Workforce Skills Series

Australian Aid

SOLOMON ISLANDS INFRASTRUCTURE PROGRAM

Bill of Quantities

Barry Dolan | Solomon Islands Infrastructure Program
Bennett Pitakia | FMC Pacific

30 July 2024
Heritage Park Hotel

Learning Objectives

The learning objectives of this workshop are for local construction companies to:

- Recognise what a Bill of Quantities (BOQ) includes
- Develop a construction program
- Estimate preliminaries and include in a BOQ
- Estimate labour costs and include in a BOQ
- Estimate plant & material costs and include in a BOQ
- Understand what a provisional sum is

Agenda

Time	Topic
9:00am – 9:10am	Welcome and Opening Remarks
9:10am – 9:30am	What is a BOQ and why it is important
9:30am – 10:30am	Group activity – BOQ for a wall construction
10:30am – 11:00am	Morning Tea Break & Group Photo
11:00am – 12:30pm	Costing a BOQ
12:30pm – 12:45pm	Wrap up/Closing Remarks and Evaluations
12:45pm -1:30pm	Lunch

What is a Bill of Quantities (BOQ)

- A document used in tendering in the construction industry in which materials, plant, and labour are itemised to be costed by Tenderers.
- Prepared by a Quantity Surveyor, who quantifies the work items and provides descriptions in line with drawings and specification
- Because all tenderers are pricing the same document, ensure that all the items are accounted for. This ensures that all bids are evaluated on a like for like basis.
- Needs to be read in conjunction with drawings and specification

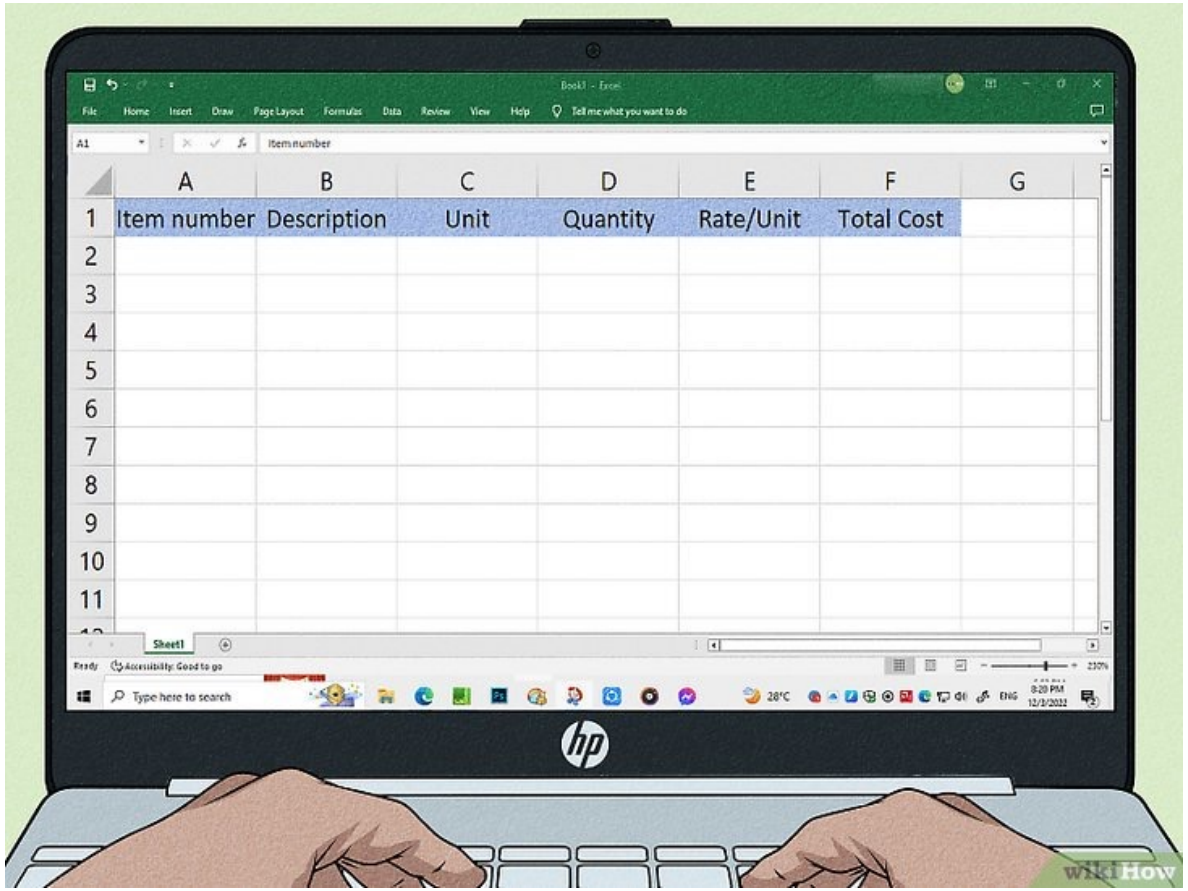
BOQ

- A standard BOQ comprises a list of items (with a number and a description), a measurement unit, the quantity, the cost per unit, and the total cost per item.

Bill of Quantities Sheet

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
A	**PRELIMINARY WORK**				
A.1	Allow to effect all necessary insurance policies as specified or required by conditions of contract. Allow for full Occupational Health and Safety practices on and during construction period as required.	Item	1.00		
A.2	Provision for full time site supervisor	Hrs	72.00		
B	**CIVIL WORK**				
B.1	Excavation of strip footing and backfill and disposal on site of excess material	cu.m.	6.00		
B.2	Supply and place 25MPa plain concrete strip footing pad 300x 600mm in depth as indicated in drawing details.	cu.m.	1.80		
B.3	Supply and install 200 mm x 200 mm x 400 mm thick block work in cement, sand mortar	sq.m.	32.00		
B.4	Supply and install all relevant D12 bars	m	212.50		
B.5	15 Mpa Core Fill to blockwork	cu.m.	0.34		
C	**PROVISIONAL SUM**				
C.1	Allow prosional sum of SBS2,500 for unforeseen works, as directed by the client	LS	1.00	2500	

Total Price



If you can, create a spreadsheet to organise your BOQ. This is where some administrative support might make tendering much quicker and accurate.

Bids from all tenderers will be evaluated based on the BOQ that a quantity surveyor may have produced.

- So, work out the prices for materials and labor in your area by talking to suppliers.
- BOQs from similar projects that were recently completed can help you come up with a cost estimate.

It’s not about the lowest cost

- Your BOQ will be compared with other tenders to select the most suitable.
- Tenders can be easily compared using the BOQ provided without needing to analyse and break tenders down.
- This is where your cost estimate is critical. If a tenderer submits a bid significantly lower than other cost estimates, it may be evaluated as too cheap (not realistic).

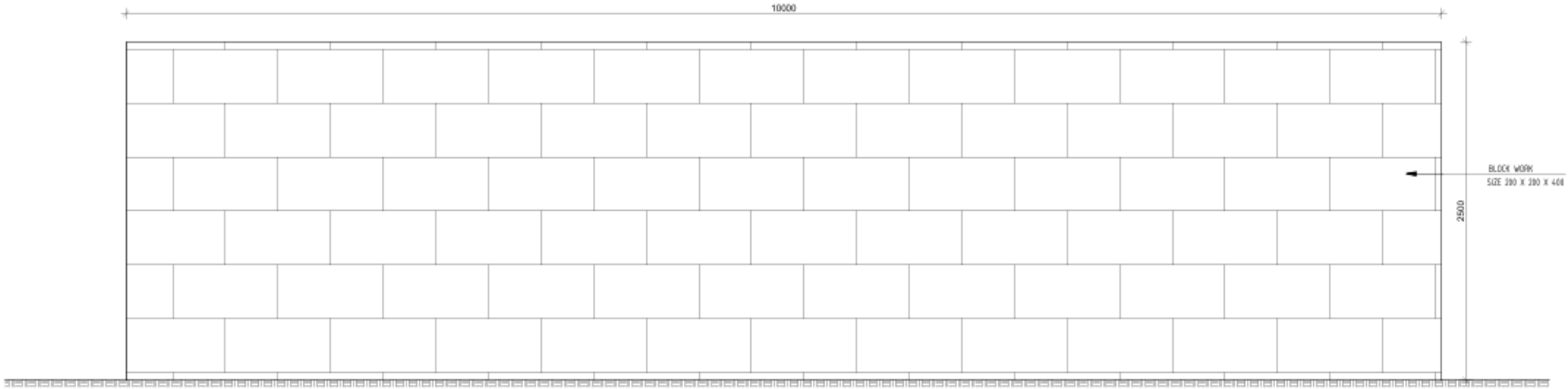
Q&A

- What have been your experiences in putting together a BOQ?
  - What has helped you with putting together accurate and winning BOQs?
  - What challenges have you faced?

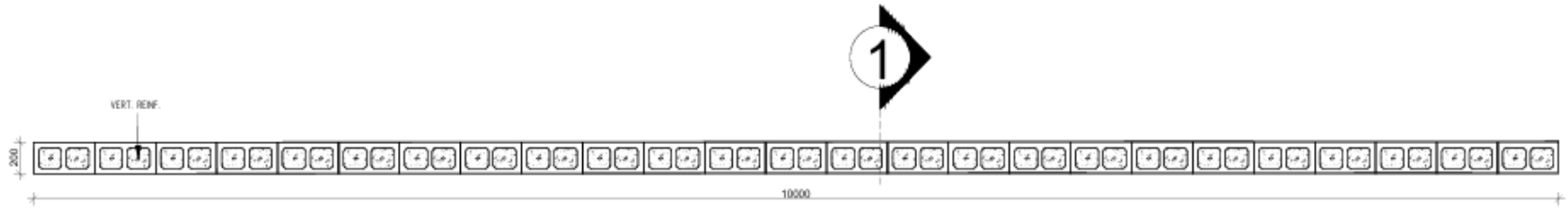
Table Group Activity - *Put together a BOQ for a wall*

- Review the diagram and the BOQ
- In table groups, estimate your costs for each item and calculate your total cost – 20 minutes to complete
- Share the total cost at the end

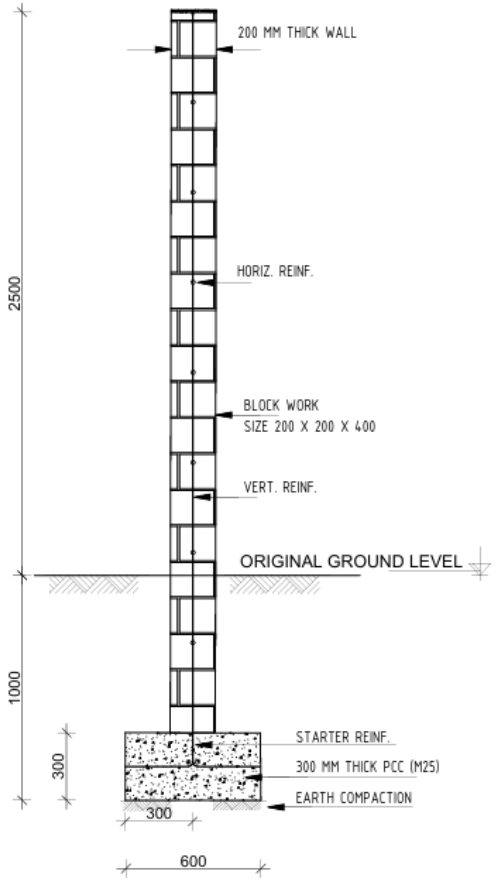
Project Drawing



ELEVATION



WALL PLAN



FOOTING SECTION AT 1-1
Scale: Not in Scale

BOQ

Bill of Quantities Sheet

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B.5	15 Mpa Core Fill to blockwork	cu.m.	0.34		
C	**PROVISIONAL SUM**				
C.1	Allow prosional sum of SBS2,500 for unforeseen works, as directed by the client	LS	1.00	2500	

Total Price

Morning Tea Break And Group Photo

Session 2

Process to cost a BOQ

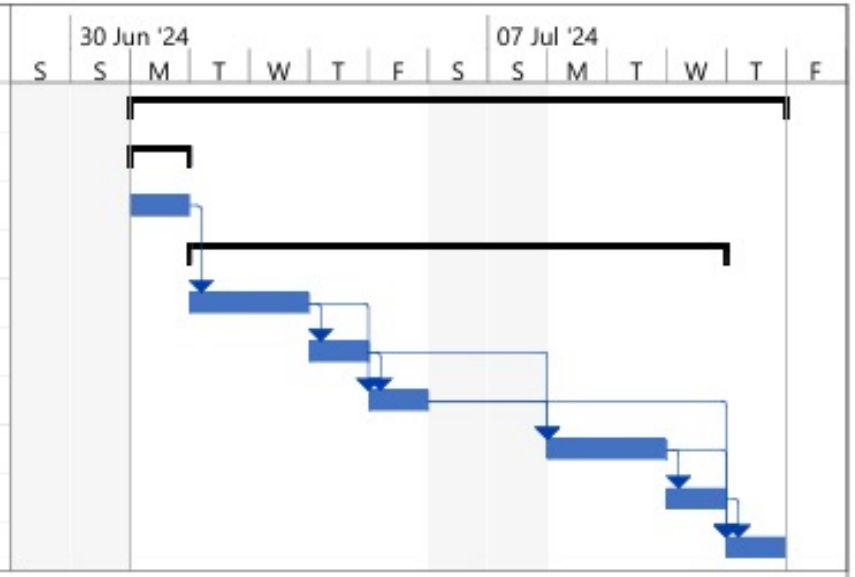
1. Develop a construction program
2. Estimate preliminaries
3. Build up rates for individual BOQ line items
   - Work breakdown structure – each ‘item’ is made up of a series of tasks that may have time and resource/cost implications
   - Cost labour and materials for each task within a line item and use the total cost in the BOQ
   - Keep a record of your ‘working out’ so that you develop a bank of knowledge for future BOQs

Develop a construction program

- A construction program sets out the time required to complete different items in the BOQ.
- You can develop the construction program as a Gantt chart in specialised programs (e.g. MS Project) or in Excel

Construction Program

ID	Task Name	Duration	% Complete	Start	Finish	Predecessors
1	**Compound Wall Work**	**9 days**	**0%**	**Mon 01/07/24**	**Thu 11/07/24**	
2	**PRELIMINARY WORK**	**1 day**	**0%**	**Mon 01/07/24**	**Mon 01/07/24**	
3	CAR insurance	1 day	0%	Mon 01/07/24	Mon 01/07/24	
4	**CIVIL Work**	**7 days**	**0%**	**Tue 02/07/24**	**Wed 10/07/24**	
5	Excavation of Footing	2 days	0%	Tue 02/07/24	Wed 03/07/24	3
6	Reinforcement Work	1 day	0%	Thu 04/07/24	Thu 04/07/24	5
7	25 Mpa Concrete Work	1 day	0%	Fri 05/07/24	Fri 05/07/24	5,6
8	Block Work	2 days	0%	Mon 08/07/24	Tue 09/07/24	6,7
9	15 Mpa Core Filling	1 day	0%	Wed 10/07/24	Wed 10/07/24	8
10	**Completion and Handover**	**1 day**	**0%**	**Thu 11/07/24**	**Thu 11/07/24**	**7,8,9**



Estimate preliminaries

- Preliminaries are a group of items necessary for a contractor to complete a project but will not actually become part of the works e.g. site establishment, scaffolding, plant, power to the site, insurance, site accommodation etc.
- Some Items are time related such as site supervison
- Some Items are one off such as utility fee connections, mobilise/demobilise to site.

Preliminaries

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
A	**PRELIMINARY WORK**				
A.1	Allow to effect all necessary insurance policies as specified or required by conditions of contract. Allow for full Occupational Health and Safety practices on and during construction period as required.	LS	1	$5,500.00	$5,500.00

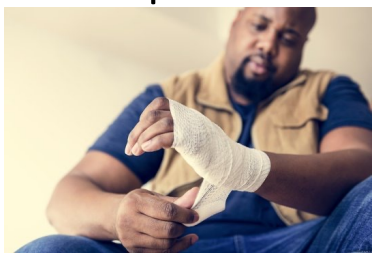
Quote From Capitol Insurance Brokers for Contrators All Risk Policy	LS	1	$5,000.00
Profit & Overhead @ 10%	%	10	$500.00
		Total Insurance Cost	**$5,500.00**

Estimate the true cost of labour

In addition to the hourly wage, consider your other costs……

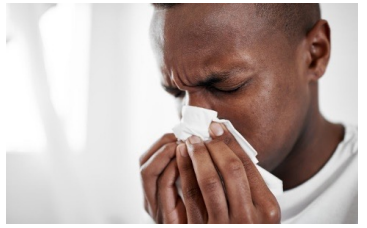
SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
A	PRELIMINARY WORK				
A.1	Allow to effect all necessary insurance policies as specified or required by conditions of contract. Allow for full Occupational Health and Safety practices on and during construction period as required.	Item	1.00		
A.2	Provision for full time site supervisor	Hrs	72.00		

Workers compensation



Annual leave

Sick leave



Annual leave fares

NPF

Public holidays

Personal Protective Equipment (PPE)

Cost of labour

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
A	**PRELIMINARY WORK**				
A.2	Provision for full time site supervisor (80 Hours)	hours	72	33.26	2394.72
	Hourly Rate- ($25.00 per hour) - Site Supervisor				
	Holiday Pay (4 weeks per year) = ($25x(52/48)			27.08	
	Annual Passage - SBD 2000 (2000/(48*5*8) - 1920 working hours per year			1.04	
	Sub Total			**28.13**	
	NPF Contribution @7.5% of SBD28.13			*2.11*	
	Subtotal including NPF			**30.23**	
	Overhead & Margin @10%			**3.02**	
	Hourly Rate for Site Supervisor			**33.26**	

Calculating total costs of materials

- Unit costs (direct costs) may not include INDIRECT costs associated with the product or service.
- If applicable, make sure you add :
  - The cost of an employee in sourcing, negotiating and ordering the materials;
  - Transport costs to your site;
  - Handling costs – you may need equipment to unload materials;
  - Inspection costs if you need to assure the quality of the materials;
  - Storage costs – putting into storage – storage facilities – getting out of storage;
  - Any specific insurance costs (e.g. marine transport insurance)

Estimate the true cost of materials

E.g. a delivery of concrete and reinforcing steel may include:

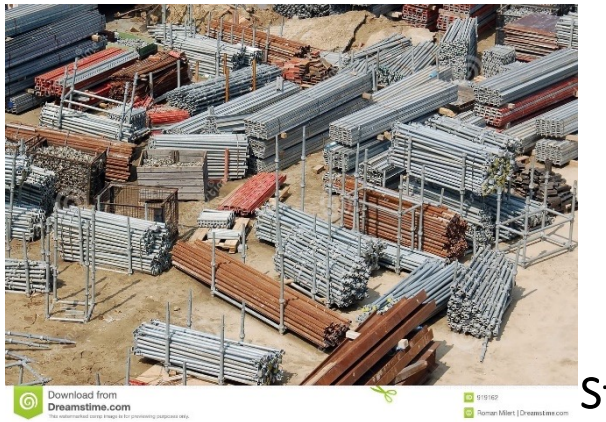
Ordering

Specification / testing

Insurances

Transport

Handling



Storage

B1. Excavation

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
B	**CIVIL WORK**				
B.1	Excavation of strip footing and backfill and disposal on site of excess material	cu.m.	6	$ 142.40	$ 854.40

Hourly Rate- ($15.00 per hour) - Unskilled Labour				$	16.25
Holiday Pay (4 weeks per year) = ($15x(52/48)					
Annual Passage - SBD 2000 (2000/(48*5*8) - 1920 working hours per year				$	1.04
	Sub Total			**$**	**17.29**
NPF Contribution @7.5% of SBD17.29				*$*	*1.30*
Subtotal including NPF				**$**	**18.59**
Overhead & Margin @10%				**$**	**1.86**
Hourly Rate for Unskilled Labour				**$**	**20.45**
2 unskilled labour x 2 days = 2*2*8 = 32 hours		hours	32	$ 20.45	$ 654.40
Hire of small tools& plant		1 Item		$ 200.00	$ 200.00
				Subtotal	**$ 854.40**
	Rate per cubic meter = SBD854.40/ 6				**$ 142.40**

B2. Concrete

Materials						
Supply of 25MPA Concrete	cu.m	1	$	1,300.00	$	1,300.00
wastage - estimates at 10%	cu.m	0.1	$	1,300.00	$	130.00
Overhead & Margin @ 10% = (1300+130 =SBD1430). 1430 x 10% - SBD143					$	143.00
Labour						
1 unskilled for 1 day = (8 hours*SBD20.45)/1.8)	Cu.m	1	$	90.89	$	90.89
1skilled for 1 day = (8 hours*SBD26.85)/1.8)	Cu.m	1	$	119.33	$	119.33
Hourly Rate- ($20.00 per hour) - Skilled						
Holiday Pay (4 weeks per year) = ($20x(52/48)			$	21.67		
Annual Passage - SBD 2000 (2000/(48*5*8) - 1920 working hours per year			$	1.04		
Sub Total			**$**	**22.71**		
NPF Contribution @7.5% of SBD22.71			*$*	*1.70*		
Subtotal including NPF			**$**	**24.41**		
Overhead & Margin @10%			**$**	**2.44**		
Hourly Rate for Skilled Labour			**$**	**26.85**		
Plant						
Hire of Vibrator - SBD 300 per day = (300/1.8 = 166.67)	Cu.m	1	$	166.67	$	166.67
Hire of small tools - SBD100 (100/1.8 = 55.56	Cu.m	1	$	55.56	$	55.56
Petrol - 5 litres @ SBD11 per litre = SBD 55.00 (SBD 55/1.8	Cu.m	1	$	30.55	$	30.55
Overhead & Margin @ 10% = (166.67+55.56+30.55 = SBD252.78. 252.78 * 10% = 25.28					$	25.78
Total Supply & Place 1 Cu.m of concrete					**$**	**2,061.78**

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
B.2	Supply and place 25MPa plain concrete strip footing pad 300x 600mm in depth as indicated in drawing details.	cu.m.	1.8	$ 2,061.78	$ 3,711.21

B2. Concrete

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
B.2	Supply and place 25MPa plain concrete strip footing pad 300x600mm in depth as indicated in drawing details.	cu.m.	1.8	$ 2,061.78	$ 3,711.21

B3. Blockwork

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
B.3	Supply and install 200 mm x 200 mm x 400 mm thick block work in cement, sand mortar	sq.m	32	$ 372.17	$ 11,909.44
	Materials				
	Supply of Block	no	12.5	$ 20.00	$ 250.00
	wastage - estimates at 5% (5% of 12.5 blocks = 0.625 blocks)	no	0.625	$ 20.00	$ 12.50
	Allow for 1:4 cement sand mortar	Item	1	$ 50.00	$ 50.00
	Overhead & Margin @ 10% = 250+25+50 =SBD325.00 x 10% - SBD32.50				$ 32.50
	Labour				
	1 unskilled for 2 day = (16 hours*SBD20.45)/32) =SBD10.23	sqm	1	$ 10.23	$ 10.23
	1skilled for 2 day = (16 hours*SBD26.85)/32) = SBD13.43	sqm	1	$ 13.43	$ 13.43
	Plant				
	Hire of small tools - SBD100 (100/32)= 3.20	sq.m	1	$ 3.20	$ 3.20
	Overhead & Margin @ 10% = (SBD3.20 * 10% = SBD0.32)				$ 0.32
	Total Supply & Place 1 Sq.m of Blockwork				**$ 372.17**

B4. Rebar

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
B.4	Supply and install all relevant D12 bars	m	212.5	$ 20.45	$ 4,345.14
	Materials				
	Supply of reinforcement bar	m	1	$ 15.00	$ 15.00
	wastage - estimates at 10%	m	1	$ 1.50	$ 1.50
	Overhead & Margin @ 10% = 15+1.5 =SBD16.5 x 10% =SBD1.65				$ 1.65
	Labour				
	1 unskilled for 1 day = (8 hours*SBD20.45)/212.5)= SBD 0.77	no	1	$ 0.77	$ 0.77
	1skilled for 1 day = (8 hours*SBD26.85)/212.5) = SBD1.01	no	1	$ 1.01	$ 1.01
	Plant				
	Hire of small tools for cutting and bending - SBD100 (100/212.5 = 0.47)	m	1	$ 0.47	$ 0.47
	Overhead & Margin @ 10% = (SBD0.47. 0.47 * 10% = 0.047				$ 0.05
	Total Supply & Install 1 m of D12 bars				**$ 20.45**

B5. Corefill

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
B.5	15 Mpa Core Fill to blockwork	cu.m.	0.34	$ 2,524.25	$ 857.54
	Materials				
	Supply of 15Mpa concrete	cu.m	1	$ 1,300.00	$ 1,300.00
	wastage - estimates at 10%	cu.m	0.1	$ 1,300.00	$ 130.00
	Overhead & Margin @ 10% = 1200+120 =SBD1320. 1320 x 10% - SBD132				$ 132.00
	Labour				
	2 unskilled personel for day = (16 hours*SBD20.45)= 962.25 per m3	Cu.m	1	$ 962.25	$ 962.25
	Total Supply & Place 1 Cu.m of concrete				**$ 2,524.25**

Completed BOQ

SN	Item Description	Unit	Quantity	Bidders rate (SBD)	Total Amount (SBD)
A	**PRELIMINARY WORK**				
A.1	Allow to effect all necessary insurance policies as specified or required by conditions of contract. Allow for full Occupational Health and Safety practices on and during construction period as required.	Item	1.00	5500	$ 5,500.00
A.2	Provision for full time site supervisor	Hrs	80.00	33.26	$ 2,660.63
B	**CIVIL WORK**				
B.1	Excavation of strip footing and backfill and disposal on site of excess material	cu.m.	6.00	142.40	$ 854.40
B.2	Supply and place 25MPa plain concrete strip footing pad 300x 600mm in depth as indicated in drawing details.	cu.m.	1.80	2061.78	$ 3,711.21
B.3	Supply and install 200 mm x 200 mm x 400 mm thick block work in cement, sand mortar	sq.m.	32.00	372.17	$ 11,909.44
B.4	Supply and install all relevant D12 bars	m	212.50	20.45	$ 4,345.14
B.5	15 Mpa Core Fill to blockwork	cu.m.	0.34	2524.25	$ 857.54
C	**PROVISIONAL SUM**				
C.1	Allow prosional sum of SBS2,500 for unforeseen works, as directed by the client	LS	1.00	2500	$ 2,500.00

Total Price **$ 32,338.35**

Provisional Sum

- An amount of money included in the contract sum to cover work or materials, or both, the extent of which cannot be specifically detailed when entering a contract.
- Often used to cover insurance in SIIP contracts.

Key points

- Take time to develop your BOQ
- Keep a record of past BOQs and also actual project records – review what was accurate and what could be better estimated. The more knowledge you have access to, the more accurate your BOQ will be.
- It's not the cheapest BOQ that gets selected
- Accurate costing helps your business profitability and gives the client confidence that you can deliver the work

Please complete the workshop feedback form

Australian Aid

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