



District Road Works

VOLUME

2

Contract Documentation Manuals

Manual A3:

Bills of Quantity (BoQ) for Rehabilitation, Periodic Maintenance and Minor Works



ACKNOWLEDGEMENTS

These manuals have been prepared by the Ministry of Works, Housing and Communications, Uganda.

The aim of the manuals is to complement the Ministry's effort in providing guidance and building capacity of Local Governments to enable them handle their mandated roles in planning and management of the road sector development.

This manual is part of a set titled District Road Works. The set consists of 5 Volumes, each volume comprising a series of manuals covering varying aspects under the following headings:

- Volume 1 Planning Manuals
- Volume 2 Contract Management Manuals
- Volume 3 Implementation and Monitoring Manuals
- Volume 4 Technical Manuals
- Volume 5 District Administrative and Operational Guidelines

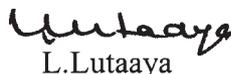
The Manuals describe in detail the organization and techniques for planning, implementation and administration of a district road network. The manuals support Government strategies on sustainable maintenance of district roads; they encourage community participation, promote use of labour based methods and gender balance, ensure protection of the environment, foster work place safety and health in implementation of road works by adopting appropriate contracting practices and support the local construction industry.

They are primarily aimed at Road Engineers, Planners and Managers involved in the planning and management of district road works.

In line with the topics covered in these manuals, related training modules have been designed and are incorporated in the curriculum of the Mount Elgon Labour Based Training Centre.

The manuals are the property of the Ministry of Works, Housing and Communications, but copying and local distribution is not restricted.

We wish to acknowledge the efforts of COWI Consulting Engineers and Planners AS who assisted in the compilation of the Drafts and the invaluable support of the Danish International Development Agency for the financial assistance extended to the Ministry in preparing the manuals.



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Engineer in Chief / DE

Volume 2 Manual A3

Bills of Quantity (BoQ) for Rehabilitation Works, Periodic Maintenance Works and Minor Works

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Preamble to the Bills of Quantity (BoQ)

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Section A3-1

Preamble to the Bills of Quantity (BoQ)

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Preamble to the Bills of Quantity (BoQ)

- The Bills of Quantity (BoQ) must be read in conjunction with the Conditions of Contract, Technical Specifications and the Conditions of Tender and Instructions to Tenderers and any other documents comprising the Contract.
- The Contractor is assumed to have acquainted him/herself with the specific requirements and standards of the Works, and working methods by which they are to be carried out.
- It is understood by the Employer and the Contractor that the Contract shall be carried out, wherever feasible, using local resource-based methods and procedures including Labour-Based Technology.
- The prices and Unit Rates entered in the **BoQ** are required to be the full inclusive value of the cost of the whole of the Works and all expenses which cover supervision of the Works, hand tools, materials, overheads, risks, profit, liabilities and other obligations such as insurance, labour regulations, indemnity, etc., are included in the **BoQ** Item Unit Rates. There shall be no exceptions to this requirement.
- The quantities set down against the **BoQ** Items are estimated quantities and are not to be taken as a guarantee that the quantities will be carried out in their entirety or that they will not be exceeded.
- Under no circumstances are the indicated quantities to be exceeded without authorisation from the Employer: refer **Clause 38** of the Conditions of Contract.
- The quantities shown in the **BoQ** shall not be considered as representing the final amounts of Works unless otherwise stated. It being the intention of the Contract that all Works shall be measured to determine quantities of actual Works performed and paid for at the Unit Rates given in the **BoQ**.
- The sum allowed under Preliminary and General (P&G) Items is to cover all costs of mobilisation and demobilisation, insurances and bonds, traffic accommodation, bill boards, maintenance of the whole of the Works during the Contract including any Defects Liability Period, supervision of the project by the Employer, site meetings with local communities including HIV/AIDS awareness measures, and any other specific P&G Items as may be pertinent to a particular Contract.
- Company overhead costs including supervision of the Works, risk allowance and profit shall be included in the Item Unit Rates.
- All materials required to perform the Works, including their sources of supply, shall be approved by the Engineer. Stockpiling of such materials shall be made at locations approved by the Engineer. Under no circumstances shall additional payments be made for the stockpiling or double handling of these materials.
- Where materials supplied to Site are found to contain other material than those from approved sources, the Engineer shall cause them to be removed from the site by the Contractor and at the full expense of the Contractor.
- When authorised in writing by the Engineer, **Dayworks** will be undertaken and paid for in accordance with the Item Unit Rates given in the **BoQ**.
- An Analysis of **BoQ** Item Activities follows which describe in detail the work activities included in each Item. This, together with the Basic Cost Data and Unit Rate Analysis, will assist Tenderers with preparation of realistic **BoQ** Item Unit Rates.

Section A3-1 : Preamble to the Bills of Quantity (BoQ)

Section A3-2

Analysis of Work Item Activities

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Section A3-2

Analysis of Work Item Activities

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BoQ; ANALYSIS OF WORK ITEM ACTIVITIES

- **Bill 1: Site Preparatory Works**
- **Bill 2: Setting Out and Site Clearing Works**
- **Bill 3: Earth Works**
- **Bill 4: Drainage Works**
- **Bill 5: Gravelling and Completion Works**
- **Bill 6: Grand Summary inc. P&G Items**

ABBREVIATIONS:

L = Labour	MAP = Measurement as Planned
E = Equipment	MBC = Measurement Before Construction
L / E = Labour or Equipment	AWD = Actual Work Done
LS = Lump Sum	

Bill 1: Site Preparatory Works						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
1.1 Construction of access roads to quarry sites including their maintenance throughout the working period	1.1.a Setting out	L	L	MBC		
	1.1.b Clearing (bushes, trees, grass)	L				
	1.1.c Levelling (fill potholes, remove humps)	L / E				
	1.1.d Maintaining throughout the working period	L				
1.2 Construction of detours including their maintenance throughout the working period	1.2.a Setting out	L	L	MBC		
	1.2.b Clearing (bushes, trees, grass)	L				
	1.2.c Earth works (fill potholes, remove humps, levelling)	L / E				
	1.2.d Maintaining throughout the working period	L				

Bill 2: Setting Out and Site Clearing Works						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
2.1 (Re) Establishment of road alignment and setting out of road works	2.1.a Establishing centre line (10 meter intervals)	L	L	AWD		
	2.1.b Establish chainage reference points	L				
	2.1.c Setting out of all works and material deposit and disposal areas for all	L				
2.2 Clear site of all grass, bushes and boulders (up to 1.5m maximum girth) and Grub all roots of grass and bushes including excavation of top soil from road formation	2.2.a Cutting bushes and grass	L	L	AWD		
	2.2.b Grubbing all roots	L/E				
	2.2.c Removing boulders and stockpiling outside quarry at approved locations	L/E				
	2.2.d Removal of topsoil and depositing outside road way at approved locations	L/E				
2.2.1 Extra over item 2.2 for boulders over 1.5m maximum girth	2.2.1.a by rolling	L/E	L	AWD		
	2.2.1.b by burying	L/E				
	2.2.1.c by heating and water method	L				
	2.2.1.d by using wedge and feathers	L				
	2.2.1.e by towing/pushing with equipment	E				
	2.2.1.f by use of explosives	L/E				
	(Day Work)					

Bill 2: Setting Out and Site Clearing Works (continued)					
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks
2.3 Cut and remove from site trees (up to 1 m girth), including removal of stumps and roots (No.)	2.3.a Cutting trees and removing from site as directed by the Engineer	L	L	MBC	
	2.3.b Excavating and removing stumps as directed by the Engineer	L / E			
2.3.1 Extra over Item 2.3 for trees over 1 metre in girth (No.)	2.3.1.a Cutting trees and removing from site as directed by the Engineer	L	L	MBC	
	2.3.1.b Excavating and removing stumps as directed by the Engineer	L / E			

Bill 3: Earth Works						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
3.1 Rehabilitation of existing road formation						
3.1.1 Reshaping of existing road formation including watering and compaction	3.1.1.a Establishing road formation levels (profile boards or centre levels)	L			# control of vertical alignment	
	3.1.1.b Establishing profile guides at 10m intervals	L				
	3.1.1.c Reshaping formation; scarify and form camber. Side borrow from ditch if required and where material is approved	L / E	L / E	AWD	Labour: # Excavate and balance by following profile guides. (Excavation of side ditches has to be included in this activity) # Spread the material from centre to road shoulder break point.	
	3.1.1.d Watering and Compaction	E				
3.1.2 Opening of / re-excavation of side, mitre, catch water drains and other specified drains (m)	(Re)-excavating side drains, mitre drains, catch water and other drains depositing surplus or unsuitable material well outside the area	L	L	AWD		
3.1.3 Opening culverts (m)	Opening of culverts	L	L	AWD		

Bill 3: Earth Works (continued)						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
3.2 (Re-) Construction of road formation						
3.2.1 Excavation to level	3.2.1.a Cutting/filling of slots at 10m intervals	L				
	3.2.1.b Cutting and filling as guided by the slots. Levelling of terrace	L/E	L/E	MBC		
	3.2.1.c Filling in layers of maximum 15cm loose, watering and compacting	L/E				
3.2.2 Excavation of side, mitre, catch water and other specified drains (m³)	3.2.2.a Excavating ditch and place in road centre	L	L	AWD		
	3.2.2.b Sloping and backsloping, and where suitable, place material on roadway	L				
3.2.3 Form, water and compact road bed (m)	3.2.3.a Camber formation	L/E	L	AWD	Labour: This activity consists of spreading the ditch material in the road centre	
	3.2.3.b Watering and Compacting; layers not to exceed 15cm loose	E	E			

Bill 3: Earth Works (continued)						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
3.3 Provision of Fill Materials						
3.3.1 Preparation of borrow pit(s) consisting of clearing vegetation and removing topsoil	3.3.1.a Cutting grass, bushes (and trees), deposit outside the Site	L	L	AWD		
	3.3.1.b Grubbing, deposit outside the Site	L	L			
	3.3.1.c Excavate top soil layer and loading	L/E	L			
	3.3.1.d Hauling top soil	L/E	L/E			
	3.3.1.e Stockpiling, to be reused for reinstatement of quarry	L	L			
3.3.2 Excavation, hauling, placing, watering and compaction of approved fill material in embankments and low spots to create a level road bench	3.3.2.a Excavating and Stockpiling	L/E	L	AWD		
	3.3.2.b Loading and Hauling	L/E	L/E			
	3.3.2.c Unloading and Spreading	L	L			
	3.3.2.d Watering and Compacting; layers not to exceed 15cm loose	E	L/E			
3.4 Excavation of Rock (Day Work)		L/E	L/E	AWD		

Bill 4: Drainage Works					
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks
4.1 Provide and install scour checks:	Refer the Specifications	L	L	AWD	
4.1.1 Using stones					
4.1.2 Using sticks					
4.2 Excavation of foundation for structures:	Refer the Specifications	L / E	L	AWD	
4.2.1 In soil not more than 1m deep					
4.2.2 In soil more than 1m deep (m ³)					
4.3 Supply and install concrete culvert pipe rings:	Refer the Specifications	L	L	AWD	
4.3.1 600mm diameter					
4.3.2 900mm diameter					
4.3.3 1200mm diameter (m)					

Bill 4: Drainage Works (continued)						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
4.4 Supply and install steel culvert pipe rings:						
4.4.1 600mm diameter	Refer the Specifications	L	L	AWD		
4.4.2 900mm diameter						
4.4.3 1200mm diameter						
4.4.4 >1200mm diameter (m)						
4.5 Demolish existing structures and cart away debris (Lump Sum)	Refer the Specifications	L / E	L	MBC		
4.6 Provide material and build cement bound masonry work in:						
4.6.1 stones	Refer the Specifications	L	L	MAP / AWD		
4.6.2 concrete blocks (m ³)						
4.7 Provide stones and build dry stone masonry walls (m ³)	Refer the Specifications	L	L	MAP / AWD		

Bill 4: Drainage Works (continued)						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
4.8 Provide, erect and remove formwork for concrete (m ²)	Refer the Specifications	L	L	MAP / AWD		
4.9 Provide and fix steel reinforcement:						
4.9.1 steel bars (kg)	Refer the Specifications	L	L	MAP / AWD		
4.9.2 weld mesh (m ²)						
4.10 Provide, place and compact hard core foundation layer for structures (m ³)	Refer the Specifications	L	L	MAP / AWD		
4.11 Provide, cast and cure concrete in class:						
4.11.1 Class lean (1:4:8)						
4.11.2 Class 15 (1:3:6)	Refer the Specifications	L	L	MAP / AWD		
4.11.3 Class 20 (1:2:4) (m ³)						

Bill 4: Drainage Works (continued)						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
4.12 Provide gabion baskets and stones, place and fill baskets (m ³)	Refer the Specifications	L	L	AWD		
4.13 Provide materials and build grouted stone pitching, 150mm thickness (m ²)	Refer the Specifications	L	L	MAP / AWD		
4.14 Provide select material and backfill structures (m ³)	Refer the Specifications	L / E	FC	MAP / AWD		
4.15 Excavate water diversions and/or construct barriers (Lump Sum)	Refer the Specifications	L / E	L	AWD		
4.16 Clear swamps for structures, 50m upstream from inlet and 100m downstream from outlet of structure over full width of structure including head and wing walls (Lump Sum)	Refer the Specifications	L	L	AWD		
4.17 Other drainage erosion protection works as directed by the Engineer (Provisional Item)	Refer the Specifications					

Bill 5: Graveling and Completion Works						
Item	Work Activities	Possible Method(s)	Preferred Method	Method of Measurement	Remarks	
5.1 Preparation of quarry site(s) consisting of clearing vegetation and removing topsoil	5.1.a Cutting grass, bushes (and trees), deposit well outside the Site	L	L / E	AWD		
	5.1.b Grubbing, deposit well outside the Site	L				
	5.1.c Excavating top soil layer and loading	L / E				
	5.1.d Removing boulders and stockpiling outside quarry	L / E				
	5.1.e Hauling top soil	L / E				
	5.1.f Stockpiling, to be reused for reinstatement of quarry	L				
					(m²)	

Bill 6: Grand Summary		
Bills 1 to 5:	Description	Remarks
<ol style="list-style-type: none"> 1. Site Preparatory Works 2. Setting Out and Site Clearing Works 3. Earth Works 4. Drainage Works 5. Graveling & Completion Works 	<p>Refer details from respective Bills 1 to 5 inclusive</p>	
Bill 6:	Description	Method of Payment
<ol style="list-style-type: none"> 6. Preliminary and General Items 	<ol style="list-style-type: none"> 6.1 Mobilisation and Demobilisation 6.2 Insurances and Bonds 6.3 Traffic Accommodation 6.4 Bill Boards 6.5 Maintenance of the Whole of the Works 6.6 Supervision of the Project by the Employer including testing 6.7 Site Meetings with Local Communities and HIV/AIDS awareness 6.8 6.9 6.10 	<p>LS LS LS No. LS LS LS</p>

Section A3-1 : Preamble to the Bills of Quantity (BoQ)

Section A3-2 : Analysis of Work Item Activities

Section A3-3
BoQ Summary Sheets

Section A3-3

BoQ Summary Sheets

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Bill 1
Site Preparatory Works

BILL 1

Bill of Quantities				Page No.	
Bill 1: Site Preparatory Works				Bill 1 Page 1/1	
Project Name:				Contract No.	
District:				District:	
Item	Description of Works	Unit	Qty.	Rate (Ush)	Amount (Ush)
1.1 (MBC)	Construction of access roads to quarry sites including their maintenance throughout the working period	LS			0
1.2 (MBC)	Construction of deviations including their maintenance throughout the working period	LS			0
Total Bill 1 (c.f. to Grand Summary)					0

Bill 2
Setting Out and Site Clearing Works

2

BILL

Bill of Quantities				Page No.	
Bill 2: Setting Out and Site Clearing Works				Bill 2 Page 1/1	
Project Name:				Contract No.	
District:				District:	
Item	Description of Works	Unit	Qty.	Rate (Ush)	Amount (Ush)
2.1 (AWD)	(Re) Establishment of road alignment and setting out of road works	m			0
2.2 (AWD)	Clear site of all grass, bushes and boulders (up to 1.5m maximum girth) and Grub all roots of grass and bushes including excavation of top soil from road formation	m			0
2.2.1 (AWD)	Extra over item 2.2 for boulders over 1.5m maximum girth.	daywork			0
2.3 (MBC)	Cut and remove from site trees (up to 1 m girth), including removal of stumps and roots	No			0
2.3.1 (MBC)	Extra over Item 2.3 for trees over 1 metre in girth	No			0
Total Bill 2 (c.f. to Grand Summary)					0

Bill 3
Earth Works

3

BILL

Bill of Quantities				Page No.	
Bill 3: Earth Works				Bill 3 Page 1/1	
Project Name:				Contract No.	
District:				District:	
Item	Description of Works	Unit	Qty.	Rate (Ush)	Amount (Ush)
3.1	Rehabilitation of existing road formation				
3.1.1 (AWD)	Reshaping of existing road formation including watering and compaction	m			0
3.1.2 (AWD)	Opening of culverts, opening / re-excavation of side, mitre, catch water and other spec. drains	m			0
3.2	(Re-) Construction of road formation				
3.2.1 (MBC)	Excavation to level	m ³			0
3.2.2 (AWD)	Excavation in side, mitre, catch water and other specified drains	m			0
3.2.3 (AWD)	Form, water and compact road bed	m			0
3.3	Provision of Fill Materials				
3.3.1 (AWD)	Preparation of Quarry Site consisting of clearing vegetation and removing topsoil	m ²			0
3.3.2 (AWD)	Excavation, hauling, placing, watering and compaction of approved fill material in embankments & lowspots to create a level road bench	m ³			0
3.4 (AWD)	Excavation of Rock	Daywork			0
Total Bill 3 (c.f. to Grand Summary)					0

Bill 4
Drainage Works

4
BILL

Bill of Quantities				Page No. Bill 4 Page 1/2	
Bill 4: Drainage Works				Contract No.	
Project Name:				District:	
Item	Description of Works	Unit	Qty.	Rate (Ush)	Amount (Ush)
4.1 (AWD)	Provide and install scour checks:				
4.1.1	Using stones	No.			0
4.1.2	Using sticks	No.			0
4.2 (AWD)	Excavation of foundation for structures:				
4.2.1	In soil not more than 1m deep	m ³			0
4.2.2	In soil more than 1m deep	m ³			0
4.3 (AWD)	Supply and install concrete culvert pipe rings:				
4.3.1	600mm diameter	m			0
4.3.2	900mm diameter	m			0
4.3.3	1200mm diameter	m			0
4.4 (AWD)	Supply and install steel culvert pipe rings:				
4.4.1	600mm diameter	m			0
4.4.2	900mm diameter	m			0
4.4.3	1200mm diameter	m			0
4.4.4	>1200mm diameter	m			0
4.5 (MBC)	Demolish existing structures and cart away debris:	LS			0
4.6 (MAP/AWD)	Provide material and build cement bound masonry work in:				
4.6.1	Stones	m ³			0
4.6.2	Concrete Blocks	m ³			0
4.7 (MAP/AWD)	Provide stones & build dry stone masonry walls	m ³			0
4.8 (MAP/AWD)	Provide, erect & remove formwork for concrete	m ²			0
4.9 (MAP/AWD)	Provide and fix steel reinforcement:				
4.9.1	Steel bars	kg			0
4.9.2	Weld mesh	m ²			0
Carried forward to next page					0

Bill of Quantities				Page No. Bill 4 Page 2/2	
Bill 4: Drainage Works (continued)				Contract No.	
Project Name:				District:	
Item	Description of Works	Unit	Qty.	Rate (Ush)	Amount (Ush)
	Brought forward from previous page				0
4.10 (MAP/AWD)	Provide, place and compact hardcore foundation layer for structures	m ³			0
4.11 (MAP/AWD)	Provide, cast and cure concrete in class:				
4.11.1	Class lean (1:4:8)	m ³			0
4.11.2	Class 15 (1:3:6)	m ³			0
4.11.3	Class 20 (1:2:4)	m ³			0
4.12 (AWD)	Provide gabion baskets and stones, place and fill baskets	m ³			0
4.13 (MAP/AWD)	Provide materials and build grouted stone pitching, 150mm thickness	m ²			0
4.14 (MBC/AWD)	Provide select material and backfill structures	m ³			0
4.15 (AWD)	Excavate water diversions and/or construct barriers	LS			0
4.16 (AWD)	Clear swamps for structures, 50m upstream from inlet and 100m downstream from outlet of structure over full width of structure including head and wingwalls	LS			0
4.17	Other drainage erosion protection works as directed by the Engineer - Provisional Item				0
Total Bill 4 (c.f. to Grand Summary)					0

Bill 5
Gravelling and Completion Works

Bill of Quantities				Page No.	
Bill 5: Gravelling and Completion Works				Bill 5 Page 1/1	
Project Name:				Contract No.	
District:				District:	
Item	Description of Works	Unit	Qty.	Rate (Ush)	Amount (Ush)
5.1 (AWD)	Preparation of quarry site consisting of clearing vegetation and removing topsoil	m ²			0
5.2 (AWD)	Excavate gravel, remove boulders, stockpile, load, haul, offload, spread, water and compact	m ³ in place			0
5.3 (AWD)	Restoration of site(s), quarries and borrow pits	LS			0
Total Bill 5 (c.f. to Grand Summary)					0

Bill 6
Grand Summary

Bill of Quantities					Page No.
Bill 6: Grand Summary					Bill 6 Page 1/1
Project Name:					District:
Bill	Description				Amount (Ush)
1	SITE PREPARATORY WORKS				0
2	SETTING OUT AND SITE CLEARING WORKS				0
3	EARTH WORKS				0
4	DRAINAGE WORKS				0
5	GRAVELLING AND COMPLETION WORKS				0
SUBTOTAL 1					0
Item	Description	Unit	Qty.	Rate (Ush)	Amount (Ush)
6	PRELIMINARY AND GENERAL ITEMS				
6.1	Mobilisation and Demobilisation	LS			0
6.2	Insurances and Bonds	LS			0
6.3	Traffic Accommodation	LS			0
6.4	Bill Boards	No			0
6.5	Maintenance of the Whole of the Works	LS			0
6.6	Supervision of the Project by the Employer	LS			0
6.7	Site Meetings with Local Communities	LS			0
6.8					
6.9					
6.1					
6.11					
6.12					
Total P & G					0
SUBTOTAL 2					0
PROVISIONAL 10% FOR CONTINGENCIES					
SUBTOTAL 3					
Add VAT (17%)					
GRAND TOTAL				Ush	0
(Carried forward to Form of Tender)					

