (mechanical)

Description Mechanically clear any obstruction including boulders and debris out of road reserve.

Unit m2
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.031	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0.5	0	
M1	Bulldozer Driving	BD65EX	Hour	0	0.25	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Bulldozer Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	33.84	0		
22.63.101	Bulldozer	BD65EX	Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

Unit Price Calculation Table

No. 9

Work Category Site Clearing and Backfill
 Code 04.50.085
 Work Item Name Clearing obstructions (manual)

Description Manually clear any obstruction including boulders and debris out of road reserve.

Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	3	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 10

Work Category Site Clearing and Backfill
 Code 04.50.090
 Work Item Name Stripping and grubbing (mechanical)

Description Clear site on road reserve mechanically by stripping and grubbing roots.

Unit m2
 Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.625	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Bulldozer Driving	BD65EX	H	0	5	0	
M2	Excavator Driving	197hp	H	0	3.5	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Bulldozer Driving

per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	33.84	0	
22.63.101	Bulldozer	BD65EX	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M2 Excavator Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 11

Work Category Site Clearing and Backfill
 Code 04.50.095
 Work Item Name Stripping and grubbing (manual)

Description Clear site on road reserve manually by stripping and grubbing roots.

Unit m2
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	20	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 12

Work Category Site Clearing and Backfill
 Code 04.50.110
 Work Item Name Clearing trees, hedges, bushes, vegetation and deleterious materials (mechanical)
 Description

Description Clear site on road reserve mechanically by removal of trees, hedges, bushes, vegetation and other deleterious materials.

Unit m2
 Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Bulldozer Driving	BD65EX	Hour	0	8	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Bulldozer Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day	
22.74.002	Fuel	Diesel	litre	0	33.84	0		
22.63.101	Bulldozer	BD65EX	Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

Unit Price Calculation Table

No. 13

Work Category Site Clearing and Backfill
 Code 04.50.115
 Work Item Name Clearing trees, hedges, bushes, vegetation and deleterious materials (manual)

Description Clear site on road reserve manually by removal of trees, hedges, bushes, vegetation and other deleterious materials.

Unit m2
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	8	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 14

Work Category Concrete Demolition
 Code 04.50.010
 Work Item Name Excavate remove & disposal of concrete structures

Description Demolish reinforced or mass concrete structures and cart to spoil or stockpile for re-use.

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.625	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator Driving	197hp	Hour	0	5	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 15

Work Category Top Soil Stripping
Code 10.80.002
Work Item Name Removal of overburden

Description Remove topsoil to a maximum depth of 200mm.

Unit m3
Quantity 200

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.5	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Bulldozer Driving	BD65EX	Hour	0	4	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Bulldozer Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	33.84	0	
22.63.101	Bulldozer	BD65EX	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 16

Work Category Pipe Culvert Removal
 Code 04.50.120
 Work Item Name Removal of cracked small pipe culverts below 600mm

Description Excavate, remove and dispose cracked pipe culverts below 600mm in diameter.

Unit m
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.042	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator Driving	197hp	Hour	0	0.33	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 17

Work Category Pipe Culvert Removal
 Code 04.50.125
 Work Item Name Removal of cracked large pipe culverts above 600mm

Description Excavate, remove and dispose cracked pipe culverts above 600mm in diameter.

Unit m
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.042	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator Driving	197hp	Hour	0	0.5	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 18

Work Category Material Filling
Code 05.50.006
Work Item Name Fill in soft material and compact

Description Provide, place and compact soft patching material to surface defects or gravel road. It is assumed that soil to be filled is on the site or provided from cut area.

Unit m3
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	25	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	10	0	1.25days = 10hours
M2	Water tanker driving		Hour	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M2 Water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 19

Work Category Material Filling
 Code 05.50.006a
 Work Item Name Fill in soft material and compact (soil purchased)

Description Provide, place and compact soft purchased patching material to surface defects or gravel road.

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	25	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.108	Soil (soft)		m3	0	120	0	100 * 1.2 (loss margin) = 120
M1	Pedestrian roller driving		Hour	0	10	0	1.25days = 10hours
M2	Water tanker driving		Hour	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M2 Water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 20

Work Category Material Filling
Code 05.50.007
Work Item Name Fill in hard material and compact

Description Provide, place and compact hard patching material to surface defects or gravel road. It is assumed that soil to be filled is on the site or provided from cut area.

Unit m3
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	25	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	15	0	1.9days = 15hours
M2	Water tanker driving		Hour	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	Total					0		

Note

M2 Water tanker driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	13.36	0		
22.62.015	Water Tanker : 6000 - 8000 Lt.		Hour	0	1	0		
22.70.003	water		m3	0	1	0	Temporarily estimated quantity	
	Miscellaneous Cost		%	0	0			
	Total					0		

Note

Unit Price Calculation Table

No. 21

Work Category Material Filling
 Code 05.50.007a
 Work Item Name Fill in hard material and compact (soil purchased)

Description Provide, place and compact hard purchased patching material to surface defects or gravel road.

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	25	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.109	Soil (hard)		m3	0	120	0	100 * 1.2 (loss margin) = 120
M1	Pedestrian roller driving		Hour	0	15	0	1.9days = 15hours
M2	Water tanker driving		Hour	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M2 Water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 - 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 22

Work Category Material Cutting
Code 05.50.008
Work Item Name Cut to spoil in soft

Description Cut manually soft material to spoil

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0		
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
 - 4.the unit price includes loading.

Unit Price Calculation Table

No. 23

Work Category Material Cutting
 Code 07.50.008a
 Work Item Name Cut to spoil in soft (mechanical)

Description Cut mechanically soft material to spoil

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator driving		Hour	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 24

Work Category Material Cutting
 Code 05.50.009
 Work Item Name Cut to spoil in hard

Description Cut manually hard material to spoil

Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
 4. the unit price includes loading.

Unit Price Calculation Table

No. 25

Work Category Material Cutting
 Code 07.50.009a
 Work Item Name Cut to spoil in hard (mechanical)

Description Cut mechanically hard material to spoil

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.5	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator driving		Hour	0	4	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day	
22.74.002	Fuel	Diesel	litre	0	26.32	0		
22.63.102	Excavator	130-150hp	Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	total					0		

Note

Unit Price Calculation Table

No. 26

Work Category Rock filling
Code 05.50.120
Work Item Name Rock fill to swamp

Description Manually provide and place rock fill to swamp

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.022	Hardcore		m3	0	12	0	10 * 1.2 (loss margin) =12
M1	Pedestrian roller driving		Hour	0	1	0	0.125days = 1hours
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	Total					0		

Note

Unit Price Calculation Table

No. 27

Work Category Rock filling
 Code 05.50.125
 Work Item Name Rock fill to embankment construction

Description Manually provide and place rock fill to construct embankment.

Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person	0	0	0	
22.72.022	Hardcore		m3	0	12	0	10 * 1.2 (loss margin) = 12
M1	Pedestrian roller driving		Hour	0	1	0	0.125days = 1hours
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. Material quantity is based on M.o.P.W.:1988: Activity No. 30201
 3. The unit price does not include haulage cost.
 4. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	Total					0		

Note

Unit Price Calculation Table

No. 28

Work Category Planting
Code 05.50.014
Work Item Name Grassing

Description Plant grass on the slope and inverts of ditches to reduce scour effects, or on slopes to reduce soil erosion and to improve stability.

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.139	Grass		m2	0	100	0	
22.79.140	Red soil		m3	0	7.5	0	0.075m*100m2=7.5m3
22.79.141	Manure		m3	0	2.5	0	0.025m*100m2=2.5m3
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 29

Work Category Compaction
Code 05.60.012
Work Item Name Compaction of subgrade in cut

Description Grading and compaction of subgrade in cut

Unit m2
Quantity 750

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Motor Grader driving	131hp	Hour	0	2	0	
M2	Roller driving	130hp	Hour	0	2	0	
M3	Water tanker driving	10t	Hour	0	2.1	0	750m2*2.8L/m2 = 2100L = 2.1m3 1m3 watering per hour
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25	
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125	
22.74.002	Fuel	Diesel	litre	0	26	0		
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP		0 Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	total					0		

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	10.92	0		
22.64.004	Single drum steel Vibrator roller: 9–10T, 130 HP		0 Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	total					0		

Note

M3 Water tanker driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	13.36	0		
22.62.015	Water Tanker : 6000 – 8000 Lt.		0 Hour	0	1	0		
22.70.003	water		m3	0	1	0	Temporarily estimated quantity	
	Miscellaneous Cost		%	0	0	0		
	Total					0		

Note

Unit Price Calculation Table

No. 30

Work Category Compaction
Code 05.60.014
Work Item Name Compaction of subgrade in fill

Description Grading and compaction of subgrade in fill

Unit m3
Quantity 450

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.021	Gravel material (murrum)		m3	0	540	0	450 *1.2(loss margin) = 540
M1	Motor Grader driving	131hp	Hour	0	6	0	
M2	Roller driving	130hp	Hour	0	6	0	
M3	Water tanker driving	10t	Hour	0	6	0	
	Sub total					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours	0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125	
22.74.002	Fuel	Diesel	litre	0	26	0		
22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		0 Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours	1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0		
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

M3 Water tanker driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours	1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0		
22.62.015	Water Tanker : 6000 - 8000 Lt.		0 Hour	0	1	0		
22.70.003	water		m3	0	1	0		Temporarily estimated quantity
	Miscellaneous Cost		%	0	0			
	Total					0		

Note

Unit Price Calculation Table

No. 31

Work Category Compaction
Code 05.60.016
Work Item Name Compaction of original ground level

Description Compact the top 150 mm layer of existing ground below fills and cuts to 95% MDD (AASHTO T99)

Unit m2
Quantity 3,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Motor Grader driving	131hp	Hour	0	6	0	
M2	Roller driving	130hp	Hour	0	6	0	
M3	Water tanker driving	10t	Hour	0	8.4	0	3000m2*2.8L/m2 = 8400L = 8.4m3 1m3 watering per hour
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	total					0	

Note

M2 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9–10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	total					0	

Note

M3 Water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 – 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 32

Work Category Material Excavation for Structures
 Code 07.50.001
 Work Item Name Excavate for structure in soft material (manual)
 Description Excavate manually soft material for structures.
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 33

Work Category Material Excavation for Structures
 Code 07.50.001a
 Work Item Name Excavate for structure in soft material (mechanical)

Description Excavate mechanically soft material for structures.

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator driving		Hour	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 34

Work Category Material Excavation for Structures
 Code 07.50.002
 Work Item Name Excavate for structure in hard material (manual)

Description Excavate manually in hard material for structures.

Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 35

Work Category Material Excavation for Structures
 Code 07.50.002a
 Work Item Name Excavate for structure in hard material (mechanical)

Description Excavate mechanically in hard material for structures.

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.5	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator driving		Hour	0	4	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 36

Work Category Gabion
Code 08.70.004
Work Item Name Gabion Installation

Description Provide and place Macaferri or equivalent gabion boxes (2m * 1m * 1m).

Unit m2 (mesh area)
Quantity 110

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	standard gabion block size: 2*1*1=2m3 (mesh area 11m2 with partition in the middle) 110m2 = 10 blocks
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.77.101	Gabion mesh	2m*1m = 2m2	No.	0	60.5	0	110m2 / 2m2 * 1.1 (loss margin) = 60.5
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 37

Work Category Gabion
 Code 08.70.005
 Work Item Name Rock fill to Gabions

Description Provide and place rock fill to gabions.

Unit m3
 Quantity 20

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	8	0	Filling+Haulage within site
22.50.001	Support Staff		Person Day	0	0	0	
22.72.102	Stone		m3	0	24	0	20 * 1.2 (loss margin) = 24
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 38

Work Category Stone Pitching
Code 08.70.001
Work Item Name Stone pitching

Description Provide stone pitching including grouting of ratio 1:4 cement to mortar.

Unit m2
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.102	Stone		m3	0	2.4	0	10 * 0.2 (thckness) * 1.2 = 2.4
B1	Mortar mixing		m3	0	2.2	0	
B2	Mortar curing		m3	0	2.2	0	
	subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.

B1 Mortar mixing

Per 1m3

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	-	
22.50.005	Artisans G2		Person Day	0	2	-	
22.50.002	Unskilled labour		Person Day	0	1	-	
22.50.001	Support Staff		Person Day	0	0	-	
22.70.004	Cement (ordinary portland)		Kg	0	402	-	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	1.2	-	1.05*1.1 (loss margin) = 1.155
	subtotal					-	
	Miscellaneous Cost		%		20	-	% of Subtotal
	Total					-	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Mortar curing

Unit m3
Quantity 1

Per 1m3

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 39

Work Category Ditch Cleaning
 Code 08.50.001
 Work Item Name Ditch cleaning – mechanical

Description Mechanically excavate/desilt, grade to shape inlets outfalls, side drains to free flow conditions

Unit m
 Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.15	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.2	0	
22.50.001	Support Staff		Person Day	0	0		
M1	Backhoe loader driving		Hour	0	3	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Backhoe loader driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.103	Backhoe loader	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 40

Work Category Ditch Cleaning
 Code 08.50.002
 Work Item Name Ditch cleaning – manual

Description Manually excavate/desilt, grade to shape inlets outfalls, side drains to free flow conditions.

Unit m
 Quantity 250

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.3	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	4.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0.0	Tottal/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 41

Work Category Culvert Cleaning
 Code 08.60.001a
 Work Item Name Small culvert cleaning-partially blocked-below 450mm

Description Clean culverts of below 450mm in diameter to free flow conditions

Unit m
 Quantity 80

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	30	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 42

Work Category Culvert Cleaning
 Code 08.60.001b
 Work Item Name Medium culvert cleaning-partially blocked-600mm

Description Clean culverts of below 600mm in diameter to free flow conditions

Unit m
 Quantity 80

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	20	0	The length of culvert to be cleaned per person is 4 m
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal +tool
	Total					0	
	Per unit					0	Tottal/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 43

Work Category Culvert Cleaning
 Code 08.60.003c
 Work Item Name Large culvert cleaning-partially blocked-900 mm and above

Description Clean culverts of below 900mm in diameter to free flow conditions

Unit m
 Quantity 80

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	15	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 44

Work Category Culvert Cleaning
 Code 08.50.025
 Work Item Name Manhole cleaning

Description Remove all silt and debris and wash out manhole to free flow conditions.

Unit No.

Quantity 8.3

Per 10m3 = per 8.3 No. (see note 4)

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	5.5	0	
22.50.001	Support Staff		Person Day	0	0		
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. The unit price does not include haulage cost but loading
 2. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
 3. 10 m3 / amount of dirt per one manhole: 1.2 m3 (1.5*0.8*1.0) = 8.3 manhole units

Unit Price Calculation Table

No. 45

Work Category Culvert Cleaning
 Code 08.50.016
 Work Item Name Gulley pot cleaning

Description Clean siltation and debris from gulley pot to good impoundment conditions.

Unit No.

Quantity 67

Per 10m3 = per 67 No.
(see note 4)

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	0		
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. The unit price does not include haulage cost but loading
 2. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
 3. $10 \text{ m}^3 / \text{amount of dirt per one gully pot} = 0.1495 \text{ m}^3 (0.23 * 0.23 * \pi * 0.90) = 67 \text{ gully pot units}$

Unit Price Calculation Table

No. 46

Work Category Culvert Cleaning
 Code 08.50.009
 Work Item Name Covered (slotted) lined drain cleaning

Description Remove all silt and debris and wash out covered lined drain to free flow conditions

Unit m
 Quantity 200

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	19.8	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 47

Work Category Culvert Cleaning
 Code 08.50.050
 Work Item Name Ditch/mitre drain excavation in soft (mechanical)

Description Excavate mechanically for inlet, outfall, mitre and catchwater drains in soft material

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.2	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Motor grader driving		Hour	0	2.69	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25	
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125	
22.74.002	Fuel	Diesel	litre	0	26	0		
22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		0 Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

Unit Price Calculation Table

No. 48

Work Category Culvert Cleaning
 Code 08.50.052
 Work Item Name Ditch/mitre drain excavation in soft (manual)

Description Excavate manually for inlet, outfall, mitre and catchwater drains in soft material

Unit m3
 Quantity 20

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	0		
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.The unit price does not include haulage cost but loading
 - 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 49

Work Category Culvert Cleaning
 Code 08.50.054
 Work Item Name Ditch/mitre drain excavation in hard (mechanical)

Description Excavate mechanically in hard material for inlet, outfall, mitre and catchwater drains.

Unit m3
 Quantity 20

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator driving		Hour	0	3.5	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 50

Work Category Culvert Cleaning
 Code 08.50.056
 Work Item Name Ditch/mitre drain excavation in hard (manual)

Description Excavate manually in hard material for inlet, outfall, mitre and catchwater drains

Unit m3
 Quantity 2

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	19.75	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost but loading
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 51

Work Category Pipe Culvert Installation
Code 08.60.020
Work Item Name Culvert installation-300mm with surround

Description Provide, lay and joint pipe culvert of 300mm in diameter with surround

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	6	0	(0.3 (diameter) + 0.05 *2 (pipe thickness) + 0.1*2 (surround thickness)) * 10 = 6.0
B3	Form work		m2	0	12	0	(0.3 + 0.05*2 + 0.1*2) * 2 (both sides) * 10 = 12.0
B4	Concrete placement Class 15/20		m3	0	1.7	0	(0.6*0.6 (surround crossection) - 0.2*0.2*π (pipe crossection) - ½*0.25*0.25*2 (chamfers)) * 10 = 1.718
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	0.75	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.101	Precast concrete culvert - 300mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

B3 Form work

Unit m2

Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss magin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.The unit price does not include haulage cost.
- 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 15/20

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.The unit price does not include haulage cost.
- 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 52

Work Category Pipe Culvert Installation
 Code 08.60.021
 Work Item Name Culvert installation-300mm without surround

Description Provide, lay and joint unhunched pipe culvert of 300mm in diameter without surround

Unit m
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	6	0	(0.3 (diameter) + 0.05 *2 (pipe thickness) + 0.1*2 (additional width on both sides)) * 10 = 6.0
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.The quantities are based on standard drawings
 2.The unit price does not include haulage cost.
 3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	0.75	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.101	Precast concrete culvert - 300mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0		1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	Total					0		

Note

Unit Price Calculation Table

No. 53

Work Category Pipe Culvert Installation
Code 08.60.022
Work Item Name Culvert installation-450mm with surround

Description Provide, lay and joint pipe culvert of 450mm in diameter with surround.

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	7.5	0	$(0.45 \text{ (diameter)} + 0.05*2 \text{ (pipe thickness)} + 0.1*2 \text{ (surround thickness)}) * 10 = 7.5$
B3	Form work		m2	0	15	0	$(0.45 + 0.05*2 + 0.1*2) * 2 \text{ (both sides)} * 10 = 15.0$
B4	Concrete placement Class 15/20		m3	0	2.6	0	$(0.75*0.75 \text{ (surround crosssection)} - 0.275*0.275*\pi \text{ (pipe crosssection)} - \frac{1}{2} * 0.25*0.25*2 \text{ (chamfers)}) * 10 = 2.625$
	Total					0	
	Per unit					0	Total/Quantity

- Note
- The quantities are based on standard drawings
 - The unit price does not include haulage cost.
 - The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	0.75	0	
22.50.002	Unskilled labour		Person Day	0	2.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.001	Precast concrete culvert - 450mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$0.10*100*1.2 \text{ (loss margin)} = 12$
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

B3 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss magin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.The unit price does not include haulage cost.
- 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 15/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.The unit price does not include haulage cost.
- 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 54

Work Category Pipe Culvert Installation
 Code 08.60.023
 Work Item Name Culvert installation-450mm without surround

Description Provide, lay and joint pipe culvert of 450mm in diameter without surround.

Unit m
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	7.5	0	(0.45 (diameter) + 0.05 *2 (pipe thickness) + 0.1*2 (additional width on both sides)) * 10 = 7.5
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.The quantities are based on standard drawings
 2.The unit price does not include haulage cost.
 3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	0.75	0	
22.50.002	Unskilled labour		Person Day	0	2.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.001	Precast concrete culvert - 450mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0		1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	Total					0		

Note

Unit Price Calculation Table

No. 55

Work Category Pipe Culvert Installation
Code 08.60.024
Work Item Name Culvert installation-600mm with surround

Description Provide, lay and joint pipe culvert of 600mm in diameter with surround

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	10	0	(0.6 (diameter) + 0.05*2 (pipe thickness) + 0.15*2 (surround thickness)) * 10 = 10.0
B3	Form work		m2	0	19	0	(0.6 + 0.05*2 + 0.15(top surrounding) + 0.1(bottom surrounding)) * 2 (both sides) * 10 = 19.0
B4	Concrete placement Class 15/20		m3	0	5.0	0	0.5 (standard volume for surround and bed) * 10 = 5
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.002	Precast concrete culvert - 600mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murram)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

B3 Form work

Unit m2

Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2. The unit price does not include haulage cost.
3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 15/20

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2. The unit price does not include haulage cost.
3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work
 Unit m3
 Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 56

Work Category Pipe Culvert Installation
Code 08.60.025
Work Item Name Culvert installation-600mm without surround

Description Provide, lay and joint pipe culvert of 600mm in diameter without surround

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	10	0	(0.6 (diameter) + 0.05 *2 (pipe thickness) + 0.15*2 (additional width on both sides)) * 10 = 10.0
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.002	Precast concrete culvert - 600mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 57

Work Category Pipe Culvert Installation
Code 08.60.026
Work Item Name Culvert installation-900mm with surround

Description Provide, lay and joint pipe culvert of 900mm in diameter with surround.

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	14	0	(0.9 (diameter) + 0.09*2 (pipe thickness) + 0.15*2 (surround thickness)) * 10 = 13.8
B3	Form work		m2	0	27	0	(0.9 + 0.09*2 + 0.15(top surrounding) + 0.1(bottom surrounding)) * 2 (both sides) * 10 = 26.6
B4	Concrete placement Class 15/20		m3	0	8.6	0	0.86 (standard volume for surround and bed) * 10 = 8.6
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	1.25	0	
22.50.002	Unskilled labour		Person Day	0	3.75	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.003	Precast concrete culvert - 900mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murram)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

B3 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss magin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2.The unit price does not include haulage cost.

3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)

- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)

- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 15/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2.The unit price does not include haulage cost.

3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)

- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)

- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 58

Work Category Pipe Culvert Installation
Code 08.60.027
Work Item Name Culvert installation-900mm without surround

Description Provide, lay and joint pipe culvert of 900mm in diameter without surround

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	14	0	(0.9 (diameter) + 0.09 *2 (pipe thickness) + 0.15*2 (additional width on both sides)) * 10 = 13.8
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	1.25	0	
22.50.002	Unskilled labour		Person Day	0	3.75	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.003	Precast concrete culvert - 900mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 59

Work Category Pipe Culvert Installation
Code 08.60.028
Work Item Name Culvert installation-1200mm with surround

Description Provide, lay and joint pipe culvert of 1200mm in diameter with surround

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	17	0	(1.2 (diameter) + 0.1*2 (pipe thickness) + 0.15*2 (surround thickness)) * 10 = 17.0
B3	Form work		m2	0	33	0	(1.2 + 0.1*2 + 0.15(top surrounding) + 0.1(bottom surrounding)) * 2 (both sides) * 10 = 33.0
B4	Concrete placement Class 15/20		m3	0	14.6	0	1.46 (standard volume for surround and bed) * 10 = 14.6
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.75	0	
22.50.005	Artisans G2		Person Day	0	1.75	0	
22.50.002	Unskilled labour		Person Day	0	4.75	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.004	Precast concrete culvert - 1200mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

B3 Form work

Unit m2

Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2. The unit price does not include haulage cost.
3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 15/20

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2. The unit price does not include haulage cost.
3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work
 Unit m3
 Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 60

Work Category Pipe Culvert Installation
Code 08.60.029
Work Item Name Culvert installation-1200mm without surround

Description Provide, lay and joint culvert of 1200mm in diameter without surround

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	17	0	(1.2 (diameter) + 0.1 *2 (pipe thickness) + 0.15*2 (additional width on both sides)) * 10 = 17.0
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.75	0	
22.50.005	Artisans G2		Person Day	0	1.75	0	
22.50.002	Unskilled labour		Person Day	0	4.75	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.004	Precast concrete culvert - 1200mm		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0		1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	Total					0		

Note

Unit Price Calculation Table

No. 61

Work Category Pipe Culvert Installation
 Code 08.60.030
 Work Item Name Excavate in soft material for culverts

Description Excavation manually in soft material for culvert in any size.

Unit m3
 Quantity 20

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	-	
22.50.005	Artisans G2	-	Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	7.5	-	
22.50.001	Support Staff		Person Day	0	0		
	Subtotal					-	
	Miscellaneous Cost		%		10	-	% of subtotal
	Total					-	
	Per unit					-	Total/Quantity

- Note
- 1.The unit price does not include haulage cost.
 - 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 62

Work Category Pipe Culvert Installation
 Code 08.60.031
 Work Item Name Excavate in hard material for culverts

Description Excavation manually in hard material for culvert in any size.

Unit m3
 Quantity 2

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	-	
22.50.005	Artisans G2		Person Day	0	0	-	
22.50.002	Unskilled labour		Person Day	0	19.75	-	
22.50.001	Support Staff		Person Day	0	0	-	
	Subtotal					-	
	Miscellaneous Cost		%		10	-	% of subtotal
	Total					-	
	Per unit					-	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost but loading.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 63

Work Category Headwall Construction
Code 08.60.190
Work Item Name Headwall construction for 450mm pipe culvert

Description Reconstruct or repair damaged headwall (wingwall and apron) for 450mm pipe culvert to prevent the collapse and the potential slippage of the material and pavement above the culvert.

Unit No.(a pair)
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	3.9	0	$((0.9: \text{inlet width} + 2.6: \text{apron width})/2) * 1.1: \text{base width} * 2: \text{pair} = 3.85$
B2	Form work		m2	0	9.9	0	Apron: $(0.09 * 2 + 1.4 * 2 + 2.6) * 0.15 * 2: \text{pair} = 1.674$ Wingwalls: $((0.9 + 0.3)/2) * 1.4 + (0.9 + 0.3)/2) * 1.31 * 2: \text{sides} * 2: \text{pair} = 6.504$ Headwall (back side): $1.11 * 0.25 * 2: \text{pair} = 0.555$ Headwall (front side): $(0.9 * 0.85 - 0.45 * 0.45 * \pi / 4) * 2: \text{pair} = 1.212$ $1.674 + 6.504 + 0.555 + 1.212 = 9.945$
B3	ReinforCement (Mesh wire)		m2	0	10.0	0	Apron: 3.85 Wingwalls: $((0.9 + 0.3)/2) * 1.4) * 2: \text{sides} * 2: \text{pair} = 3.36$ Headwall: 1.212 Toewall: $2.6 (\text{toe width}) * 0.3 (\text{depth}) * 2 (\text{inlet and outlet}) = 1.56$ $3.85 + 3.36 + 1.212 + 1.56 = 9.982$
B4	Concrete placement Class 25/20		m3	0	1.5	0	$9.982 * 0.15 (\text{thickness}) = 1.497$
Total (per unit)						0	

- Note
- The quantities are based on standard drawings
 - The unit price does not include haulage cost.
 - The unit cost includes gravelling for base and concrete formwork but not excavating and filling.
 - Head wall construction is assumed to include that of wingwalls and aprons. For detail, refer to the standard drawing

B1 Base work
Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$0.10 * 100 * 1.2 (\text{loss margin}) = 12$
Subtotal						0	
Miscellaneous Cost				%	10	0	% of subtotal
Total						0	
Per unit						0	Total/Quantity

- Note
- Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

B2 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 ReinforCement (Mesh wire)

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.77.001	Mesh wire 8' x 4' gauge 18		m2	0	110	0	100 * 1.1 (loss margin) = 110
	Subtotal					0	
	Miscellaneous Cost		%		20	0	
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 25/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	402	0	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	0.42	0	0.38*1.1 (loss margin) = 0.418
22.70.002	Graded aggregates (ballast)		m3	0	0.84	0	0.76*1.1 (loss margin) = 0.836
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 64

Work Category Headwall Construction
 Code 08.60.192
 Work Item Name Headwall construction for 600mm pipe culvert

Description Reconstruct or repair damaged headwall (wingwall and apron) for 600mm pipe culvert to prevent the collapse and the potential slip of the material and pavement above the culvert.

Unit No.(a pair)
 Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	5.3	0	$((1.2: \text{inlet width} + 3.0: \text{apron width})/2) * 1.25: \text{base width} * 2: \text{pair} = 5.25$
B2	Form work		m2	0	12.0	0	Apron: $(0.09 * 2 + 1.53 * 2 + 3) * 0.15 * 2: \text{pair} = 1.872$ Wingwalls: $((1.05 + 0.3)/2) * 1.53 + (1.05 + 0.3)/2) * 1.44 * 2: \text{sides} * 2: \text{pair} = 8.019$ Headwall (back side): $1.2 * 0.25 * 2: \text{pair} = 0.6$ Headwall (front side): $(1.0 * 1.05 - 0.6 * 0.6 * \pi / 4) * 2: \text{pair} = 1.535$ $1.872 + 8.019 + 0.6 + 1.535 = 12.026$
B3	ReinforCement (Mesh wire)		m2	0	12.9	0	Apron: 5.25 Wingwalls: $((1.05 + 0.3)/2) * 1.53) * 2: \text{sides} * 2: \text{pair} = 4.131$ Headwall: 0.767 Toewall: $3.0 * 0.3 * 2(\text{inlet and outlet}) = 1.98$ $5.25 + 4.131 + 0.767 + 1.98 = 12.896$
B4	Concrete placement Class 25/20		m3	0	1.6	0	1.58 (standard volume for inlet and outlet)
	Total (per unit)					0	

- Note
- 1.The quantities are based on standard drawings
 - 2.The unit price does not include haulage cost.
 - 3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.
 4. Head wall construction is assumed to include that of wingwalls and aprons. For detail, refer to the standard drawing

B1 Base work

Unit m2
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$0.10 * 100 * 1.2$ (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

B2 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 ReinforCement (Mesh wire)

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.77.001	Mesh wire 8' x 4' gauge 18		m2	0	100	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	
	Total					0	
	Per unit					0	Total/Quantity

Note

1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 25/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	402	0	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	0.42	0	0.38*1.1 (loss margin) = 0.418
22.70.002	Graded aggregates (ballast)		m3	0	0.84	0	0.76*1.1 (loss margin) = 0.836
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 65

Work Category Headwall Construction
Code 08.60.194
Work Item Name Headwall construction for 900mm pipe culvert

Description Reconstruct or repair damaged headwall (wingwall and apron) for 900mm pipe culvert to prevent the collapse and the potential slip of the material and pavement above the culvert.

Unit No.(a pair)
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	13.6	0	$((1.50: \text{inlet width} + 4.54: \text{apron width})/2) * 2.25: \text{base width} * 2: \text{pair} = 13.59$
B2	Form work		m2	0	23.7	0	Apron: $(0.09 * 2 + 2.69 * 2 + 4.54) * 0.15 * 2: \text{pair} = 3.03$ Wingwalls: $((1.35 + 0.3) / 2) * 2.69 + (1.35 + 0.3)/2) * 2.6 * 2: \text{sides} * 2: \text{pair} = 17.457$ Headwall (back side): $1.56 * 0.25 * 2: \text{pair} = 0.78$ Headwall (front side): $(1.38 * 1.35 - 0.9 * 0.9 * \pi / 4) * 2: \text{pair} = 2.454$ $3.03 + 17.457 + 0.78 + 2.454 = 23.721$
B3	ReinforCement (Mesh wire)		m2	0	28.0	0	Apron: 13.59 Wingwalls: $((1.35 + 0.3)/2) * 2.69) * 2: \text{sides} * 2: \text{pair} = 8.877$ Headwall: 2.454 Toewall: $4.54 * 0.25 * 2(\text{inlet and outlet}) = 2.27$ $13.59 + 8.877 + 2.454 + 2.27 = 27.971$
B4	Concrete placement Class 25/20		m3	0	4.1	0	4.07 (standard volume for inlet and outlet)
	Total (per unit)					0	

- Note
- 1.The quantities are based on standard drawings
 - 2.The unit price does not include haulage cost.
 - 3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.
 4. Head wall construction is assumed to include that of wingwalls and aprons. For detail, refer to the standard drawing

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$0.10 * 100 * 1.2$ (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

B2 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 ReinforCement (Mesh wire)

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.77.001	Mesh wire 8' x 4' gauge 18		m2	0	100	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 25/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	402	0	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	0.42	0	0.38*1.1 (loss margin) = 0.418
22.70.002	Graded aggregates (ballast)		m3	0	0.84	0	0.76*1.1 (loss margin) = 0.836
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 66

Work Category Headwall Construction
Code 08.60.196
Work Item Name Headwall construction for 1200mm pipe culvert

Description Reconstruct or repair damaged headwall (wingwall and apron) for 1200mm pipe culvert to prevent the collapse and the potential slip of the material and pavement above the culvert.

Unit No.(a pair)
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	21.2	0	$((1.88 \times \text{inlet width} + 5.56 \times \text{apron width}) / 2) \times 2.85$; base width * 2; pair = 21.20
B2	Form work		m2	0	34.4	0	Apron: $(0.09 \times 2 + 3.38 \times 2 + 5.56) \times 0.15 \times 2$; pair = 3.75 Wingwalls: $((1.65 + 0.3) / 2) \times 3.38 + (1.65 + 0.3) / 2 \times 3.29 \times 2$; sides * 2; pair = 26.016 Headwall (back side): $1.88 \times 0.25 \times 2$; pair = 0.94 Headwall (front side): $(1.8 \times 1.65 - 1.2 \times 1.2 \times \pi / 4) \times 2$; pair = 3.68 $3.75 + 26.016 + 0.94 + 3.68 = 34.386$
B3	ReinforCement (Mesh wire)		m2	0	40.8	0	Apron: 21.2 Wingwalls: $((1.65 + 0.3) / 2) \times 3.38 \times 2$; sides * 2; pair = 13.182 Headwall: 3.68 ToeWall: $5.56 \times 0.25 \times 2$ (inlet & outlet) = 2.78 $21.2 + 13.182 + 3.68 + 2.78 = 40.842$
B4	Concrete placement Class 25/20		m3	0	5.9	0	5.92 (standard volume for inlet and outlet)
	Total (per unit)					0	

- Note
- The quantities are based on standard drawings
 - The unit price does not include haulage cost.
 - The unit cost includes gravelling for base and concrete formwork but not excavating and filling.
 - Head wall construction is assumed to include that of wingwalls and aprons. For detail, refer to the standard drawing

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian roller driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$0.10 \times 100 \times 1.2$ (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

B2 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss magin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 ReinforCement (Mesh wire)

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.77.001	Mesh wire 8' x 4' gauge 18		m2	0	100	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 25/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	402	0	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	0.42	0	0.38*1.1 (loss margin) = 0.418
22.70.002	Graded aggregates (ballast)		m3	0	0.84	0	0.76*1.1 (loss margin) = 0.836
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 67

Work Category Manhole installation
Code 08.50.240
Work Item Name Manhole construction less than 1m

Description Install new small manhole of less than 1m in depth (900-1200mm in inner diameter)

Unit No.(a set)
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	2.2	0	bed plan: $1.6 * 1.4 = 2.24$
B2	Form work		m2	0	6.3	0	outer surrounding: $(1.6 + 1.4) * 2 * \text{outer depth}$: $0.7 + \text{inner surrounding}$: $1.2 * \pi * \text{inner depth}$: $0.55 = 6.27$
B3	Concrete casting		m3	0	0.946	0	$1.6 * 1.4 * 0.7$ (external volume) - $1.2 * 1.2 * \pi / 4 * 0.55$ (hollow circular section) = 1.668
B6	Cover slab and cast iron cover installation		No.	0	1	0	
	Total					0	
	Per unit					0	Total/Quantity

- Note
- The quantities are based on standard drawings
 - The unit price does not include haulage cost.
 - The unit cost includes gravelling for base and concrete formwork but not excavating and filling.
 - For the purpose of simplification, the depth of manhole is assumed to be 0.7m (about half of 1.35m (08.50.245)) and the inner diameter is 1200mm.

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$0.10 * 100 * 1.2$ (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.005	Vibrator P/Tamper	0	Hour	0	1	0	
	Miscellaneous Cost		%	0		0	
	Total					0	

Note

B2 Form work

Unit m2

Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Concrete placement Class 25/20

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
B4	Concrete mix work		m3	0	10	0	
B5	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	402	0	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	0.42	0	0.38*1.1 (loss margin) = 0.418
22.70.002	Graded aggregates (ballast)		m3	0	0.84	0	0.76*1.1 (loss margin) = 0.836
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B5 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Cover slab and cast iron cover installation
 Unit No.
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.107	Manhole cover slab	1220*150	No.	0	5	0	
22.77.111	Cast iron manhole cover	600*450 heavy duty with frame	No.	0	5	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 68

Work Category Manhole installation
Code 08.50.245
Work Item Name Manhole construction more than 1m

Description Install new large manhole of more than 1m in depth (900–1200mm in inner diameter)

Unit No.(a set)
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	2.2	0	bed plan: $1.6 * 1.4 = 2.24$
B2	Form work		m2	0	12.6	0	outer surrounding: $(1.6 + 1.4) * 2 * \text{outer depth: } 1.35 + \text{inner surrounding: } 1.2 * \pi * \text{inner depth: } 1.2 = 12.62$
B3	Reinforcement (below 16mm)	6mm	t	0	0.0016	0	$3 \text{ (no. of 6mm)} * 0.9 + 4 * 0.7 = 5.5$, $5.5 * 0.294\text{kg/m} = 1.62\text{kg}$
B4	Concrete casting		m3	0	1.7	0	$1.6 * 1.4 * 1.35$ (external volume) - $1.2 * 1.2 * \pi / 4 * 1.2$ (hollow circular section) = 1.668
B7	Cover slab and cast iron cover installation		No.	0	1	0	
Total						0	
Per unit						0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.
 4. For the purpose of simplification, the depth of manhole is assumed to be 1.35m and the inner diameter is 1200mm.

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$0.10 * 100 * 1.2$ (loss margin) = 12
Subtotal						0	
Miscellaneous Cost						10	% of subtotal
Total						0	
Per unit						0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Unit Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.005	Vibrator P/Tamper		Hour	0	1	0	
Miscellaneous Cost						0	%
Total						0	

Note

B2 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Reinforcement (below 16mm)

Unit ton
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	2.25	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.71.012	Square twisted bars 16mm		t	0	1.1	0	1.0 * 1.1 (loss margin) =1.1
	price adjustment		%		3	0	deduction to above 16mm price
	Subtotal					0	
	Miscellaneous Cost		%		20	0	
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.
3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete placement Class 25/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.
3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	402	0	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	0.42	0	0.38*1.1 (loss margin) = 0.418
22.70.002	Graded aggregates (ballast)		m3	0	0.84	0	0.76*1.1 (loss margin) = 0.836
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B7 Cover slab and cast iron cover installation

Unit No.
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.107	Manhole cover slab	1220*150	No.	0	5	0	
22.77.111	Cast iron manhole cover	600*450 heavy duty with	No.	0	5	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 69

Work Category Gulley Pot installation
Code 08.50.015
Work Item Name Gulley pot construction

Description Provide and place gulley pots including grating (H=900mm) for inlet structures as directed by the Engineer.

Unit No.(a set)
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		Set	10,982	10	109,820	
B2	Base work		m2	0	4.9	0	0.7*0.7*10=4.9
	Total					109,820	
	Per unit					10,982	Total/Quantity

- Note
- 1.The quantities are based on standard drawings
 - 2.The unit price does not include haulage cost.
 - 3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit Set
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.5	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.103	Gully pot with grating		Set	0	10	91,520	
	Subtotal					91,520	
	Miscellaneous Cost		%		20	18,304	% of subtotal
	Total					109,824	
	Per unit					10,982	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.005	Vibrator P/Tamper		Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 70

Work Category Drain Lining
 Code 08.50.140
 Work Item Name Lay drain lining with concrete

Description Place concrete lining to the slopes and invert of the ditch to prevent the scour.

Unit m2 (t=10cm)
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	100	0	
B2	Reinforcement (Mesh wire)	A252	m2	0	100	0	
B3	Concrete casting		m3	0	10	0.1 * 100 = 10.0	
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.The quantities are based on standard drawings
 2.The unit price does not include haulage cost.
 3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Base work

Unit m2
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian Roller Driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0.10*100*1.2 (loss margin) = 12	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.18	0	1hour = 0.18day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

B2 ReinforCement (Mesh wire)

Unit m2

Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.77.110	Mesh wire	A142	m2	0	100	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Miscellaeous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Concrete placement Class 25/20

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
B4	Concrete mix work		m3	0	10	0	
B5	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. The unit price does not include haulage cost.
 2. Miscellaeous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	402	0	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	0.42	0	0.38*1.1 (loss margin) = 0.418
22.70.002	Graded aggregates (ballast)		m3	0	0.84	0	0.76*1.1 (loss margin) = 0.836
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B5 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 71

Work Category Drain Lining
Code 08.50.220
Work Item Name Laying of dressed stones

Description Place dressed stone lining to the slopes and invert of the ditch to prevent the scour.

Unit m2
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	10	0	$(1.20+0.05*2+0.1*2)*10=15.0$
B2	Stone dressing		m3	0	10	0	$(1.5*1.5-0.65*0.65*\pi)*10=9.23$
B3	Mortar mixing		m3	0	0.05	-	
B4	Mortar curing		m3	0	0.05	-	
	Total					0	
	Per unit					0	Total/Quantity

- Note
- The quantities are based on M.o.P.W.:1988: Activity No. 30201
 - The unit price does not include haulage cost.
 - The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian Roller Driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$0.10*100*1.2$ (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

B2 Stone dressing
Unit m2
Quantity 6

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	-	
22.50.005	Artisans G2		Person Day	0	1	-	
22.50.002	Unskilled labour		Person Day	0	3	-	
22.50.001	Support Staff		Person Day	0	0	-	
22.72.102	Stone		m3	0	2.4	-	10 * 0.2 (thickness) * 1.2 (loss margin) = 2.4
	subtotal					-	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					-	
	Per unit					-	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Mortar mixing

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	-	
22.50.005	Artisans G2		Person Day	0	2	-	
22.50.002	Unskilled labour		Person Day	0	1	-	
22.50.001	Support Staff		Person Day	0	0	-	
22.70.004	Cement (ordinary portland)		Kg	0	402	-	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	1.2	-	1.05*1.1 (loss margin) = 1.155
	subtotal					-	
	Miscellaneous Cost		%		20	-	% of Subtotal
	Total					-	

- Note
- Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Mortar curing
Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 72

Work Category Drain Lining
Code 08.50.225
Work Item Name Laying of side slabs

Description Place side slab lining to the slopes and invert of the ditch to prevent the scour.

Unit m2 (t = 10cm)
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	100	0	
B2	Installation		m2	0	100	0	0.1*100=10.0
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian Roller Driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

B2 Installation

Unit m2

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	-	
22.50.005	Artisans G2		Person Day	0	1	-	
22.50.002	Unskilled labour		Person Day	0	2	-	
22.50.001	Support Staff		Person Day	0	0	-	
22.72.106	Side Slab concrete block	3"*9"*24"	No.	0	78.6	-	0.23m(9") * 0.61m(24") = 0.14 m2/No. (10m2/0.14) * 1.1 (loss margin) = 78.57
B3	Mortar mixing		m3	0	0.05	-	
B4	Mortar curing		m3	0	0.05	-	
	subtotal					-	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					-	
	Per unit					-	Total/Quantity

- Note
- The unit price does not include haulage cost.
 - Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Mortar mixing

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	-	
22.50.005	Artisans G2		Person Day	0	2	-	
22.50.002	Unskilled labour		Person Day	0	1	-	
22.50.001	Support Staff		Person Day	0	0	-	
22.70.004	Cement (ordinary portland)		Kg	0	369	-	365*1.01 (loss margin) = 369
22.69.009	Fine aggregates(sand)		m3	0	1.1	-	1.05*1.05 (loss margin) = 1.1
	subtotal					-	
	Miscellaneous Cost		%		0	-	% of Subtotal
	Total					-	

B4 Mortar curing

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 73

Work Category Drain Lining
Code 08.60.050
Work Item Name Laying of 300mm invert block drain

Description Provide, lay and joint invert block drain of 300mm in diameter

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	6.5	0	(0.3 (IBD diameter) + 0.075 (block side thickness) * 2 + 0.1(surround) * 2) * 10 = 6.5
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 20

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.104	Invert block drain	600*330*355	No.	0	36.7	0	(20m/0.6m) per No. * 1.1 (loss margin) = 36.7
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per 1m					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian Roller Driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 74

Work Category Drain Lining
Code 08.60.051
Work Item Name Laying of 750mm invert block drain

Description Provide, lay and joint invert block drain of 750mm in width

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		m	0	10	0	
B2	Base work		m2	0	9.5	0	(0.6 (IBD width) + 0.075 (block side thickness) * 2 + 0.1(surround) * 2) * 10 = 9.5
	Total					0	
	Per unit					0	Total/Quantity

Note
1.The quantities are based on standard drawings
2.The unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Installation

Unit m
Quantity 20

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.105	Invert block drain	600*760*190	No.	0	36.7	0	(20m/0.6m) per No. * 1.1 (loss margin) = 36.7
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per 1m					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Pedestrian Roller Driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	0.10*100*1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Pedestrian Roller Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 75

Work Category Traffic Control
 Code 09.50.004
 Work Item Name Traffic Control

Description Place warning signs, barriers and cones around the working lane on the carriageway and guide the passage of traffic through the works

Unit Day
 Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.13	0	
22.50.005	Artisans G2		Person Day	0	0.05	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffolding, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 76

Work Category Traffic Control
Code 09.50.005
Work Item Name Watchman

Description Provide watchman for all round surveillance.

Unit No. (a set per day)
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.13	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	2	0	2 shifts per day
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 77

Work Category Traffic Control
 Code 09.50.006
 Work Item Name Watering

Description Sprinkle water to control dust for passage of traffic through the works or compaction at earth works

Unit m2
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
M1	water tanker driving		Hour	0	0.28	0	1.4litre/m2*2 times = 2.8litre/m2 280litre(0.28m3) per 100m2
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2.The unit price does not include haulage cost.

M1 water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 – 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 78

Work Category Grading
 Code 10.50.001
 Work Item Name Heavy grading without watering or compaction

Description Trim with Motor Grader or heavy towed grader existing carriageway surface to camber, including slopes and ditches without providing watering and compaction

Unit m2
 Quantity 10,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.5	-	
22.50.005	Artisans G2		Person Day	0	0	-	
22.50.002	Unskilled labour		Person Day	0	1.5	-	
22.50.001	Support Staff		Person Day	0	0	-	
M1	Motor Grader driving	131hp	Hour	0	5.5	-	
	Subtotal					-	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					-	
	Per unit					0.0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25	
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125	
22.74.002	Fuel	Diesel	litre	0	26	0		
22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

Unit Price Calculation Table

No. 79

Work Category Grading
Code 10.50.002
Work Item Name Heavy grading with watering and compaction

Description Trim with Motor Grader or heavy towed grader existing carriageway surface to camber, including slopes and ditches providing watering and compaction

Unit m2
Quantity 10,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.5	-	
22.50.005	Artisans G2		Person Day	0	0	-	
22.50.002	Unskilled labour		Person Day	0	1.5	-	
22.50.001	Support Staff		Person Day	0	1	-	
M1	Motor Grader driving	131hp	Hour	0	5.5	-	
M2	Pneumatic roller driving	130hp	Hour	0	4	-	
M3	Water tanker driving	10t	Hour	0	4	-	
	Subtotal					-	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					0.0	
	Per unit					0.0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M2 Pneumatic roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M3 water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 – 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 80

Work Category Grading
Code 10.50.003
Work Item Name Light grading

Description Trim with motor grader existing carriageway to camber, including slopes and ditches.

Unit m2
Quantity 18,000

Code	Name	Type	Unit	Unit price(	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	-	
22.50.005	Artisans G2		Person Day	0	0	-	
22.50.002	Unskilled labour		Person Day	0	1	-	
22.50.001	Support Staff		Person Day	0	1	-	
M1	Motor Grader driving	131hp	Hour	0	8	-	
	Subtotal					-	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					-	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaeous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Per hour

Code	Name	Type	Unit	Unit price(	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 81

Work Category Grading
Code 10.50.004
Work Item Name Reshaping

Description Restore manually the camber on earth or gravel roads by returning material from road sides and shoulder toward road centre.

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.15	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.5	0	
22.50.001	Support Staff		Person Day	0			
	Subtotal					0.0	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					0.0	
	Per unit					0.0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 82

Work Category Grading
Code 10.50.005
Work Item Name Dragging

Description Remove manually loose material from the surface to delay the formation of corrugations

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.15	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0.0	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					0.0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 83

Work Category Graveling
Code 10.60.001
Work Item Name Regraveling

Description Prepare for road formation and provide, place spread, shape and compact with watering gravel of not less than CBR 20%

Unit m3
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.08	-	
22.50.005	Artisans G2		Person Day	0	0	-	
22.50.002	Unskilled labour		Person Day	0	0.35	-	
22.50.001	Support Staff		Person Day	0	0	-	
22.72.021	Gravel material (murrum)		m3	0	6	2,965	5*1.2 (loss margin) = 6
M1	Motor Grader driving	131hp	Hour	0	0.09	-	
M2	Roller driving	130hp	Hour	0	0.09	-	
M3	Pneumatic roller driving	130hp	Hour	0	0.09	-	
M4	water tanker driving	10t	Hour	0	0.09	-	
	subtotal					2,965	
	Miscellaneous Cost		%		10	297	% of Subtotal
	Total					3,262	
	Per unit					652	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours	0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125	
22.74.002	Fuel	Diesel	litre	0	26	0		
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP	0	Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours	1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0		
22.64.004	Single drum steel Vibrator roller: 9–10T, 130 HP	0	Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

M3 Pneumatic roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 - 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 84

Work Category Graveling
Code 10.60.001a
Work Item Name Regraveling without watering

Description Prepare for road formation and provide, place spread, shape and compact without watering gravel of not less than CBR 20%

Unit m3
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.08	-	
22.50.005	Artisans G2		Person Day	0	0	-	
22.50.002	Unskilled labour		Person Day	0	0.35	-	
22.50.001	Support Staff		Person Day	0	0	-	
22.72.021	Gravel material (murrum)		m3	0	6	2,965	5*1.2 (loss margin) = 6
M1	Motor Grader driving	131hp	Hour	0	0.09	-	
M2	Roller driving	130hp	Hour	0	0.09	-	
M3	Pneumatic roller driving	130hp	Hour	0	0.09	-	
	subtotal					2,965	
	Miscellaneous Cost		%		10	297	% of Subtotal
	Total					3,262	
	Per unit					652	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9–10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M3 Pneumatic roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 85

Work Category Shoulder Rebuilding
Code 11.50.001
Work Item Name Shoulder grading

Description Prepare surface of existing shoulders, accesses and bus bays, including benching where necessary, water process and compact

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.35	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Motor Grader driving	131hp	Hour	0	0.09	0	
M2	Roller driving	120hp	Hour	0	0.09	0	
M3	Water tanker driving	10t	Hour	0	0.28	0	100m2*2.8L/m2 = 280L = 0.28m3 1m3 watering per hour
	subtotal					0	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M2 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M3 water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 - 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 86

Work Category Shoulder Rebuilding
Code 11.50.002
Work Item Name Shoulder repairing

Description Prepare surface of existing shoulders, accesses and bus bays, water process and compact

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.35	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Motor Grader driving	131hp	Hour	0	0.09	0	
M2	Roller driving	130hp	Hour	0	0.09	0	
M3	Water tanker driving	10t	Hour	0	0.28	0	100m2*2.8L/m2 = 280L = 0.28m3 1m3 watering per hour
	subtotal					0	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M3 water tanker driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 – 8000 Lt.	0	Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 87

Work Category Shoulder Graveling
Code 11.50.030
Work Item Name Shoulder graveling with natural gravel

Description Provide, place, spread, shape and compact 150mm of natural gravel of CBR 30% to shoulders, accesses and bus bays

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.08	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.35	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	10*1.2 (loss margin) = 12
M1	Motor Grader driving	131hp	Hour	0	0.09	0	
M2	Roller driving	130hp	Hour	0	0.09	0	
M3	Water tanker driving	10t	Hour	0	0.09	0	
	subtotal					0	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	total					0	

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	total					0	

Note

M4 water tanker driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 – 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 88

Work Category Shoulder Graveling
Code 11.50.035
Work Item Name Shoulder graveling with quarry waste

Description Provide, place and compact quarry waste material to shoulders, accesses and bus bays

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.08	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.35	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.024	Quarry waste material		m3	0	12.7	0	10*1.2 (loss margin) = 12
M1	Motor Grader driving	131hp	Hour	0	0.09	0	
M2	Roller driving	130hp	Hour	0	0.09	0	
M3	Water tanker driving	10t	Hour	0	0.09	0	
	subtotal					0	
	Miscellaneous Cost		%		10	-	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25	
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125	
22.74.002	Fuel	Diesel	litre	0	26	0		
22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		0 Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	10.92	0		
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

M4 water tanker driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	13.36	0		
22.62.015	Water Tanker : 6000 - 8000 Lt.		0 Hour	0	1	0		
22.70.003	water		m3	0	1	0	Temporarily estimated quantity	
	Miscellaneous Cost		%	0	0			
	Total					0		

Note

Unit Price Calculation Table

No. 89

Work Category Pavement Removal
 Code 12.70.001
 Work Item Name Scarify existing pavement to form subbase

Description Break or scarify mechanically the existing pavement layer, and compact.

Unit m3
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	3.4	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	3.4	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator driving	197hp	Hour	0	7.2	0	
M2	Motor Grader driving	131hp	Hour	0	0.09	0	
M3	Roller driving	130hp	Hour	0	0.09	0	
M4	Water tanker driving	10t	Hour	0	0.09	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffolding, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.18	0	1 hour = 0.18day
22.74.002	Fuel	Diesel	litre	0	26.32	0	
22.63.102	Excavator	130-150hp	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M2 Motor Grader driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M3 Roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 water tanker driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 - 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 90

Work Category Subbase Rebuilding
 Code 12.50.001
 Work Item Name Handpacked stone paving

Description Provide, lay, and compact hand packed stone material including filling of voids with stone dust

Unit m3 (t = 15cm)
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	7.4	0	
22.50.002	Unskilled labour		Person Day	0	3.7	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.022	Hardcore		m3	0	12	0	10*1.2 (loss margin) = 12
22.72.020	Stone dust		m3	0	1.5	0	
M1	Roller driving		Hour	0	2	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 91

Work Category Subbase Rebuilding
 Code 12.50.020
 Work Item Name Provide, place and compact quarry waste

Description Provide, spread, shape and compact approved quarry waste of CBR 30% and above for 5cm in thickness.

Unit m3 (t = 5cm)
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.08	0	
22.50.005	Artisans G2		Person Day	0	1.4	0	
22.50.002	Unskilled labour		Person Day	0	4.43	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.024	Quarry waste material		m3	0	6	0	5*1.2 (loss margin) = 6
M1	Roller driving		Hour	0	6.26	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.64.001	Pedestrian Roller : 700 - 1000 Kg.		Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 92

Work Category Base Rebuilding
Code 12.50.002
Work Item Name Provide, place, spread and compact natural gravel

Description Provide, spread, shape and compact approved natural gravel of CBR 30% and above for 15cm in thickness.

Unit m3 (t = 15cm)
Quantity 15

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.6	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.021	Gravel material (murrum)		m3	0	18	0	15*1.2 (loss margin) = 18
M1	Motor Grader driving	131hp	Hour	0	0.13	0	
M2	Roller driving	130hp	Hour	0	0.13	0	
M3	Pneumatic roller driving	130hp	Hour	0	0.13	0	
M4	water tanker driving	10t	Hour	0	0.13	0	
	subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M3 Pneumatic roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	total					0	

Note

M4 water tanker driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 – 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 93

Work Category Graded Crushed Stone
 Code 13.50.002
 Work Item Name Graded Crushed Stone for subbase

Description Provide, place and spread approved graded crushed stone for subbase.

Unit m3 (t = 15cm)
 Quantity 15

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.6	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.023	Crusher run material (Graded crushed stone)		m3	0	18	0	15*1.2 (loss margin) = 18
M1	Motor Grader driving	131hp	Hour	0	0.13	0	
M2	Roller driving	130hp	Hour	0	0.13	0	
M3	Pneumatic roller driving	130hp	Hour	0	0.13	0	
M4	water tanker driving	10t	Hour	0	0.13	0	
	subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125
22.74.002	Fuel	Diesel	litre	0	26	0	
22.63.012	Motor Grader (e.g. CAT 112F): 100 - 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M2 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M3 Pneumatic roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	total					0	

Note

M4 water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 – 8000 Lt.		0 Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 94

Work Category Graded Crushed Stone
Code 13.50.003
Work Item Name Graded Crushed Stone for base

Description Provide, place and spread approved graded crushed stone for base.

Unit m3(t = 15cm)
Quantity 15

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.6	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.023	Crusher run material (Graded crushed stone)		m3	0	18	0	15*1.2 (loss margin) = 18
M1	Motor Grader driving	131hp	Hour	0	0.13	0	
M2	Roller driving	130hp	Hour	0	0.13	0	
M3	Pneumatic roller driving	130hp	Hour	0	0.13	0	
M4	water tanker driving	10t	Hour	0	0.13	0	
	subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Motor Grader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.25	0	1 day = 8 hours 0.125day (= 1hour) * 2 (operator + mechanic) = 0.25	
22.50.002	Unskilled labour		Person Day	0	0.125	0	0.125day (= 1hour) * 1 (turnboy) = 0.125	
22.74.002	Fuel	Diesel	litre	0	26	0		
22.63.012	Motor Grader (e.g. CAT 112F): 100 – 130 HP		Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

M2 Roller driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	10.92	0		
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	total					0		

Note

M3 Pneumatic roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 water tanker driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	13.36	0	
22.62.015	Water Tanker : 6000 - 8000 Lt.	0	Hour	0	1	0	
22.70.003	water		m3	0	1	0	Temporarily estimated quantity
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 95

Work Category Cement/Lime Stabilization
 Code 14.50.001
 Work Item Name Cement stabilization

Description Provide, spread cement on natural gravel or graded crushed stone

Unit m3
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	1.4	0	
22.50.002	Unskilled labour		Person Day	0	4.43	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	550	0	Assumed quantity for average soil condition: 500 * 1.1 (loss margin) = 550
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 96

Work Category Cement/Lime Stabilization
 Code 14.50.002
 Work Item Name Lime stabilization

Description Provide, spread lime on natural gravel or graded crushed stone

Unit m3
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	1.4	0	
22.50.002	Unskilled labour		Person Day	0	4.43	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.006	Hydrated lime		Kg	0	550	0	Assumed quantity for average soil condition: 500 * 1.1 (loss margin) = 550
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 97

Work Category Cement/Lime Stabilization
Code 14.50.003
Work Item Name Cement/lime mixing

Description Mixing in cement/lime into natural gravel or graded crushed stone

Unit m3
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1 (14.50.001)	Cement stabilization		m3	0	2.5	0	
B2 (14.50.002)	Lime stabilization		m3	0	2.5	0	
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2. The unit price does not include haulage cost.

B1 (14.50.001) Cement stabilization

Unit m3
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	1.4	0	
22.50.002	Unskilled labour		Person Day	0	4.43	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	550	0	Assumed quantity for average soil condition: 500 * 1.1 (loss margin) = 550
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2. The unit price does not include haulage cost.

3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2(14.50.002) Lime stabilization

Unit m3
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	1.4	0	
22.50.002	Unskilled labour		Person Day	0	4.43	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.006	Hydrated lime		Kg	0	550	0	Assumed quantity for average soil condition: 500 * 1.1 (loss margin) = 550
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2. The unit price does not include haulage cost.

3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 98

Work Category Cement/Lime Stabilization
 Code 14.50.004
 Work Item Name Curing and protection of treated layers

Description Cure and protect layers treated with cement or lime stabilizers

Unit m2
 Quantity 200

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.125	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.38	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0.0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 99

Work Category Prime Coat
 Code 15.50.002
 Work Item Name Prime Coat (MC-30 cutback bitumen)

Description Prepare surface of carriageway, bus bays and repair areas, provide and spray MC-30 cutback bitumen at a rate of 0.8-1.2 litre/m² as prime coat

Unit litre
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0			
M1	Sprayer driving		Hour	0	2.97	0	
22.73.012	MC 30 Bitumen		litre	0	110	0	1kg = 1 litre 100 * 1.1 (loss margin) = 110
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 100

Work Category Tack Coat
 Code 15.50.030
 Work Item Name Tack Coat (grade bitumen cutback)

Description Prepare surface of carriageway and bus bays, provide and spray 80/100 penetration grade bitumen cut back using 5-15% kerosene as tack coat for asphalt concrete wearing course at a spray rate of 0.5-0.7 litre/m²

Unit litre
 Quantity 60

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0			
M1	Sprayer driving		Hour	0	2.97	0	
22.73.012	MC 30 Bitumen		litre	0	66	0	1kg = 1 litre 60 * 1.1 (loss margin) = 66
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0		1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0		
	Miscellaneous Cost		%	0	0			
	Total					0		

Note

Unit Price Calculation Table

No. 101

Work Category Tack Coat
 Code 15.50.035
 Work Item Name Tack Coat (bitumen emulsion)

Description Prepare surface of repair areas provide and spray K1-60 bitumen emulsion as tack coat or seal to repair areas at a spray rate of 0.8-1.0 litre/m²

Unit litre
 Quantity 90

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0			
M1	Sprayer driving		Hour	0	2.97	0	
22.73.012	MC 30 Bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

Unit Price Calculation Table

No. 102

Work Category Surface Dressing
Code 15.70.001
Work Item Name Seal coat

Description Cover a large worn surface area with aggregate distributed over spread bitumen to seal cracks and to recover adequate surface texture

Unit litre
Quantity 60

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Sprayer driving		Hour	0	2.97	0	
M2	Roller driving		Hour	0	2.71	0	
M3	Pneumatic roller driving		Hour	0	2.91	0	
22.73.012	MC 30 Bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M2 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M3 Pneumatic roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 103

Work Category Surface Dressing
 Code 15.60.002
 Work Item Name Provide and roll 3/6 mm precoated chipping

Description Treat worn surface with graded aggregates of 3 to 6mm precoated with bitumen to recover adequate surface texture

Unit m3(5cm)
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.016	Coarse aggregates(chippings) - 3/6mm		0 m3	0	5.5	0	5*1.1 (loss margin) = 5.5
22.73.013	80/100 Pen grade bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Sprayer driving		Hour	0	0.5	0	
M2	Chip spreader driving		Hour	0	1	0	
M3	Roller driving		Hour	0	0.5	0	
M4	Pneumatic roller driving		Hour	0	3	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M2 chip spreader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.33	0	
22.67.110	Chip spreader		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M3 Roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 Pneumatic roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 104

Work Category Surface Dressing
 Code 15.60.003
 Work Item Name Provide and roll 6/10 mm precoated chipping

Description Treat worn surface with graded aggregates of 6 to 10mm precoated with bitumen to recover adequate surface texture

Unit m3(5cm)
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.017	Coarse aggregates(chippings) – 6/10mm	0	m3	0	5.5	0	5*1.1 (loss margin) = 5.5
22.73.013	80/100 Pen grade bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Sprayer driving		Hour	0	0.5	0	
M2	Chip spreader driving		Hour	0	1	0	
M3	Roller driving		Hour	0	0.5	0	
M4	Pneumatic roller driving		Hour	0	3	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M2 chip spreader driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.33	0	
22.67.110	Chip spreader	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M3 Roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 Pneumatic roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 105

Work Category Surface Dressing
 Code 15.60.004
 Work Item Name Provide and roll 10/14 mm precoated chipping

Description Treat worn surface with graded aggregates of 10 to 14mm precoated with bitumen to recover adequate surface texture

Unit m3(5cm)
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.018	Coarse aggregates(chippings) - 10/14mm		0 m3	0	5.5	0	5*1.1 (loss margin) = 5.5
22.73.013	80/100 Pen grade bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Sprayer driving		Hour	0	0.5	0	
M2	Chip spreader driving		Hour	0	1	0	
M3	Roller driving		Hour	0	0.5	0	
M4	Pneumatic roller driving		Hour	0	3	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 chip spreader driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.33	0	
22.67.110	Chip spreader	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M3 Roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 Pneumatic roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 106

Work Category Surface Dressing
 Code 15.60.005
 Work Item Name Provide and roll 14/20 mm pre-coated chipping

Description Treat worn surface with graded aggregates of 14 to 20mm pre-coated with bitumen to recover adequate surface texture

Unit m3(5cm)
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.72.019	Coarse aggregates(chippings) – 14/20mm		0 m3	0	5.5	0	5*1.1 (loss margin) = 5.5
22.73.013	80/100 Pen grade bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Sprayer driving		Hour	0	0.5	0	
M2	Chip spreader driving		Hour	0	1	0	
M3	Roller driving		Hour	0	0.5	0	
M4	Pneumatic roller driving		Hour	0	3	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 chip spreader driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.33	0	
22.67.110	Chip spreader	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M3 Roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 Pneumatic roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 107

Work Category Pavement Repairing
Code 16.50.001
Work Item Name Pothole patching – hot mix

Description Repair defects on bituminous surface by hot bituminous mixture

Unit m3(5cm)
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0			
22.73.003	Premix – AC Type I (hot)		m3	-	5.5	0	5*1.1 (loss margin) = 5.5
22.73.012	MC 30 Bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Asphalt cutter driving		Hour	0	16	0	Cut length: 0.5*4=2m for 0.25m2 800m for 100m2 (5m3/0.05m) 800m/50m per hour = 16
M2	Compressor driving		Day	0	0.2	0	(for cleaning) Area: 100m2 (5m3/0.05m) 100/500m2 per day = 0.2
M3	Sprayer driving		Hour	0	2.97	0	
M4	Roller driving		Hour	0	2.71	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Asphalt cutter driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.109	Asphalt cutter		Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M2 Compressor driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	79.1	0	
22.67.108	Air compressor	150CFM, 4250LPM	Day	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M3 Sprayer driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M4 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 108

Work Category Pavement Repairing
Code 16.50.002
Work Item Name Pothole patching – cold mix

Description Repair defects on bituminous surface by cold bituminous mixture

Unit m3 (5cm)
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0			
22.73.002	Premix – AC Type I (cold)		m3	-	5.5	0	5*1.1 (loss margin) = 5.5
22.73.012	MC 30 Bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Asphalt cutter driving		Hour	0	8	0	
M2	Compressor driving		Day	0	0.2	0	(for cleaning) Area: 100m2 (5m3/0.05m) 100/500m2 per day = 0.2
M3	Sprayer driving		Hour	0	2.97	0	
M4	Roller driving		Hour	0	2.71	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.109	Asphalt cutter		Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 Compressor driving							Per hour	Remarks
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)		
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0		1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	79.1	0		
22.67.108	Air compressor	150CFM, 4250LPM	Day	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	Total					0		

Note

M3 Sprayer driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M4 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 109

Work Category Pavement Repairing
Code 16.50.004
Work Item Name Crack sealing

Description Repair transverse or longitudinal cracking on surface dressed or asphalt concrete

Unit m
Quantity 2,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	1	0	
22.50.001	Support Staff		Person Day	0	1	0	
22.73.006	Bituminous sealant		m3	0	0.11	0	2000 * 0.05 (sealing width) * 0.001 (sealing thickness) * 1.1 (loss margin) = 0.11
22.72.020	Stone dust		m3	0	6	0	2000 * 0.05(crack width) * 0.05 (crack depth) * 1.2 (loss margin) = 6
M1	Compressor driving		Day	0	0.2	0	(for cleaning) 2000m * 0.05m(crack width) = 100m2 100/500m2 per day = 0.2
M2	Sprayer driving		Hour	0	2.97	0	
M3	Roller driving		Hour	0	2.71	0	
M4	Pneumatic roller driving		Hour	0	2.91	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Compressor driving

Per day

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	79.1	0	
22.67.108	Air compressor	150CFM, 4250LPM	Day	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 Sprayer driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M3 Roller driving

M3 Roller driving							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 Pneumatic roller driving

M4 Pneumatic roller driving							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 110

Work Category Pavement Repairing
 Code 16.60.001
 Work Item Name Asphalt concrete for surfacing – hot mix.

Description Overlay or continuously repave surface by hot bituminous mixture

Unit m3 (5cm)
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.73.003	Premix – AC Type I (hot)		m3	0	5.5	0	5*1.1 (loss margin) = 5.5
22.73.012	MC 30 Bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Sprayer driving		Hour	0	1	0	
M2	Asphalt finisher driving		Hour	0	1	0	
M3	Roller driving		Hour	0	1	0	
M4	Pneumatic roller driving		Hour	0	1	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 Asphalt finisher driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.33	0	
22.67.104	Asphalt finisher	37H	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M3 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	total					0	

Note

M4 Pneumatic roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	total					0	

Note

Unit Price Calculation Table

No. 111

Work Category Pavement Repairing
 Code 16.70.001
 Work Item Name Base repair – Dense Bitumen Macadam (DBM)

Description Place dense bitumen macadam for base material and roll

Unit m3 (5cm)
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.04	0	
22.50.005	Artisans G2		Person Day	0	0.12	0	
22.50.002	Unskilled labour		Person Day	0	0.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.73.004	Dense Bitumen Macadam		m3	0	5.5	0	5*1.1 (loss margin) = 5.5
22.73.012	MC 30 Bitumen		litre	0	99	0	1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Sprayer driving		Hour	0	1	0	
M2	Asphalt finisher driving		Hour	0	1	0	
M3	Roller driving		Hour	0	1	0	
M4	Pneumatic roller driving		Hour	0	1	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Sprayer driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.004	Bitumen Sprayer H/Operated	200L	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M2 Asphalt finisher driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.33	0	
22.67.104	Asphalt finisher	37H	Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	Total					0	

Note

M3 Roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

M4 Pneumatic roller driving

							Per hour
Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	0	
22.64.005	Pneumatic Roller: 10T, 130 HP		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0		
	total					0	

Note

Unit Price Calculation Table

No. 112

Work Category Milling and Paving
 Code 16.80.010
 Work Item Name Milling the existing bituminous layer to spoil

Description Mill mechanically the existing bituminous layer to spoil

Unit m3
 Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.13	0	
22.50.005	Artisans G2		Person Day	0	0.40	0	
22.50.002	Unskilled labour		Person Day	0	0.95	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Excavator Driving	197hp	Hour	0	0.62	0	
M2	Milling machine Driving		Hour	0	1	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	
	Total					0	10m3
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Excavator Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	26.32	0		
22.63.102	Excavator	130-150hp	Hour	0	1	0		
	Miscellaneous Cost		%	0		0		
	total					0		

Note

M2 Milling machine Driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	37.04	0		
22.67.101	Milling machine	197hp	Hour	0	1	0		
	Miscellaneous Cost		%	0		0		
	Total					0		

Note

Unit Price Calculation Table

No. 113

Work Category Milling and Paving
Code 16.80.015
Work Item Name Milling the existing bituminous layer for reuse

Description Mill mechanically the existing bituminous layer and stockpile for reuse or recycle

Unit m3
Quantity 5

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.13	0	
22.50.005	Artisans G2		Person Day	0	0.40	0	
22.50.002	Unskilled labour		Person Day	0	0.95	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.002	Graded aggregates (ballast)		m3	0	1.65	0	Additional aggregates 1.5 * 1.1 (loss margin) = 1.65
22.73.012	MC 30 Bitumen		litre	0	99	0	Additional bitumen 1kg = 1 litre 90 * 1.1 (loss margin) = 99
M1	Road heater driving	197hp	Hour	23,992	1.03	24,712	
M2	Resurface machine driving		Hour	31,002	0.51	15,811	
M3	Roller driving		Hour	3,168	0.51	1,616	
M4	Pneumatic roller driving		Hour	3,149	0.51	1,606	
	Subtotal					43,744	
	Miscellaneous Cost		%		10	4,374	Subtotal*0.10
	total					48,119	
	Per unit					9,624	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Road heater driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	7.56	751		
22.67.103	Road heater	63hp	Hour	0	1	23,100		
	Miscellaneous Cost		%	0	0			
	Total					23,992		

Note

M2 Resurface machine driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	12.84	1,276	
22.67.102	Resurface machine	120hp	Hour	0	1	29,600	
	Miscellaneous Cost		%	0	0		
	Total					31,002	

Note

M3 Roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	1,085	
22.64.004	Single drum steel Vibrator roller: 9-10T, 130 HP	0	Hour	0	1	1,942	
	Miscellaneous Cost		%	0	0		
	total					3,168	

Note

M4 Pneumatic roller driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	10.92	1,085	
22.64.005	Pneumatic Roller: 10T, 130 HP	0	Hour	0	1	1,923	
	Miscellaneous Cost		%	0	0		
	total					3,149	

Note

Unit Price Calculation Table

No. 114

Work Category Concrete Work
Code 17.60.010
Work Item Name Concrete work (class 15/20)

Description Provide, place and compact class 15/20 concrete mixture for blinding.

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B1	Concrete mix work		m3	0	10	0	
B2	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Concrete mix work
Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B2 Concrete curing
Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 115

Work Category Concrete Work
Code 17.60.015
Work Item Name Concrete work (class 20/20)

Description Provide, place and compact class 20/20 concrete mixture for blinding.

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.43	0	
22.50.005	Artisans G2		Person Day	0	1.98	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B1	Concrete mix work		m3	0	10	0	
B2	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.The unit price does not include haulage cost.
- 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	319	0	290 * 1.1 (loss margin) = 319
22.69.009	Fine aggregates(sand)		m3	0	0.46	0	0.42 * 1.1 (loss margin) = 0.462
22.70.002	Graded aggregates (ballast)		m3	0	0.88	0	0.80*1.1 (loss margin) = 0.88
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B2 Concrete curing

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 116

Work Category Concrete Work
Code 17.60.002
Work Item Name Concrete work (class 25/20)

Description Provide, place and compact class 25/20 concrete mixture for blinding.

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	6	0	
22.50.001	Support Staff		Person Day	0	0	0	
B1	Concrete mix work		m3	0	10	0	
B2	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.
3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	402	0	365*1.1 (loss margin) = 401.5
22.69.009	Fine aggregates(sand)		m3	0	0.42	0	0.38*1.1 (loss margin) = 0.418
22.70.002	Graded aggregates (ballast)		m3	0	0.84	0	0.76*1.1 (loss margin) = 0.836
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B2 Concrete curing

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 117

Work Category Formwork
 Code 17.60.003
 Work Item Name Vertical formwork class F2 finish

Description Provide and erect formwork of class F2 finish to the vertical direction

Unit m2 (W=1.0m)
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2	0	
22.50.005	Artisans G2		Person Day	0	4	0	
22.50.002	Unskilled labour		Person Day	0	8	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss magin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 118

Work Category Formwork
 Code 17.60.004
 Work Item Name Horizontal formwork class F2 finish

Description Provide and erect formwork of class F2 finish to the horizontal direction

Unit m2 (H=1.0m)
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100 * 1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 119

Work Category Reinforcement
 Code 17.60.050
 Work Item Name Reinforcement work (below 16mm)

Description Provide, cut bend and fix into position high yield reinforcement bar below 16mm

Unit ton
 Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	2.25	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.71.012	Square twisted bars 16mm		t	0	1.10	0	1*1.1 (loss margin) = 1.1
	price adjustment		%		3	0	deduction to above 16mm price
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 120

Work Category Reinforcement
 Code 17.60.055
 Work Item Name Reinforcement work (above 16mm)

Description Provide, cut bend and fix into position high yield reinforcement bar above 16mm

Unit ton
 Quantity 1

B3 Reinforcement

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	2.25	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.71.012	Square twisted bars 16mm		t	0	1.1	0	1*1.1 (loss margin) = 1.1
	price adjustment		%		3	0	adjust to above 16mm price
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2. The unit price does not include haulage cost.

3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)

- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)

- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 121

Work Category Boundary posts
Code 20.50.001
Work Item Name Road reserve boundary posts

Description Provide and erect road reserve boundary posts (size 1.2 x 0.2 x 0.2)

Unit No.
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Form work		m2	0	159	0	$(0.2 \text{ (post width)} * 4 * 1.2 \text{ (post height)} + 0.45 \text{ (base width)} * 4 * 0.35 \text{ (base height)}) * 100 = 159$
B2	Concrete casting Class 20/20	for post	m3	0	4.8	0	(for post) $0.2 * 0.2 * 1.2 * 100 = 4.8$
B5	Concrete casting Class 15/20	for base	m3	0	5.9	0	(for base) $(0.45 * 0.45 * 0.35 - 0.2 * 0.2 * 0.3 \text{ (post submerged depth)}) * 100 = 5.89$
B8	Reinforcement (below 16mm)	R16,R8	t	0	0.376	0	$((1.1 \text{ (bar length)} * 4 + 0.1 \text{ (bend length)} * 4) * 0.56 \text{ kg/m (for main bars)} + 0.1 \text{ (vertical rebar gap)} * 4 * 0.448 \text{ kg/m (for hoop)} * 6 \text{ (No. of links)}) * 100 = 376.32 \text{ kg}$
	Total					0	
	Per unit					0	Total/Quantity

Note 1.The unit price does not include haulage cost.

B1 Form work

Unit m2 (H=1.0m)
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	$100 * 1.2 \text{ (loss margin)} = 120$
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.The unit price does not include haulage cost.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Concrete casting Class 20/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.43	0	
22.50.005	Artisans G2		Person Day	0	1.98	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B3	Concrete mix work		m3	0	10	0	
B4	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2.The unit price does not include haulage cost.
3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	319	0	290*1.1 (loss margin) = 319
22.69.009	Fine aggregates(sand)		m3	0	0.46	0	0.42*1.1 (loss margin) = 0.462
22.70.002	Graded aggregates (ballast)		m3	0	0.88	0	0.80*1.1 (loss margin) = 0.88
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B4 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B5 Concrete casting Class 15/20

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B6	Concrete mix work		m3	0	10	0	
B7	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2.The unit price does not include haulage cost.

3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)

- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)

- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B6 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B7 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B8 Reinforcement (below 16mm)

Unit ton

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	2.25	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.71.012	Square twisted bars 16mm		t	0	1.1	0	1*1.1 (loss margin)
	price adjustment		%		3	0	deduction to above 16mm price
	Subtotal					0	
	Miscellaneous Cost		%		20	0	
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2.The unit price does not include haulage cost.

3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)

- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)

- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 122

Work Category Boundary posts
 Code 20.50.004
 Work Item Name Edge marker posts

Description Provide and erect edge marker posts

Unit No.
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	3.3	0	
22.50.005	Artisans G2		Person Day	0	3.3	0	
22.50.002	Unskilled labour		Person Day	0	6.7	0	
22.50.001	Support Staff		Person Day	0		0	
22.79.013	Reflective mark posts	White PVC post 1400	No.	0	100	0	Temporarily estimated quantity
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 123

Work Category Road Marking
Code 20.50.060
Work Item Name Roads markings – white paint

Description Provide reflectorized white paint for road markings (w = 10cm)

Unit m (w = 10cm)
Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.33	0	
22.50.005	Artisans G2		Person Day	0	2.33	0	
22.50.002	Unskilled labour		Person Day	0	6.98	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Road Marking Machine Driving		Hour	0	3.01	0	
M2	truck driving		Hour	0	3.01	0	(For haulage within site)
22.79.004	Road making paint white	0 litre		0	44	0	40*1.1 (loss margin) = 44
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Road Marking Machine Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.5	0	
22.65.008	Road Marking Machine	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 Truck driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.32	0	
22.61.101	Truck Flat bed : 2.5 – 5 Tonnes	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 124

Work Category Road Marking
Code 20.50.065
Work Item Name Road markings – white thermoplastic material

Description Renew faded or missing white road markings (w = 10cm) with thermoplastic material

Unit m (w = 10cm)
Quantity 900

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	5.75	0	
22.50.002	Unskilled labour		Person Day	0	7.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Road Marking Machine Driving		Hour	0	8.43	0	
M2	truck driving		Hour	0	14	0	(For haulage within site)
M3	Melting pod driving	200 – 350kg	Hour	0	8.43	0	
22.79.006	Thermoplastic paint white	premixed with primer and glass beads	Kg	0	605	0	550 * 1.1 (loss margin) = 605
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Road Marking Machine Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.5	0	
22.65.008	Road Marking Machine		Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 Truck driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.32	0	
22.61.101	Truck Flat bed : 2.5 – 5 Tonnes		Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M3 Melting pod driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.65.101	Melting pod (for paint)	200 – 350kg	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 125

Work Category Road Marking
Code 20.50.070
Work Item Name Road markings – yellow paint

Description Provide reflectorized yellow paint for road markings (w = 10cm)

Unit m (w = 10cm)
Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.33	0	
22.50.005	Artisans G2		Person Day	0	2.33	0	
22.50.002	Unskilled labour		Person Day	0	6.98	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Road Marking Machine Driving		Hour	0	3.01	0	
M2	truck driving		Hour	0	3.01	0	(For haulage within site)
22.79.004	Road making paint white	0 litre		0	44	0	40*1.1 (loss margin) = 44
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Road Marking Machine Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.5	0	
22.65.008	Road Marking Machine	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 Truck driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.32	0	
22.61.101	Truck Flat bed : 2.5 – 5 Tonnes	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 126

Work Category Road Marking
Code 20.50.075
Work Item Name Road markings – yellow thermoplastic material

Description Upgrade faded or missing yellow road markings (w = 10cm) with thermoplastic material

Unit m (w = 10cm)
Quantity 900

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	5.75	0	
22.50.002	Unskilled labour		Person Day	0	7.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Road Marking Machine Driving		Hour	0	8.43	0	
M2	truck driving		Hour	0	14	0	(For haulage within site)
M3	Melting pod driving	200 – 350kg	Hour	0	8.43	0	
22.79.005	Thermoplastic paint yellow	premixed with primer and glass beads	Kg	0	605	0	550 * 1.1 (loss margin) = 605
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Road Marking Machine Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.5	0	
22.65.008	Road Marking Machine		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 Truck driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.32	0	
22.61.101	Truck Flat bed : 2.5 – 5 Tonnes		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M3 Melting pod driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.65.101	Melting pod (for paint)	200 – 350kg	Hour	0	1	0	3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears) <ul style="list-style-type: none"> - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation) - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 127

Work Category Road Marking
Code 20.50.107
Work Item Name Road marking black paint

Description Provide reflectorized black paint for road markings (w = 10cm)

Unit m (w = 10cm)
Quantity 1,000

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.33	0	
22.50.005	Artisans G2		Person Day	0	2.33	0	
22.50.002	Unskilled labour		Person Day	0	6.98	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Road Marking Machine Driving		Hour	0	3.01	0	
M2	truck driving		Hour	0	3.01	0	(For haulage within site)
22.79.004	Road making paint white	0	litre	0	44	0	40*1.1 (loss margin) = 44
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Road Marking Machine Driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.5	0	
22.65.008	Road Marking Machine	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M2 Truck driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	5.32	0	
22.61.101	Truck Flat bed : 2.5 - 5 Tonnes	0	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 128

Work Category Road Sign Erection
Code 20.50.050
Work Item Name Warning signs

Description Provide and erect priority, prohibitory or mandatory signs

Unit No.
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	14.6	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.142	Warning triangular sign	600mm	No.	0	10	0	
B1	Concrete casting Class 15/20		m3	0	4	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Concrete casting Class 15/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B2	Concrete mix work		m3	0	10	0	
B3	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Concrete mix work
 Unit m3
 Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B3 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 129

Work Category Road Sign Erection
 Code 20.50.052
 Work Item Name Priority, prohibitory or mandatory signs
 Description Priority, prohibitory or mandatory signs
 Unit No.
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	14.6	0	
22.50.001	Support Staff		Person Day	0			
22.79.143	Priority triangular sign	600mm	No.	0	10	0	
B1	Concrete casting Class 15/20		m3	0	4	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Concrete casting Class 15/20
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B2	Concrete mix work		m3	0	10	0	
B3	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Concrete mix work
 Unit m3
 Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B3 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 130

Work Category Road Sign Erection
Code 20.50.054
Work Item Name Standard informatory signs

Description Provide and erect informatory signs

Unit No.
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	14.6	0	
22.50.001	Support Staff		Person Day	0			
22.79.144	Standard informatory sign		No.	0	10	0	
B1	Concrete casting Class 15/20		m3	0	4	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Concrete casting Class 15/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B2	Concrete mix work		m3	0	10	0	
B3	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B3 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 131

Work Category Road Sign Erection
 Code 20.50.056
 Work Item Name Non-standard informatory signs

Description Provide and erect non-standard warning signs

Unit No.
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	14.6	0	
22.50.001	Support Staff		Person Day	0			
22.79.145	Non-standard informatory sign	less than 1m2	No.	0	10	0	
B1	Concrete casting Class 15/20		m3	0	4	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Concrete casting Class 15/20
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B2	Concrete mix work		m3	0	10	0	
B3	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B3 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 132

Work Category Kerb Installation
Code 20.50.012
Work Item Name Kerbs

Description Provide lay and joint concrete class 20/20 kerbs in support to carriageway, bus bays and junctions

Unit m
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	5	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	14.6	0	
22.50.001	Support Staff		Person Day	0			
B1	Base work		m3	0	2.7	0	
B2	Form work		m3	0	12	0	
B3	Concrete casting Class 15/20		m3	0	4	0	
22.79.107	Road Kerb		No.	0	112	0	No. of road kerb per 100m = 100/ (kerb length + mortar thickness) = 100/ (0.88+0.01) =112
22.79.108	Road channel		No.	0	112	0	No. of channel per 100m =100/ (channel length + mortar thickness) = 100/ (0.88+0.01) =112
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2. The unit price does not include haulage cost.
3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	100 * 0.1 (10cm) * 1.2 (loss margin) =12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.005	Vibrator P/Tamper		Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

B2 Form work
Unit m2 (H=1.0m)
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100*1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.
3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Concrete casting Class 15/20
Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B4	Concrete mix work		m3	0	10	0	
B5	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.
3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete mix work
Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B5 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 133

Work Category Kilometre marker post Installation
 Code 20.50.013
 Work Item Name Kilometre marker posts

Description Kilometre marker post Installation.

Unit No.
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Steel plate Installation		100	0	100	0	
B2	Base work		m2	0	25	0	0.45 (foundation width) + 0.05 (margin) = 0.5 0.5 * 0.5 * 100 = 25
B3	Form work		m2	0	63	0	0.45 * 4 * 0.35 (depth) * 100 = 63
B4	Concrete casting class 15/20		m3	0	7.1	0	(0.45 * 0.45 * 0.35) * 100 = 7.09
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2.The unit price does not include haulage cost.

B1 Steel plate installation

Unit No.
 Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	4	0	
22.50.005	Artisans G2		Person Day	0	4	0	
22.50.002	Unskilled labour		Person Day	0	8	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.77.107	Steel angle	125*5mm	kg	0	1383	0	(0.125 + 0.125 (total width)) * 0.005(thickness) * 1.4 (length) * 7.9(density)* 100 = 1.383t
22.77.108	Steel plate	450*3mm	kg	0	480	0	(0.45 * 0.45 (area)) * 0.003(thickness) * 7.9(density) * 100 = 0.48t
22.79.105	White paint		litre	0	100	0	(steel angle: 0.125 * 4 * 1.4) + (steel plate: 0.45 * 0.33 * 2) * 0.001 (paint thickness) * 100 = 0.0997m3
22.79.106	Black paint		litre	0	5	0	White paint * 5% = 5
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2.The unit price does not include haulage cost.
 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work
Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	100 * 0.1 (10cm) * 1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.67.005	Vibrator P/Tamper		Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	Total					0		

Note

B3 Form work
Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100*1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete casting Class 15/20

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work

Unit m3

Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing

Unit m3

Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 134

Work Category Bollard Installation
Code 20.50.170
Work Item Name Concrete bollards

Description Concrete bollard Installation (diameter 0.2m, length 0.9m, embedded depth 0.45m)

Unit No.
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	30	0	0.5 (foundation width) + 0.05 (margin) = 0.55, 0.55*0.55 * 100 = 30.25
B2	Form work		m2	0	147	0	(0.2*π*0.9: bollard + 0.5*4*0.45: foundation)*100=146.5
B3	Concrete casting	Class 20/20	m3	0	2.8	0	for bollard (0.1*0.1*π*0.9)*100=2.8
B6	Concrete casting	Class 15/20	m3	0	10.3	0	for foundation (0.5*0.5*0.45 - 0.1*0.1*π*0.3) * 100 = 10.3
B9	Reinforcement	R10,R8	t	0	0.41	0	(0.85*6*0.56kg/m (for bollard) + 0.15*π*6*0.448kg/m (for foundation)) * 100 = 410kg
Total						0	
Per unit						0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	100 * 0.1 (10cm) * 1.2 (loss margin) = 12
Subtotal						0	
Miscellaneous Cost						0	% of subtotal
Total						0	
Per unit						0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.005	Vibrator P/Tamper		Hour	0	1	0	
Miscellaneous Cost						0	
Total						0	

Note

B2 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100*1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Concrete placement Class 20/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.43	0	
22.50.005	Artisans G2		Person Day	0	1.98	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B4	Concrete mix work		m3	0	10	0	
B5	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	319	0	290 * 1.1 (loss margin) = 319
22.69.009	Fine aggregates(sand)		m3	0	0.46	0	0.42 * 1.1 (loss margin) = 0.462
22.70.002	Graded aggregates (ballast)		m3	0	0.88	0	0.80*1.1 (loss margin) = 0.88
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B5 Concrete curing
Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete placement Class 15/20
Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B7	Concrete mix work		m3	0	10	0	
B8	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.
3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B7 Concrete mix work
Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B8 Concrete curing
Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B9 Reinforcement (below 16mm)
Unit ton
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	2.25	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.71.012	Square twisted bars 16mm		t	0	1.1	0	1*1.1 (loss margin) = 1.1
	price adjustment		%		3	0	deduction to above 16mm price
	Subtotal					0	
	Miscellaneous Cost		%		20	0	
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2.The unit price does not include haulage cost.

3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)

- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)

- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 135

Work Category Bollard Installation
Code 20.50.175
Work Item Name Steel bollards

Description Place and provide gauge 16 steel pipe Bollards of diameter 150 mm and 1.05m above above the ground embedded to a depth of 0.45m at place

Unit No.
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Installation		No.	300	100	30,000	
B2	Base work		m2	0	16	0	Base width: 0.35(foundation width) + 0.05 (margin) = 0.4, 0.4 * 0.4 * 100 = 16.0
B3	Form work		m2	0	63	0	for foundation 0.35*4*0.45*100=63.0
B4	Concrete casting Class 15/20		m3	0	5.9	0	(0.35*0.35*0.45 (foundation) + 0.047*0.047 * π * 0.6 (in bollard above foundation))*100 = 5.9m3
	Total					30,000	
	Per unit					300	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.

B1 Inatallation
Unit No.
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.77.109	Steel bollard	SGP. 5B. 125A	kg	0	909	27,270	0.9*10.1*100=909kg
	Subtotal					27,270	
	Miscellaneous Cost		%		10	2,727	% of Subtotal
	Total					29,997	
	Per unit					300	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.
3.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Base work
Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	100 * 0.1 (10cm) * 1.2 (loss margin) =12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.005	Vibrator P/Tamper		0 Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

B3 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100*1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete casting Class 15/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B5	Concrete mix work		m3	0	10	0	
B6	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note

- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
- 2.The unit price does not include haulage cost.
- 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B5 Concrete mix work
 Unit m3
 Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

Unit Price Calculation Table

No. 136

Work Category Reflective Stud Installation
 Code 20.50.019
 Work Item Name Reflective studs

Description Install reflective studs along the centre line

Unit No.
 Quantity 120

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.9	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	7.2	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.012	Reflective 'cat' eyes		No	0	120	0	
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)
 4. The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

Unit Price Calculation Table

No. 137

Work Category Microtunneling
 Code 20.60.010
 Work Item Name Microtunneling for a 150mm diameter PVC (polyvinyl chloride) duct
 Description Conduct microtunneling with a 150mm dia PVC duct (under silt or sand condition)
 Unit m
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Leading pipe jacking		m	0	10	0	
B2	Underground pipe jacking		m	0	10	0	
B3	Screw conveyor removal		m	0	10	0	
B4	Removal of surplus soil (temporary stock)		No.	0	1	0	
B5	Entrance of tunnel		No.	0	1	0	
B6	Entrance of exiting manhole		No.	0	1	0	
B7	Entrance wall cutting		No.	0	1	0	
B8	Jacking equipment installation		No.	0	1	0	
B9	Muddy water processing		No.	0	1	0	
22.79.109	Duct Pipe (PVC150)		m	-	11	0	10 * 1.1 (loss margin) = 11
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2.The unit price does not include haulage cost.
 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B1 Leading pipe jacking

Unit m
 Quantity 16

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	2.5	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Truck driving (with crane)		Hour	0	5.3	0	(for haulage within site and hoisting)
M2	Equipment for leading pipe jacking 1		Day	0	1	0	
M3	Equipment for leading pipe jacking 2		Day	0	1	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	per 1 day
	Per unit					0	Total/Quantity

Note
 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M1 Truck driving (with crane)

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day	
22.74.002	Fuel	Diesel	litre	0	8.95	0		
22.61.102	Truck with crane	4t	Hour	0	1	0		
	Miscellaneous Cost		%		0	0		
	Total					0		

Note

M2 Equipment for lead pipe jacking 1

Per day

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.79.110	Equipment for lead pipe jacking		Day	0	1	0	
	Total					0	

Note

M3 Equipment for lead pipe jacking 2

Per day

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.79.111	Equipment for lead pipe jacking (fixing part)		Day	0	1	0	
22.79.112	Equipment for lead pipe jacking (moving part)		m	0	1	0	
	Total					0	
	Per 1day					0	

Note

B2 Underground pipe jacking

Unit
m
Quantity
10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	2.5	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
M4	Truck driving (with crane)		Hour	0	5.3	0	(for haulage within site and hoisting)
M5	Equipment for Underground pipe jacking 1		Day	0	1	0	
M6	Equipment for underground pipe jacking 2		Day	0	1	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M4 Truck driving (with crane)

Per 1hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	8.95	0	
22.61.102	Truck with crane	4t	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M5 Equipment for underground pipe jacking 1

Per 1day

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.79.113	Equipment for Underground pipe jacking		Day	0	1	0	
	Total					0	

Note

M6 Equipment for underground pipe jacking 2

Per 1day

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.79.114	Equipment for Underground pipe jacking (fixing part)		Day	0	1	0	
22.79.115	Equipment for Underground pipe jacking (moving part)		m	0	1	0	
	Total					0	
	Per 1day					0	

Note

B3 Screw conveyor removal

Per 1m

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	2.5	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
M7	Truck with crane driving		Hour	0	5.3	0	(for haulage within site and hoisting)
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per 1m					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M7 Truck driving (with crane)

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	8.95	0	
22.61.102	Truck with crane	4t	Hour	0	1	0	
	Miscellaneous Cost		%		0	0	
	Total					0	

Note

B4 Removal of surplus soil (temporary stock)

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
M8	Power suction car driving		Day	0	3	0	Temporarily estimated quantity 10/16 (leading pipe jacking) + 10/10 (underground pipe jacking) + 10/35 (screw conveyor remove) + 1.0 (reserve) = 2.91
	Subtotal					0	
	Miscellaneous Cost		%		0	0	
	Total					0	

Note

M8 Power suction car driving

Per day

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	7.2	0	
22.67.105	Power suction car	4t	Hour	0	1	0	
	Miscellaneous Cost		%		0	0	
	Total					0	Per 1hour
	Per 1day					0	Per1hour * 6.2hour/day = Per 1day

Note

B5 Entrance of tunnel

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	2.5	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.116	Water stopper		No.	0	1	0	
M9	Truck with crane driving	4T,2.9tup	Hour	0	1.06	0	(for haulage within site and hoisting)
M10	Steel welding		m	0	1.7	0	
M11	Steel cutting		m	0	3.4	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M9 Truck driving (with crane)

Per 1hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	8.95	0	
22.61.102	Truck with crane	4t	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M10 Steel welding

Per 1m

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.025	0	
22.50.005	Artisans G2		Person Day	0	0.19	0	
22.50.002	Unskilled labour		Person Day	0	0.053	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M11 Steel cuttings

Per 1m

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0.133	0	
22.50.002	Unskilled labour		Person Day	0	0.05	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Entrance of exiting manhole

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	2.5	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.116	Water stopper		No.	0	1	0	
22.79.117	Concrete anchor		No.	0	8	0	
22.79.118	Water stop cement		Kg	0	11	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B7 Entrance wall cutting

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.018	0	
22.50.005	Artisans G2		Person Day	0	0.143	0	
22.50.002	Unskilled labour		Person Day	0	0.055	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B8 Jacking equipment installation

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	5	0	
22.50.005	Artisans G2		Person Day	0	10	0	
22.50.002	Unskilled labour		Person Day	0	10	0	
22.50.001	Support Staff		Person Day	0	0	0	
M12	Truck driving (with crane)		Hour	0	10.6	0	(for haulage within site and hoisting)
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M12 Truck driving (with crane)

Per 1hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	8.95	0	
22.61.102	Truck with crane	4t	Hour	0	1	0	
	Miscellaneous Cost		%		0	0	
	Total					0	

Note

B9 Muddy water processing

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
M13	Muddy water processor Installation and removal		No.	0	1	0	
M15	Muddy water processing		No.	0	1	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	

Note

M13 Muddy water processor Installation and removal

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	1.25	0	
22.50.002	Unskilled labour		Person Day	0	2.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
M14	Truck driving (with crane)		Hour	0	2.65	0	(for haulage within site and hoisting)
	Total					0	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M14 Truck driving (with crane)

Per 1hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	8.95	0	
22.61.102	Truck with crane	4t	Hour	0	1	0	
	Miscellaneous Cost		%		0	0	
	Total					0	

Note

M15 Muddy water processing

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
M16	Muddy water processor Installation and removal		No.	0.0	1	0	
M18	Muddy water processing		No.	0.0	1	0	
	Total					0	

Note

M16 Muddy water processor Installation and removal

Per a day

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.25	0	
22.50.005	Artisans G2		Person Day	0	1.25	0	
22.50.002	Unskilled labour		Person Day	0	2.5	0	
22.50.001	Support Staff		Person Day	0	0	0	
M17	Truck driving (with crane)		Hour	0	2.65	0	(for haulage within site and hoisting)
	Total					0	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M17 Truck driving (with crane)

Per 1 hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	8.95	0	
22.61.102	Truck with crane	4t	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

M18 Muddy water processing

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
M19	Muddy water processing machine driving		Day	0	3	0	
M20	Muddy water aggregation		No.	0	1	0	
	Total					0	

Note

M19 Muddy water processing machine driving

Per day

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	0.235	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.67.106	Muddy water processing machine		Day	0	1	0	
	Total					0	

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

M20 Muddy water aggregation

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.79.119	Aggregation(jacking)		kg	0	67.5	0	
22.79.120	Aggregation(washing)		kg	0	0.07	0	
	Total					0	

Note

Unit Price Calculation Table

No. 138

Work Category Microtunneling
Code 20.60.015
Work Item Name Horizontal drilling

Description Conduct horizontal drilling for 150mm hole in diameter (under gravel condtion)

Unit m (150mm)
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Drilling		m	0	10	0	
B2	Hole Magnification		m	0	10	0	
B3	Casing		m	0	10	0	
B4	Boring machine setting		No.	0	1	0	
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.

B1 Drilling
Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	5	0	
22.50.002	Unskilled labour		Person Day	0	7.4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.121	Shank-rod	90mm	No.	-	0.05	0	
22.79.122	Driving-adapter		No.	-	0.04	0	
22.79.123	drilling-pipe		No.	-	0.19	0	
22.79.124	Ring-bit		No.	-	0.2	0	
22.79.125	Water-swivel		No.	-	0.02	0	
22.67.107	Boring machine	81kw	Day	-	0.99	0	
22.74.002	Fuel	Diesel	litre	0	106	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	per 1day = 10m
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B2 Hole Magnification
Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	5	0	
22.50.002	Unskilled labour		Person Day	0	7.4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.126	Cutter-set		No.	0	0.3	0	
22.79.127	Core-tube		No.	0	0.2	0	
22.79.128	Magnifying-bit		No.	0	0.2	0	
22.67.107	Boring machine	81kw	Day	0	0.99	0	
22.74.002	Fuel	Diesel	litre	0	106	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	per 1day = 10m
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Casing

Unit m
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	2.5	0	
22.50.005	Artisans G2		Person Day	0	2.5	0	
22.50.002	Unskilled labour		Person Day	0	5	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.109	Duct Pipe (PVC150)		m	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	per 1 day = 10m
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Boring machine setting

Per No.

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1.5	0	
22.50.005	Artisans G2		Person Day	0	3	0	
22.50.002	Unskilled labour		Person Day	0	3	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.101	Cypress	for fixed deck	m3	0	0.18	0	
M1	Truck with crane driving		Hour	0	3.18	0	(for haulage within site and hoisting)
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Truck driving (with crane)

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	8.95	0	
22.61.102	Truck with crane	4t	Hour	0	1	0	
	Miscellaneous Cost		%		0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 139

Work Category Street light Installation
Code 20.60.030
Work Item Name Street lighting pole (7.6m)

Description Provide and install 7.6m street lighting pole including cables accessories and lamp.

Unit No.
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	10	0	Base width: $0.8 + 0.1 * 2 = 1.0$ $1.0 * 1.0 * 10 = 10$
B2	Form work		m2	0	32	0	1.0 (foundation height) * 0.8 (foundation width) * $4 * 10 = 32$
B3	Concrete placement Class 15/20		m3	0	6.4	0	$0.8 * 0.8 * 1.0 * 10 = 6.4$
B6	Lighting pole installation		No.	0	10	0	
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.This unit price does not include haulage cost.
3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$100 * 0.1$ (10cm) * 1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Per hour

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0	
22.67.005	Vibrator P/Tamper		0 Hour	0	1	0	
	Miscellaneous Cost		%		0	0	
	Total					0	

Note

B2 Form work
Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100*1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Concrete placement Class 15/20
Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B4	Concrete mix work		m3	0	10	0	
B5	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
2.The unit price does not include haulage cost.
3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
- 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
- 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete mix work
Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note
1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B5 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Lighting pole installaion
 Unit No.
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	10.25	0	
22.50.002	Unskilled labour		Person Day	0	17.25	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.129	Earth bar	10*1500m m	No.	0	10	0	
22.79.130	Lighting pole	7.6m	No.	0	10	0	
22.79.132	Cable for light	m		0	83	0	75 * 1.1 (loss margin) = 82.5
22.79.133	Accessories for light	Set		0	10	0	
22.79.134	Lamp		No.	0	10	0	
M2	Truck driving (with crane)		Hour	0	1.9	0	(for haulage within site and hoisting)
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

- 2.Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M2 Truck driving (with crane)

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0		1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	8.95	0		
22.61.102	Truck with crane	4t	Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	Total					0		

Note

Unit Price Calculation Table

No. 140

Work Category Street light Installation
Code 20.60.035
Work Item Name Street lighting pole (10m)

Description Provide and install 10.0m street lighting pole including cables accessories and lamp.

Unit No.
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
B1	Base work		m2	0	10	0	Base width: $0.8 + 0.1 * 2 = 1.0$ $1.0 * 1.0 * 10 = 10$
B2	Form work		m2	0	60	0	1.5 (foundation height) * 0.8 (foundation width) * $4 * 10 = 48$
B3	Concrete placement Class 15/20		m3	0	9.6	0	$0.8 * 0.8 * 1.5 * 10 = 9.6$
B6	Lighting pole installation		No.	0	10	0	
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.This unit price does not include haulage cost.
 - 3.The unit cost includes gravelling for base and concrete formwork but not excavating and filling.

B1 Base work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	1	0	
22.50.002	Unskilled labour		Person Day	0	2	0	
22.50.001	Support Staff		Person Day	0	0	0	
M1	Tamper driving		Hour	0	4.81	0	
22.72.021	Gravel material (murrum)		m3	0	12	0	$100 * 0.1$ (10cm) * 1.2 (loss margin) = 12
	Subtotal					0	
	Miscellaneous Cost		%		10	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M1 Tamper driving

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour	Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0		1day = 8 hours 1hour = 0.125day
22.74.002	Fuel	Diesel	litre	0	1.03	0		
22.67.005	Vibrator P/Tamper		Hour	0	1	0		
	Miscellaneous Cost		%	0	0	0		
	Total					0		

Note

B2 Form work

Unit m2
Quantity 100

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	1	0	
22.50.005	Artisans G2		Person Day	0	2	0	
22.50.002	Unskilled labour		Person Day	0	4	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.78.102	Wooden formwork panel		m2	0	120	0	100*1.2 (loss margin) = 120
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B3 Concrete placement Class 15/20

Unit m3
Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.25	0	
22.50.005	Artisans G2		Person Day	0	0.5	0	
22.50.002	Unskilled labour		Person Day	0	3.13	0	
22.50.001	Support Staff		Person Day	0	0	0	
B4	Concrete mix work		m3	0	10	0	
B5	Concrete curing		m3	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of Subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 - 2.The unit price does not include haulage cost.
 - 3.Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

B4 Concrete mix work

Unit m3
Quantity 1

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0.75	0	
22.50.005	Artisans G2		Person Day	0	2.38	0	
22.50.002	Unskilled labour		Person Day	0	0.62	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.70.004	Cement (ordinary portland)		Kg	0	237	0	215*1.1 (loss margin) = 236.5
22.69.009	Fine aggregates(sand)		m3	0	0.51	0	0.46*1.1 (loss margin) = 0.506
22.70.002	Graded aggregates (ballast)		m3	0	1.01	0	0.92*1.1 (loss margin) = 1.012
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
- 1.Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B5 Concrete curing
 Unit m3
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0	0	
22.50.002	Unskilled labour		Person Day	0	1.73	0	
22.50.001	Support Staff		Person Day	0	0	0	
	Subtotal					0	
	Miscellaneous Cost		%		0	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

B6 Lighting pole installaion
 Unit No.
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	10.25	0	
22.50.002	Unskilled labour		Person Day	0	17.25	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.129	Earth bar	10*1500m m	No.	0	10	0	
22.79.131	Lighting pole	10.0m	No.	0	10	0	
22.79.132	Cable for light	m		0	110	0	100 * 1.1 (loss margin) = 110
22.79.133	Accessories for light	Set		0	10	0	
22.79.134	Lamp		No.	0	10	0	
M2	Truck driving (with crane)		Hour	0	1.9	0	(for haulage within site and hoisting)
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

Note 1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.

2. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

M2 Truck driving (with crane)

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Per hour Remarks
22.50.101	Skilled Labour: Operator		Person Day	0	0.125	0	1 day = 8 hours 1 hour = 0.125 day
22.74.002	Fuel	Diesel	litre	0	8.95	0	
22.61.102	Truck with crane	4t	Hour	0	1	0	
	Miscellaneous Cost		%	0	0	0	
	Total					0	

Note

Unit Price Calculation Table

No. 141

Work Category Street light Installation
 Code 20.60.310
 Work Item Name Street lighting control panel

Description Provide and install 10.0m street lighting pole including cables accessories and lamp.

Unit No.
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	13	0	
22.50.002	Unskilled labour		Person Day	0	8.75	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.135	Control panel		No.	0	10	0	
22.79.136	Cable	for control panel	m	0	11	0	10 * 1.1 (loss margin) = 11
22.79.137	Accessories	for control panel	Set	0	10	0	
22.79.138	Meter		No.	0	10	0	
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaneous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Unit Price Calculation Table

No. 142

Work Category Street light Installation
 Code 20.60.315
 Work Item Name Electric cable

Description Provide and install supply cables between the street lighting poles.

Unit m
 Quantity 10

Code	Name	Type	Unit	Unit price(Ksh)	Quantity	Sum (Ksh)	Remarks
22.50.007	Skilled Labour: Overseer		Person Day	0	0	0	
22.50.005	Artisans G2		Person Day	0	0.63	0	
22.50.002	Unskilled labour		Person Day	0	0	0	
22.50.001	Support Staff		Person Day	0	0	0	
22.79.136	Cable	for control panel	m	0	11	0	10 * 1.1 (loss margin) = 11
	Subtotal					0	
	Miscellaneous Cost		%		20	0	% of subtotal
	Total					0	
	Per unit					0	Total/Quantity

- Note
1. Average productivity rates from site surveys and the engineer's past experiences with input from JICA team.
 2. The unit price does not include haulage cost.
 3. Miscellaenous cost is for general reusable equipment to execute the work. (e.g. hand tools, scaffoldings, safety gears)
 - 10%: clearing, cleaning, earthwork, base and surfacing works, simple street furniture works (e.g. marking, sign installation)
 - 20%: concrete works, structural works, complicated street furniture works (e.g. Microtunneling, street lamp works)

Appendix. 2 References

Unit Size Calculation Details

No. 51

Work category: Pipe culvert Installation

Code: 08.60.020

Work Item Name: culvert installation 300mm with surround

Based on standard drawing, $D1=0.30$, $D2= 0.30+0.1=0.40$, $r1=0.15$, $r2=0.20$

B2 Base work: per m, $0.30+0.05*2(\text{pipe thickness}) + 0.10*2$ (surround thickness) = 0.60m²

B3: Form Work: per m, $0.30 + 0.05*2(\text{pipe thickness}) + 0.10*2$ (surround thickness) * 2 (both sides) = 1.2m²

B4: Concrete placement class 15/20: per m, $0.6*0.6$ (surround cross-section) – $0.2*0.2*\pi$ (pipe cross-section) – $\frac{1}{2}*0.25*0.25*2$ (chamfers) = 0.36 - 0.1257 - 0.0625 = 0.1718m³

No. 52

Work category: Pipe culvert Installation

Code: 08.60.021

Work Item Name: culvert installation 300mm without surround

Based on standard drawing, $D1=0.30$, $D2= 0.30+0.1=0.40$, $r1=0.15$, $r2=0.20$

B2 Base work: per m, $0.30+0.05*2(\text{pipe thickness}) + 0.10*2$ (surrounding thickness) = 0.60m²

No. 53

Work category: Pipe culvert Installation

Code: 08.60.022

Work Item Name: culvert installation 450mm with surround

Based on standard drawing, $D1=0.45$, $D2= 0.45+0.1=0.55$, $r1=0.225$, $r2=0.275$

B2 Base work: per m, $0.45+0.05*2(\text{pipe thickness}) + 0.15*2$ (surrounding thickness) = 0.85m²

B3: Form work: per m, $0.45+0.05*2+0.1(\text{bottom surr.})+0.15(\text{top surr.})$ *2(both sides)

$$(0.55+0.25)*2=0.8*2=1.6m^2$$

B4: Concrete placement class 15/20: per m, $0.75*0.75$ (surrounding cross-section) - $0.275*0.275*\pi$ (pipe cross-section) - $\frac{1}{2} * 0.25*0.25*2$ (chamfers) = $0.5625 - 0.2375 - 0.0625 = 0.2625m^3$

No. 54

Work category: Pipe culvert Installation

Code: 08.60.023

Work Item Name: culvert installation 450mm without surround

Based on standard drawing, $D1=0.45$, $D2= 0.45+0.1=0.55$, $r1=0.225$, $r2=0.275$

B2 Base work: $0.45+0.05*2$ (pipe thickness) + $0.1*2$ (surrounding thickness) = $0.75m^2$

No. 55

Work category: Pipe culvert Installation

Code: 08:60:024

Work Item Name: culvert installation 600mm with surround

Based on standard drawing, $D1=0.6$, $D2=0.6+0.05*2=0.7$

B2 Base work: per m, 0.6 (diameter) + $0.05*2$ (pipe thickness) + $0.15*2$ (surround thickness) = $0.6+0.1+0.3 = 1.0m^2$

B3 Form work: per m, $(0.6 + 0.05*2 + 0.15$ (surrounding top) + 0.1 (surrounding bottom)) * 2 (both sides) = $1.9m^2$

B4: Concrete class 15/20: per m, $1 * 0.95 - 0.35 * 0.35*\pi - (0.25 * 0.25)/2 * 2$ (chamfers) = $0.95 - 0.385 - 0.0625 = 0.5025m^3 = 0.5m^3$ (standard volume for surround & bed)

No. 56

Work category: Pipe culvert Installation

Code: 08.60.025

Work Item Name: culvert installation 600mm without surround

Based on standard drawing, $D1=0.6$, $D2=0.6+.05*2=0.7$

B2: Base work: per m, 0.6 (diameter) + $0.05 * 2$ (pipe thickness) + $0.15 * 2$ (additional width on both sides) = $0.1m^2$

No. 57

Work category: Pipe culvert Installation

Code: 08.60.026

Work Item Name: Culvert installation 900mm with surround

Based on standard drawing, $D1=0.9$, $D2=0.9+0.09 * 2 = 1.08$

B2: Base work: per m, 0.9 (diameter) + $0.09*2$ (pipe thickness) + $0.15*2$ (surround thickness) = $1.38m^2$

B3: Form work: per m, $(0.9 + 0.09 * 2 + 0.10$ (bottom surrounding) + 0.150 (top surrounding)) * 2 (both sides) = $2.66m^3$

B4 Concrete class 15/20: per m, $1.33 * 1.38 - 0.54*0.54* \pi - 0.25*0.25$ (chamfers) = $1.8354 - 0.9165 - 0.0625 = 0.8564 = 0.86m^3$ (standard volume for surround & bed)

No. 58

Work category: Pipe culvert Installation

Code: 08.60.027

Work Item Name: Culvert installation 900mm without surround

Based on standard drawing, $D1=0.9$, $D2=0.9+0.09 * 2 = 1.08$

B2: Base work: per m, 0.9 (diameter) + $0.09 * 2$ (pipe thickness) + $0.15*2$ (additional width on both sides) = $1.38m^2$

NO. 59

Work category: Pipe culvert Installation

Code: 08.60.028

Work Item Name: Culvert installation 1200mm with surround

Based on standard drawing, $D1=1.2$, $D2 = 1.2 + 0.1 * 2 = 1.4$

B2 Base work: per m, 1.2 (diameter) + $0.1*2$ (pipe thickness) + $0.15*2$ (surround thickness) = $1.2 + 0.2 + 0.3 = 1.7m^2$

B3 Form work: per m, $(1.2 + 0.1*2 + 0.15(\text{top surrounding}) + 0.1(\text{bottom surrounding})) * 2$ (both sides) = 3.3m²

B4: Concrete class 15/20: per m, $1.7 * 1.8 - 0.7 * 0.7 * \pi - 0.25*0.25(\text{chamfers}) = 3.06 - 1.54 - 0.0625 = 1.4575 = 1.46\text{m}^3$ (standard volume for surround & bed)

NO. 60

Work category: Pipe culvert Installation

Code: 08.60.029

Work Item Name: Culvert installation 1200mm without surround

Based on standard drawing, D1=1.2, D2 = $1.2 + 0.1 * 2 = 1.4$

B2: Base work: per m, 1.2 (diameter) + 0.1 *2 (pipe thickness) + 0.15*2 (additional width on both sides) = 1.7m²

NO. 63

Work category: Headwall Construction

Code: 08.60.190

Work Item Name: Headwall Construction for 450mm pipe culvert

Based on standard drawing

B1: Base work: $(0.9$ (inlet width) + 2.6 (apron width)) / 2 * 1.1 (base width) * 2 (pair) = 3.85m²

B2: Form work:

Apron: $(0.09 * 2 + 1.4 * 2 + 2.6) * 0.15 * 2$ (pair) = 1.674

Wingwalls: $((0.9 + 0.3)/2) * 1.4 + ((0.9 + 0.3)/2) * 1.31 * 2$ (side) * 2 (pair) = 6.504

Headwall (back side): $1.11 * 0.25 * 2$ (pair) = 0.555

Headwall (front side): $(0.9 * 0.85 - 0.45 * 0.45 * \pi / 4) * 2$ (pair) = 1.212

Total: 1.674 + 6.504 + 0.555 + 1.212 = 9.945m²

B3: Reinforcement (mesh wire):

Apron: 3.85 (as above)

Wingwalls: $((0.9+0.3)/2) * 1.4) * 2$ (side) * 2 (pair) = 3.36

Headwall: 1.212 (as in Form work of headwall (front side) above)

Toewall: 2.6 (toe width) * 0.3 (depth) * 2 (inlet and outlet) = 1.56

Total: 3.85 + 3.36 + 1.212 + 1.56 = 9.982m²

B4: Concrete placement class 25/20: 9.982 * 0.15(thickness) = 1.497m³

NO. 64

Work category: Headwall Construction

Code: 08.60.192

Work Item Name: Headwall Construction for 600mm pipe culvert

Based on standard drawing

B1: Base work: $((1.2(\text{inlet width}) + 3.0(\text{apron width}))/2) * 1.25(\text{base width}) * 2(\text{pair}) = 5.25\text{m}^2$

B2: Form work:

Apron: $(0.09 * 2 + 1.53 * 2 + 3) * 0.15 * 2(\text{pair}) = 1.872$

Wingwalls: $((1.05 + 0.3)/2) * 1.53 + (1.05 + 0.3)/2)) * 1.44 * 2(\text{side}) * 2(\text{pair}) = 8.019$

Headwall (back side): $1.2 * 0.25 * 2(\text{pair}) = 0.6$

Headwall (front side): $(1.0 * 1.05 - 0.6 * 0.6 * \pi / 4) * 2(\text{pair}) = 1.535$

Total: $1.872 + 8.019 + 0.6 + 1.535 = 12.026\text{m}^2$

B3: reinforcement (mesh wire)

Apron: 5.25 (as above)

Wingwalls: $((1.05 + 0.3)/2) * 1.53 * 2(\text{side}) * 2(\text{pair}) = 4.131$

Headwall: 1.535 (as in Form work of headwall (front side) above)

Toewall: $3.0 * 0.3 * 2(\text{inlet and outlet}) = 1.98$

Total: $5.25 + 4.131 + 1.535 + 1.98 = 12.896\text{m}^2$

B4: Concrete placement class 25/20

1.58m³ (standard volume for inlet & outlet indicated in the standard drawing)

NO. 65

Work category: Headwall Construction

Code: 08.60.194

Work Item Name: Headwall Construction for 900mm pipe culvert.

Based on standard drawing

B1: Base work: $((1.50(\text{inlet width}) + 4.54(\text{apron width}) / 2) * 2.25(\text{base width}) * 2(\text{pair}) = 13.59\text{m}^2$

B2: Formwork:

Apron: $(0.09 * 2 + 2.69 * 2 + 4.54) * 0.15 * 2(\text{pair}) = 3.03$

Wingwalls: $((1.35 + 0.3)/2) * 2.69 + (1.35 + 0.3) / 2)) * 2.6 * 2(\text{side}) * 2(\text{pair}) = 17.457$

Headwall (back side): $1.56 * 0.25 * 2(\text{pair}) = 0.78$

Headwall (front side): $(1.38 * 1.35 - 0.9 * 0.9 * \pi / 4) * 2(\text{pair}) = 2.454$

Total: $3.03 + 17.457 + 0.78 + 2.454 = 23.721\text{m}^2$

B3: Reinforcement (mesh wire)

Apron: 13.59 (as above)

Wingwalls: $(1.35+0.3)/2 * 2.69 * 2(\text{side}) * 2(\text{pair}) = 8.877$

Headwall: 2.454 (as in Form work of headwall (front side) above)

Toewall: $4.54 * 0.25 * 2(\text{inlet and outlet}) = 2.27$

Total: $13.59 + 8.877 + 2.454 + 2.27 = 27.971\text{m}^2$

B4: Concrete placement class 25/20

4.07m³ (standard volume for inlet & outlet indicated in the standard drawing)

NO. 66

Work category: Headwall Construction

Code: 08.60.196

Work Item Name: Headwall Construction for 1200mm pipe culvert.

Based on standard drawing

B1: Base work: $((1.8(\text{inlet width}) + 5.56(\text{apron width}))/2) * 2.85(\text{base width}) * 2(\text{pair}) = 21.20\text{m}^2$

B2: Form work

Apron: $(0.09 * 2 + 3.38 * 2 + 5.56) * 0.15 * 2(\text{pair}) = 3.75$

Wingwalls: $((1.65 + 0.3)/2) * 3.38 + (1.65 + 0.3)/2)) * 3.29 * 2(\text{side}) * 2(\text{pair}) = 26.016$

Headwall (back side): $1.88 * 0.25 * 2(\text{pair}) = 0.94$

Headwall (front side): $(1.8 * 1.65 - 1.2 * 1.2 * \pi / 4) * 2(\text{pair}) = 3.68$

Total: $3.75 + 26.016 + 0.94 + 3.68 = 34.386\text{m}^2$

B3: Reinforcement A252 Fabric mesh

Apron: 21.2 (as above)

Wingwalls: $((1.65 + 0.3)/2) * 3.38 + (1.65 + 0.3)/2)) * 3.29 * 2(\text{side}) * 2(\text{pair}) = 26.016$

Headwalls: 3.68 (as in Form work of headwall (front side) above)

Toewall: $(5.56 * 0.25) * 2 (\text{inlet \& outlet}) = 2.78$

Total: $21.2 + 26.016 + 3.68 + 2.78 = 40.842\text{m}^2$

B4: Concrete Placement; Class 25/20

5.92m³ (standard volume for inlet & outlet indicated in the standard drawing)

NO. 67

Work category: Manhole Installation

Code: 08.50.240

Work Item Name: Manhole construction less than 1m

(For the purpose of simplification, the depth of manhole is assumed to be 0.7m (about half of 1.35m (08.50.245)) and the inner diameter is 1200mm)

B1: Base work: 1.6×1.4 (bed plan area) = 2.24m²

B2: Form work:

Outer surrounding: $(1.6 + 1.4) \times 2 \times 0.7$ (outer depth) = 4.2

Inner surrounding: $1.2 \times \pi \times 0.55$ (inner depth) = 2.07

Total: $4.2 + 2.07 = 6.27$ m²

B3: Concrete casting: external volume - hollow circular section =

$1.6 \times 1.4 \times 0.7 - 1.2 \times 1.2 \times \pi/4 \times 0.55 = 1.668$ m³

NO. 68

Work category: Manhole Installation

Code: 08.50.245

Work Item Name: Manhole construction more than 1m

(For the purpose of simplification, the depth of manhole is assumed to be 1.35m and the inner diameter is 1200mm)

B1: Base work: 1.6×1.4 (bed plan area) = 2.24m²

B2: Form work:

Outer surrounding: $(1.6 + 1.4) \times 2 \times 1.35$ (outer depth) = 8.1

Inner surrounding: $1.2 \times \pi \times 1.2$ (inner depth) = 4.52

Total: $8.1 + 4.52 = 12.62$

B3: Reinforcement: (using 6mm diameter reinforcements)

Reinforcement length: 3 (number) $\times 0.9$ (length) + 4 (number) $\times 0.7$ (length) = 5.5m

Total weight: 5.5×0.294 kg/m = 1.62 kg = 0.0016t

B4: Concrete casting = external volume - hollow circular section =

$1.6 \times 1.4 \times 1.35 - 1.2 \times 1.2 \times \pi/4 \times 1.2 = 3.024 - 1.356 = 1.668$ m³

NO. 73

Work category: Drain lining

Code: 08.60.050

Work Item Name: Laying of 300mm invert block drain

B2: Base work: per m, 0.3 (IBD diameter) + 0.075 (block side thickness) * 2 + 0.1 (surround) * 2 = 0.65m^2

NO. 74

Work category: Drain lining

Code: 08:60:050

Work Item Name: Laying of 750mm invert block drain

B2: 0.6 (IBD width) + 0.075 (block side thickness) * 2 + 0.1 (surround) * 2 = 0.95m^2

No.121

Work category: Boundary Posts

Code: 20.50.001

Work Item Name: Road Reserve Boundary Posts (size $1.2 \times 0.2 \times 0.2$)

B1: Form work: per no.

Post: 0.2 (post width) * 4 * 1.2 (post height) = 0.96

Base: 0.45 (base width) * 4 * 0.35 (base height) = 0.63

Total: $0.96 + 0.63 = 1.59\text{m}^2$

B2: Concrete casting class, 20/20 for post: per no., $0.2 * 0.2 * 1.2 = 0.048\text{m}^3$

B5: Concrete casting class 15/20 for base: per no., $0.45 * 0.45 * 0.35 - 0.2 * 0.2 * 0.3$ (post submerged depth) = 0.0589m^3

B8: Reinforcement: per no.

Main vertical length (R16, 4Y10): 1.1 (bar length) * 4 + 0.1 (bend length) * 4 = 4.8m

Links length (R8, 6No.): 0.1 (vertical rebar gap) * 4 * 6 = 2.4m

Main vertical weight: $4.8 * 0.56\text{kg/m} = 2.688\text{kg}$

Links weight: $2.4 * 0.448 = 1.0752\text{kg}$

Total weight: $2.688 + 1.0752 = 3.7632\text{kg} = 0.003762\text{t}$

No.132

Work category: Kerb Installation.

Code: 20.50.012

Work Item Name: Kerbs

No. of road Kerb per 100m = $100 / (\text{kerb length} + \text{mortar thickness}) = 100 / (0.88 + 0.01) = 112$

No. of channel per 100m = $100 / (\text{channel length} + \text{mortar thickness}) = 100 / (0.88 + 0.01) = 112$

No.133

Work category: Kilometre Marker Post Installation.

Code: 20.50.013

Work Item Name: Kilometre Marker Posts

B1 Steel Plate Installation, per no.

Steel angle: $(0.125 + 0.125 \text{ (total width)}) * 0.005 \text{ (thickness)} * 1.4 \text{ (length)} * 7.9 \text{ t/m}^2 \text{ (density)} = 0.01383 \text{ t}$

Steel plate: $(0.45 * 0.45 \text{ (area)}) * 0.003 \text{ (thickness)} * 7.9 \text{ t/m}^2 \text{ (density)} = 0.0048 \text{ t}$

White paint:

Steel angle: $0.125 * 4 * 1.4 * 0.001 \text{ (paint thickness)} = 0.0007 \text{ m}^3$

Steel plate: $0.45 * 0.33 * 2 * 0.001 = 0.000297 \text{ m}^3$

Total volume: $0.0007 + 0.000297 = 0.000997 \text{ m}^3$

B2: Base work: per no.

Base width: $0.45 \text{ (foundation width)} + 0.05 \text{ (margin)} = 0.5$

Base area: $0.5 * 0.5 = 0.25 \text{ m}^2$

B3: Formwork: $0.45 \text{ (foundation width)} * 4 * 0.35 \text{ (depth)} = 0.63 \text{ m}^2$

B4: Concrete Casting class 15/20: $0.45 * 0.45 * 0.35 = 0.0709$

No.134

Work category: Bollard Installation.

Code: 20.50.170

Work Item Name: Concrete Bollards

B1: Base work: per no. $(0.5 + 0.025 * 2) * (0.5 + 0.025 * 2) = 0.55 * 0.55 = 0.3025 \text{ m}^2$
(Allowing 0.025m margin both sides)

B2: Formwork: per no.

Bollard: $0.2 * \pi * 0.9 = 0.5652$

Foundation: $0.5 * 4 * 0.45 = 0.9$

Total: $0.5652 + 0.9 = 1.465 \text{ m}^3$

B3: Concrete casting class 20/20: for bollard per no.

$$\text{Bollard diameter: } 0.2\text{m, } 0.2 * 0.2 * \pi / 4 * 0.9(\text{bollard height}) = 0.028\text{m}^3$$

B6: Concrete casting class 15/20: for foundation per no.

$$0.5 * 0.5 * 0.45 - 0.1 * 0.1 * \pi * 0.3 = 0.103\text{m}^3$$

B9: Reinforcement, per no.

$$\text{Bollard (R10): } 0.85 * 6 * 0.56\text{kg/m} = 2.856\text{kg}$$

Foundation (R8):

$$\text{Length: (bollards-concrete cover) } = 200 - 2 * 25 = 150\text{mm} = 0.15$$

$$\text{No. of links: } 0.9/\text{spacing c/c} = 0.9/0.15 = 6$$

$$\text{Weight: } 0.15 * \pi * 6 * 0.448\text{kg/m} = 1.266\text{kg}$$

$$\text{Total weight: } 2.856 + 1.266 = 4.122\text{kg} = 0.004122\text{t}$$

No.135

Work category: Bollard Installation.

Code: 20.50.175

Work Item Name: Steel Bollards

NB/ Inner diameter of steel casing= $0.1 - t * 2$ (thickness) = 0.94, r=0.47

B2: Base work: per no., $(0.35 + 0.025 * 2) * (0.35 + 0.025 * 2) = 0.4 * 0.4 = 0.16\text{m}^2$
(Allowing 0.025m margin both sides)

B3: Formwork: per no., $0.35 * 4 * 0.45 = 0.63\text{m}^2$

B4: Concrete casting class 15/20: per no.

$$\text{Foundation: } 0.35 * 0.35 * 0.45 = 0.055$$

$$\text{Injection inside bollard above foundation level: } 0.047 * 0.047 * 0.6 * \pi = 0.004$$

$$\text{Total volume: } 0.055 + 0.004 = 0.059\text{m}^3$$

NO. 139

Work category: Street lighting Installation.

Code: 20.60.030

Work Item Name: Street lighting Pole (7.6m)

B1: Base work: per no., $(0.8 + 0.1 * 2) * (0.8 + 0.1 * 2) = 1.0 * 1.0 = 1\text{m}^2$
(Allowing 0.1m margin both sides)

B2: Formwork: per no., 0.8 (foundation width) * 1.0 (foundation height) * $4 = 3.2\text{m}^2$

B3: Concrete placement class 15/20: per no., $0.8 * 0.8$ (foundation area) * 1.0 (foundation depth) = 0.64m^3

NO. 140

Work category: Street lighting Installation.

Code: 20.60.035

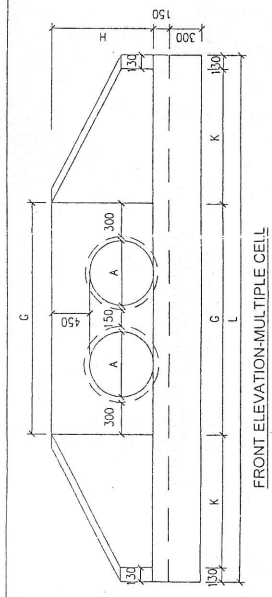
Work Item Name: Street lighting Pole (10m)

B1: Base work: per no., $(0.8 + 0.1 * 2) * (0.8 + 0.1 * 2) = 1.0 * 1.0 = 1\text{m}^2$

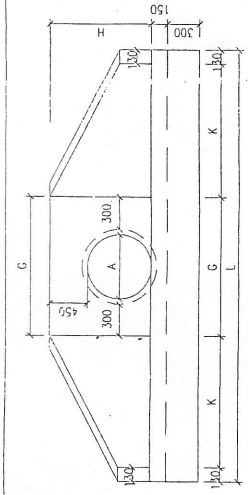
(Allowing 0.1m margin both sides)

B2: Formwork: per no., 0.8 (foundation width) * 1.5 (foundation height) * $4 = 4.8\text{m}^2$

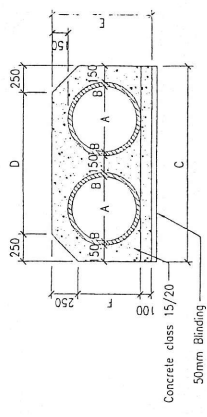
B3: Concrete placement class 15/20: per no., $0.8 * 0.8$ (foundation area) * 1.5 (foundation depth) = 0.96m^3



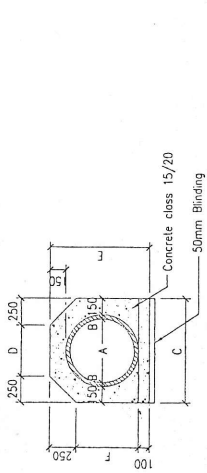
FRONT ELEVATION-SINGLE CELL



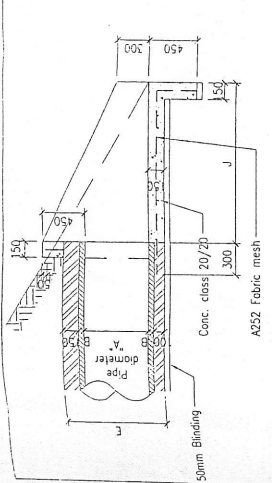
FRONT ELEVATION-MULTIPLE CELL



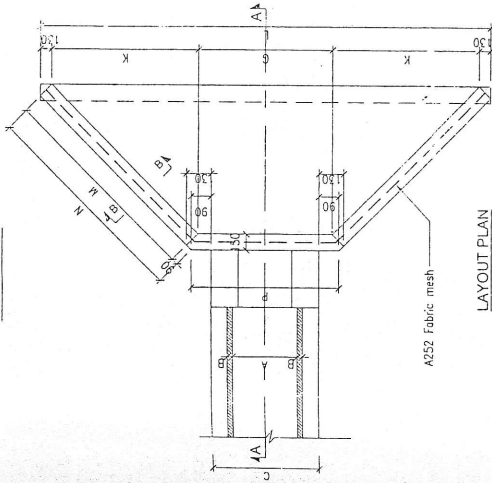
TYPICAL CONCRETE BED AND SURROUND - SINGLE CELL



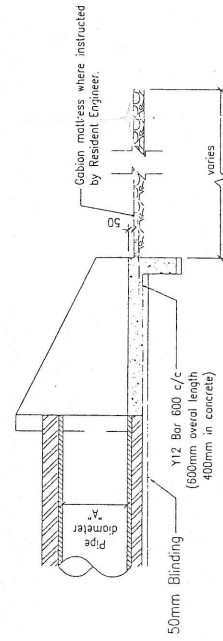
TYPICAL CONCRETE BED AND SURROUND - MULTIPLE CELL



SECTION A-A



SECTION A-A



SECTION B-B

TABLE A - 1-CELL CONCRETE PIPE CULVERTS

CULVERT	A	B	C	D	E	F	G	H	J	K	L	M	N	P	CONCRETE CLASS 15/20 Surround & Bed per running m
Diameter 0.60m	0.60	0.05	1.00	0.50	0.95	0.60	1.20	0.95	1.25	0.72	3.00	1.44	1.53	1.18	0.50m ³
Diameter 0.90m	0.90	0.09	1.38	0.88	1.33	0.98	1.50	1.25	2.25	1.30	4.54	2.60	2.69	1.56	0.86m ³
Diameter 1.20m	1.20	0.10	1.80	1.30	1.70	1.35	1.80	1.55	2.85	1.65	5.56	3.29	3.38	1.88	1.45 m ³

SECTION A-A (with gabion mattress shown)

TABLE B - 2-CELL CONCRETE PIPE CULVERTS

CULVERT	A	B	C	D	E	F	G	H	J	K	L	M	N	P	CONCRETE CLASS 15/20 Surround & Bed per running m
Diameter 0.60m	0.60	0.05	1.85	1.35	0.95	0.60	2.15	0.95	1.25	0.72	3.85	1.44	1.53	2.03	0.93m ³
Diameter 0.90m	0.90	0.09	2.61	2.11	1.33	0.98	2.91	1.25	2.25	1.30	5.77	2.60	2.69	2.79	1.56m ³
Diameter 1.20m	1.20	0.10	3.25	2.75	1.70	1.35	3.55	1.55	2.85	1.65	7.11	3.29	3.38	3.43	2.38m ³

TABLE C - 3-CELL CONCRETE PIPE CULVERTS

CULVERTS	A	B	C	D	E	F	G	H	J	K	L	M	N	P	CONCRETE CLASS 15/20 Surround & Bed per running m
Diameter 0.60m	0.60	0.05	2.70	2.20	0.95	0.60	3.00	0.95	1.25	0.72	4.70	1.44	1.53	2.88	1.35m ³
Diameter 0.90m	0.90	0.09	3.84	3.34	1.33	0.98	4.14	1.25	2.25	1.30	7.00	2.60	2.69	4.02	2.30m ³
Diameter 1.20m	1.20	0.10	4.60	4.30	1.70	1.35	5.10	1.55	2.85	1.65	8.66	3.29	3.38	4.98	3.48m ³

TABLE D - 4-CELL CONCRETE PIPE CULVERTS

CULVERTS	A	B	C	D	E	F	G	H	J	K	L	M	N	P	CONCRETE CLASS 25/20 Inlet & Outlet	CONCRETE CLASS 15/20 Surround & Bed per running m
Diameter 0.60m	0.60	0.05	3.55	3.05	0.95	0.60	3.85	0.95	1.25	0.72	5.55	1.44	1.53	3.73	3.08m ³	1.77m ³
Diameter 0.90m	0.90	0.09	5.07	4.57	1.33	0.98	5.37	1.25	2.25	1.30	8.23	2.60	2.69	5.25	6.87m ³	3.01m ³
Diameter 1.20m	1.20	0.10	6.35	5.85	1.70	1.35	6.65	1.55	2.85	1.65	10.21	3.29	3.38	6.53	10.21m ³	4.58m ³

NOTES:

- All dimensions are in millimetres unless otherwise indicated
- For location of access culverts, refer to access culvert schedule on Dwg. no. S/CP-BC/2/01.
- For location of culverts, refer to culvert schedule on Dwg. no. S/CP-BC/2/01-06
- Final dimensions and culvert invert levels to be confirmed on site by the Resident Engineer.
- Tables A,B,C&D show dimensions for single cell, double cell, 3-cell and 4-cell culverts respectively.
- For culverts with multiple cells, the spacing of pipes to be kept at 150mm.
- For details of gabion boxes and Reno mattresses see Drawing No. DD/OP/2/01
- For pipe culverts where $d < 1.2m$ gabion mattress may be substituted by rip-rap or grouted stone pitching as directed by the Resident Engineer.
- Fabric mesh reinforcement to be fixed as shown and to comply with standard specification.

KENYA NATIONAL HIGHWAYS AUTHORITY
P.O. Box 49712 - 00100
NAIROBI

DETAILED ENGINEERING DESIGN FOR
KIBWEZI - ISIOLO ROAD
CONTRACT-1
(KIBWEZI TC-KITUU)

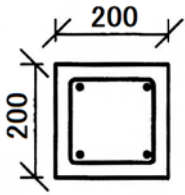
DIRECTOR GENERAL :
GENERAL MANAGER :
MANAGER EASTERN REGION :
SENIOR ENGINEER :
(Special Projects)

SCALE: N.T.S.
DWG No: DS/CP/1/01

REVISIONS:

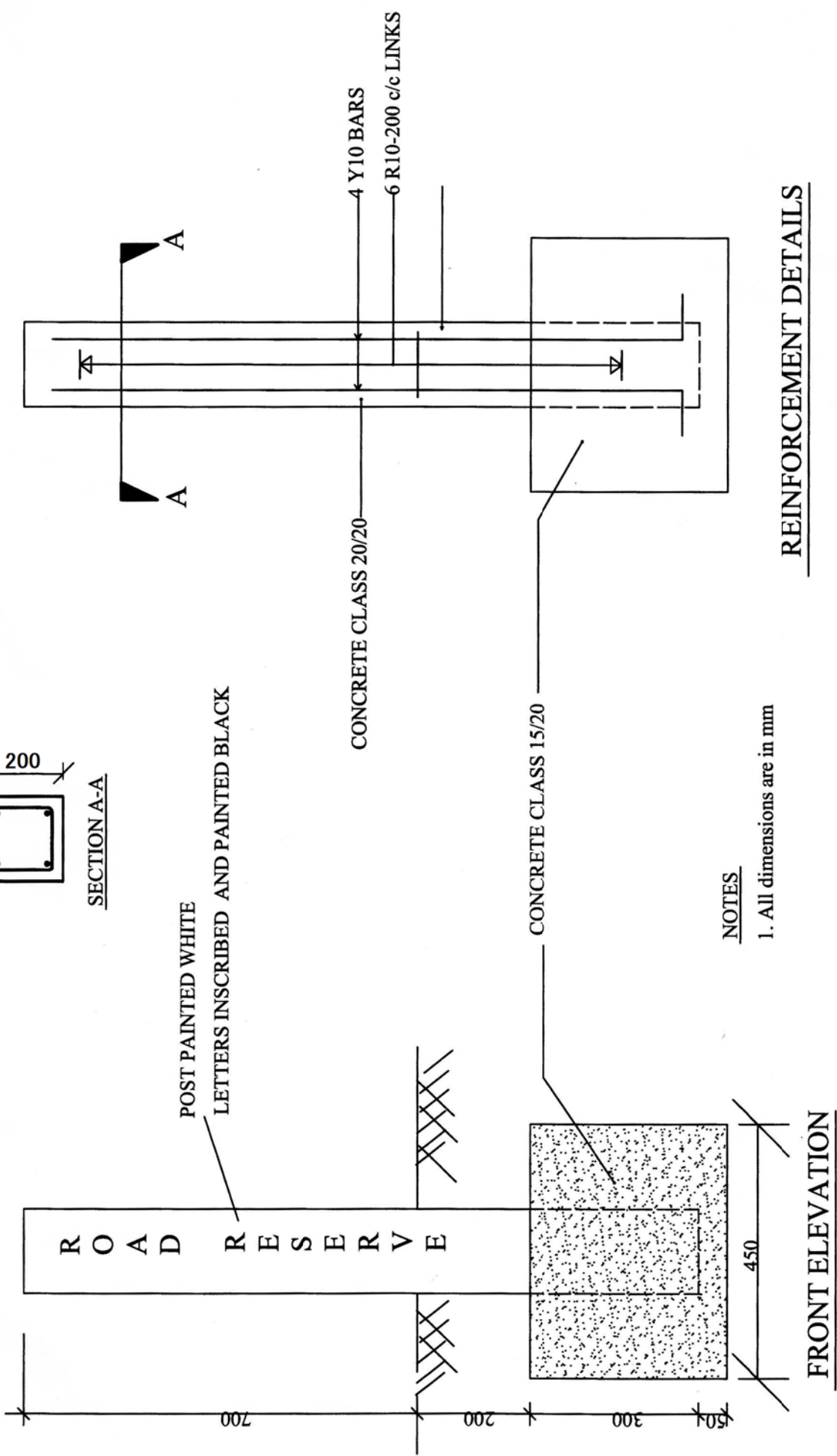
No.	Date	Rev By	Details

TYPICAL DETAILS
CONCRETE PIPE CULVERTS



SECTION A-A

POST PAINTED WHITE
LETTERS INSCRIBED AND PAINTED BLACK



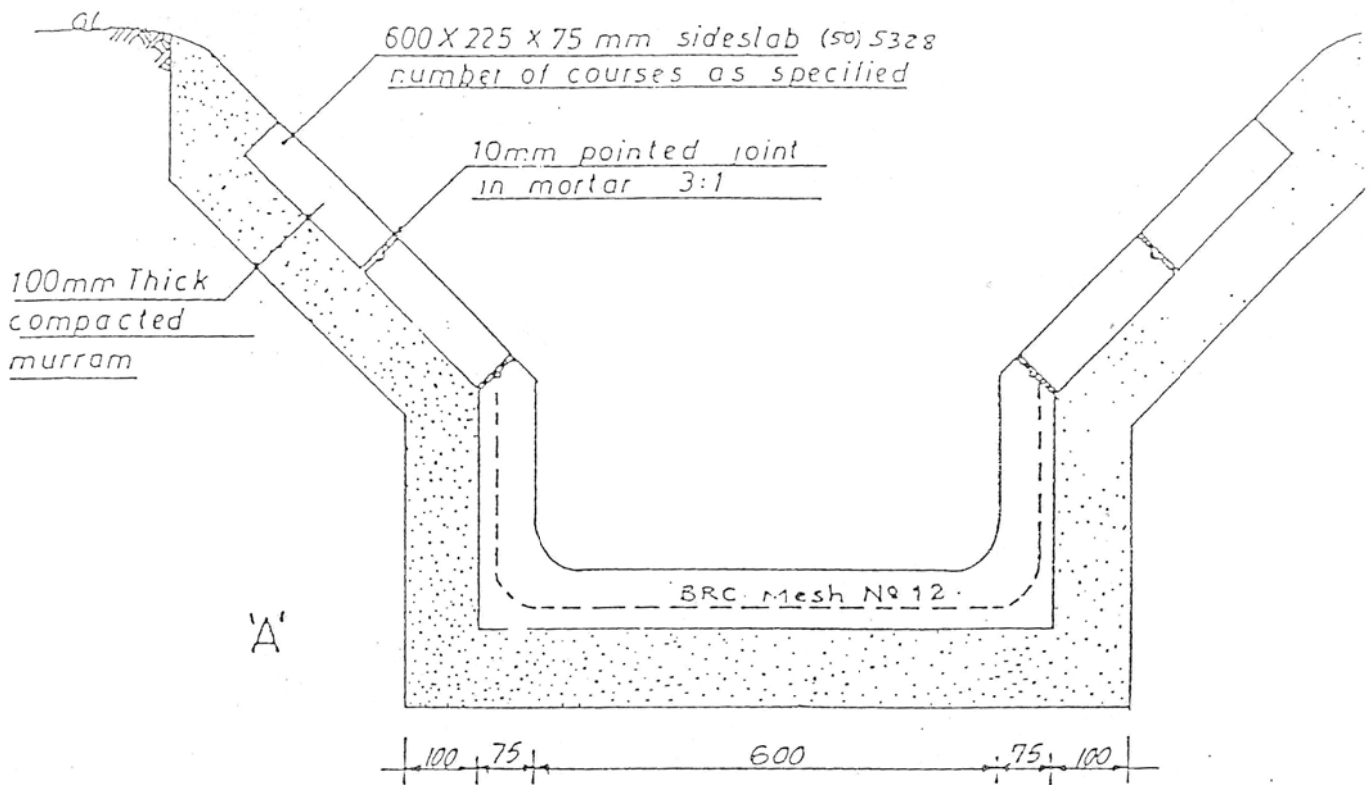
FRONT ELEVATION

NOTES

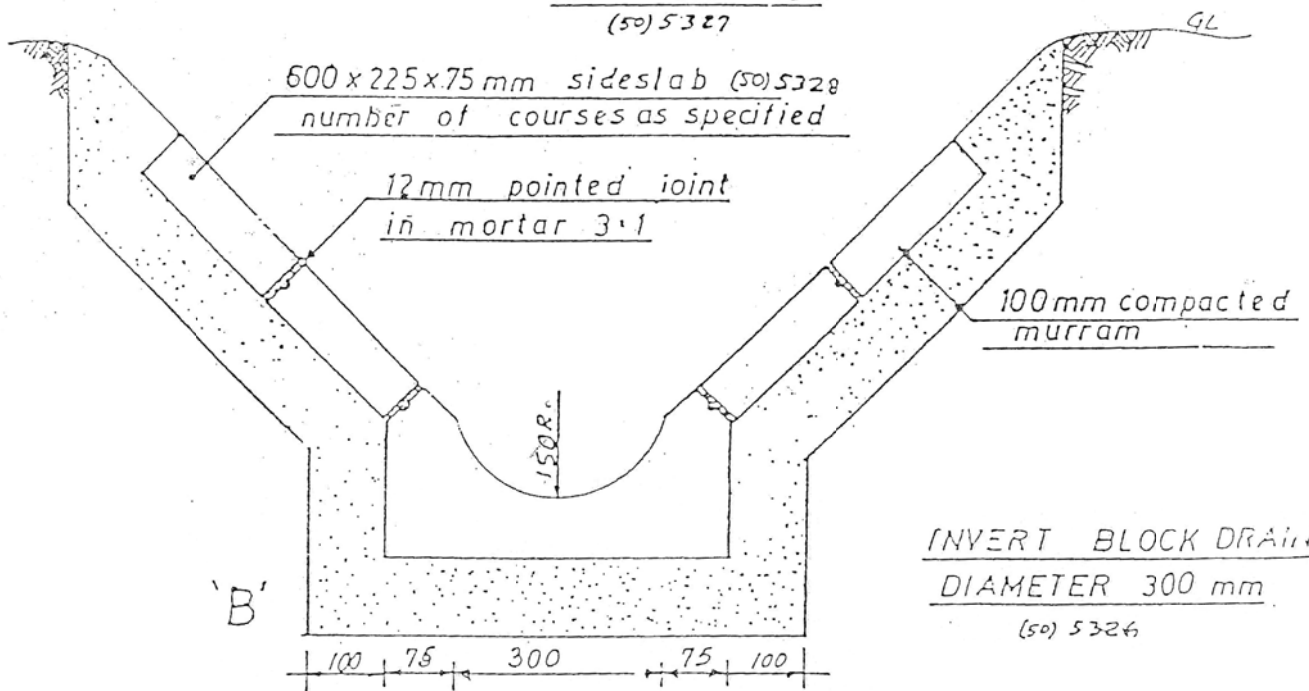
1. All dimensions are in mm

REINFORCEMENT DETAILS

ROAD RESEVE BOUNDARY MARKER POST



INVERT BLOCK DRAIN
SIZE 600x360
(50) 5327

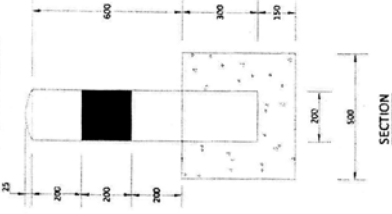


INVERT BLOCK DRAIN
DIAMETER 300 mm
(50) 5326

M.O.W. H.O. BUILDINGS DEPARTMENT	STANDARD DETAIL	DESIGNED / DRAWN <i>Linturiri / Mwariki</i>
DATE: <i>Sept. 1974</i>	INVERT BLOCK DRAINS Assembly detail	APPROVED <i>M. B. [Signature]</i> Chief structural engineer
SCALE: <i>1:10</i>		

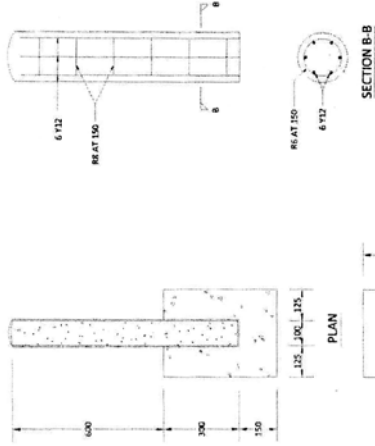
PRECAST CONCRETE BOLLARD

Scale: 1:5 (AT A1 SIZE)



CONCRETE FILLED STEEL BOLLARD

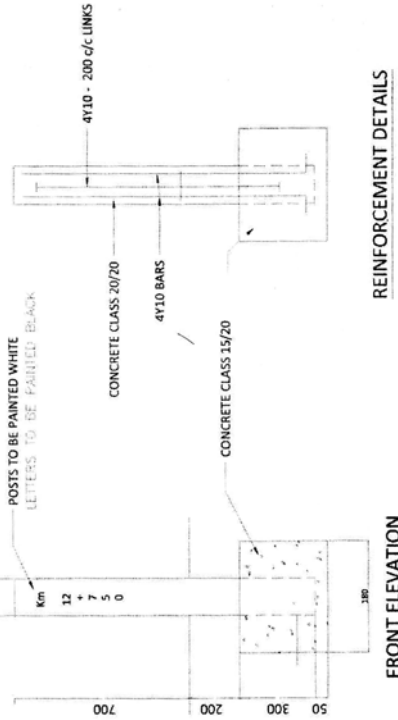
Scale: 1:5 (AT A1 SIZE)



REINFORCEMENT DETAILS

DETAILS OF CONCRETE BOLLARD

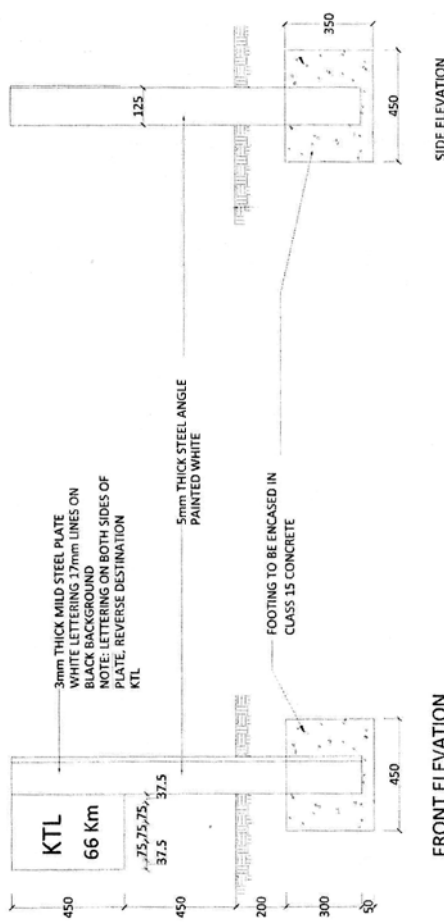
(NOT TO SCALE)



REINFORCEMENT DETAILS

DETAILS OF ROAD RESERVE BOUNDARY POST

(NOT TO SCALE)



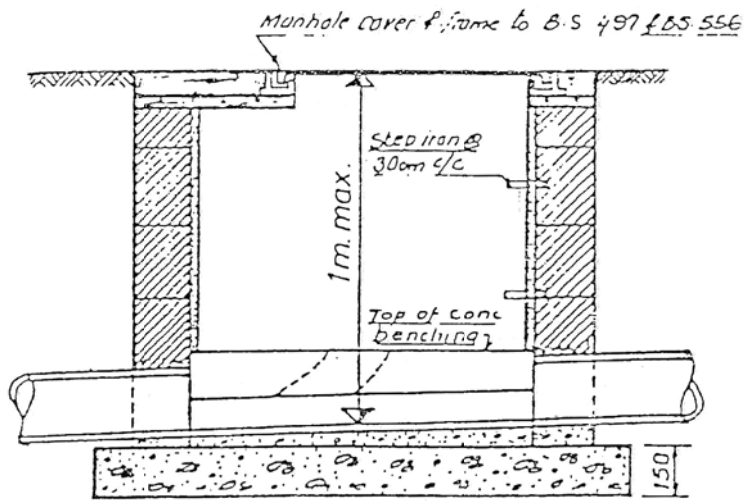
FRONT ELEVATION

SIDE ELEVATION

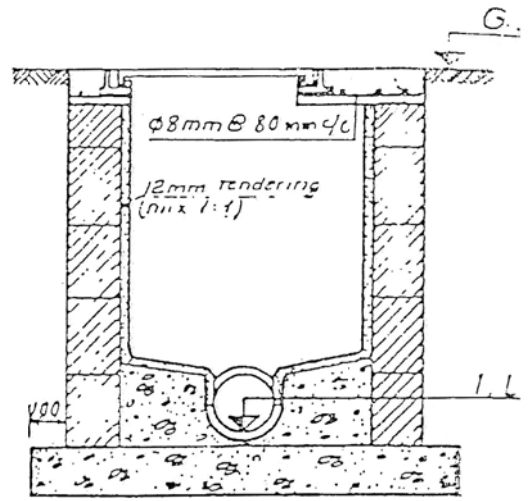
KILOMETRE MARKER POST

(NOT TO SCALE)

APPROVED BY:		Date:	AMENDMENTS		By:	Dwg. No.:	REFERENCE Dwg.:	GENERAL MANAGER (DESIGN & CONSTRUCTION):	
CHECKED BY:		Date:						MANAGER (DESIGN):	
DESIGNED BY:		Date:						PROJECT ENGINEER:	
DRAWN BY:		Date:							
								Kenya National Highway Authority P. O. BOX 49712 - 00100 NAIROBI, KENYA	
								Project Title: KISUMU - KAMUKA - RESERVE - TITLE ROAD (A1) DETAILS OF: KILOMETRE MARKER POST AND BOLLARD Dwg. No: KY/26N/A7 Scale: As indicated Date: September 2008	

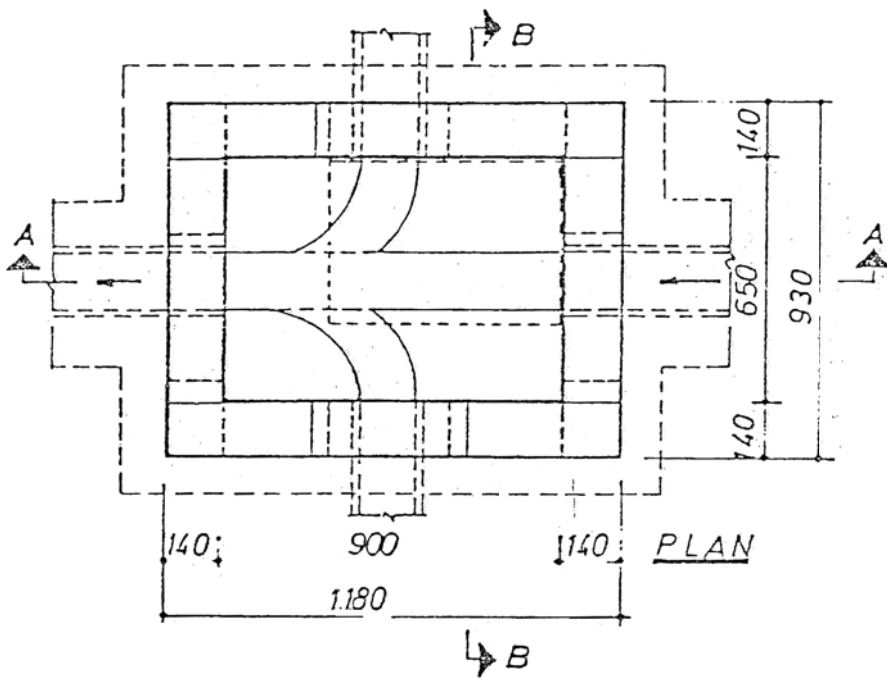


SECTION A-A



Conc. 1:3:6
Class A.

SECTION B-B



NOTES

1. Side walls may be masonry or concrete blocks.
2. This manhole to be used where additional connections are required.

STANDARD DETAIL

RECTANGULAR
MANHOLE TYPE 'B'
(DEPTH 1m. max)

National Working Group Members

Name	Organization	Position
Eng. Patrick. M. Mwinzi	Ministry of Roads (MoR)	Chief Engineer (Roads)
Eng. Francis Gitau		Principal Superintending Engineer (Roads)
Eng. Stephen. K. Kogi		Chief Engineer (Materials)
Eng. Joachim M. Mbarua		Senior Superintending Engineer (Materials)
Eng. Margaret N. Ogai	Kenya Roads Board (KRB)	Manager (Contracts)
Mr. Nelson A. Nyamao		Assistant Engineer (Contracts)
Mr. Thomas M. Bundi		Data Administrator
Eng. Okeyo C. Dede	Kenya National Highways Authority (KeNHA)	Manager (Maintenance)
Eng. Njuguna Gatitu		Manager (Maintenance)
Eng. John. O. Otiato		Regional Manager (Nairobi)
Ms. Levina Wanyonyi		Senior Procurement Officer
Mr. Hendricus. G. Owino		Chief Superintendent Roads
Eng. Peter. P. Gichohi	Kenya Rural Roads Authority (KeRRA)	Manager (Maintenance)
Eng. Julius K. Gakubia		Manager (Maintenance)
Ms. Margaret Muthui		Senior Procurement officer.
Eng. Amos Onyango Ombok	Kenya Urban Roads Authority (KURA)	Manager (Maintenance)
Eng. Christine A. Ogut		Manager (Maintenance)
Ms. Saadia Adan Khalif		Senior. Procurement officer
Mr. Titus S. Koote		Assistant Engineer
Eng. Edwin Muchugia	Kenya Wildlife Service (KWS)	Head of Roads and Fleet Management
Mr. Walter O. Odira		Engineer (Roads)
Mr. Dominic O. Oduge	Kenya National Bureau of Statistics (KNBS)	Economist statistician
Mr. Henock Kirungu	Public Procurement Oversight Authority (PPOA)	Policy & Research Manager
Mr. Robert Kanyi		Senior Policy & Research officer
Mr. Sanui Kazumasa	Japan International Cooperation Agency (JICA)	Representative
Dr. Steve N. Mogere		Infrastructure and Evaluation Advisor
Mr. Motohiko Nishibayashi		Expert (Chief Advisor)
Mr. Naoki Yanadori		Expert



REPUBLIC OF KENYA