

REPUBLIC OF LEBANON

COUNCIL FOR DEVELOPMENT & RECONSTRUCTION

EXISTING OLD LANDFILL FINAL CLOSURE IN TRIPOLI CITY



Volume 3

Bill of Quantities

June 2022



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GENERAL PREAMBLES

1 INTRODUCTION

- 1.01 The rules contained in this Preamble apply equally to both proposed and executed works.
- 1.02 The Bills of Quantities are to be read and construed in association with the Drawings, the Specification and this Preamble. Information which is given on the Drawings and/ or in the Specification is identified by cross references included in the descriptions of work in the Bill of Quantities.
- 1.03 Where work cannot be fully described or where the quantity of work required cannot be accurately determined, it is given as an item or a Provisional Sum.
- 1.04 Unless the term meter, used in this Preamble, is preceded by the words square or cubic it is deemed to be linear.
- 1.05 The rates inserted by the Tenderer in the Bill of Quantities shall be in words and figures. In the case of discrepancy between the two, the rates written in words shall govern.

2 QUANTITIES

- 2.01 Quantities set out in the Bills of Quantities are estimated quantities and are not to be taken as the actual and correct quantities for ordering and purchasing of materials or paying the Contractor. Actual Payments to the Contractor are to be based on actual measurements of executed quantities on site.
- 2.02 Works shall be measured net as fixed in position in accordance with the rules contained in this preamble or except where otherwise stated in a measurement rule applicable to the work.
- 2.03 Dimensions used in calculating quantities are taken to the nearest 10 mm (i.e. 5mm and over is regarded as 10 mm and less than 5 mm is disregarded).
- 2.04 Quantities measured in tonnes are given to two places of decimals. Quantities measured in other units of mass are given to the nearest whole unit except that any quantity less than one unit is given as one unit.
- 2.05 Unless otherwise stated, where minimum deductions for voids are dealt with in this Preamble they refer only to openings which are within the boundaries of measured areas. Openings which are at the boundaries of measured areas are always deducted irrespective of size.

3 DESCRIPTIONS

- 3.01 Headings to groups of items in the Bill of Quantities are to be read as part of the descriptions of the items to which the headings apply.
- 3.02 Dimensions are stated in descriptions generally in the sequence, length, width, height. Where ambiguity could arise, the dimensions are identified.
- 3.03 Dimensions given in descriptions are in millimeters unless otherwise indicated.
- 3.04 Unless otherwise specifically stated in the Bill of Quantities or herein, the following are deemed to be included in all work:

labour and all costs in construction therewith,

materials, products, goods and all costs in connection therewith,

Contractor's equipment, including but not limited to construction plant, scaffolding, tools, vehicles and the like and all costs in connection therewith,

assembling, fitting and fixing materials, products and goods in position,

any method of fixing, fixing to any nature of base or background including preparation and providing fixing materials,

breaking down for transport and installation and subsequent reassembly of composite items manufactured off site,

waste of materials,

square, raking and curved cutting,

work at any location or height,

work in small, isolated quantities,

protection of all work,

protection of all existing structures, utilities, site improvements, trees and vegetation, features, pavements and other facilities on and adjacent to the site, which are to remain upon completion of the work,

all other enabling tasks associated and subsidiary components and items of work which are indicated, or reasonably inferred from the Drawings and/ or Specification and necessary to perform and complete the work described,

establishment and overhead charges and profit.

- 3.05 Except where items are included in the Bill of Quantities and are priced separately by the Contractor therein, provision of the following are deemed to be included with all work:

site administration and security,

insurances,

bonds and guarantees,

water for the Works,

lighting and power for the Works,

temporary accommodation for the use of the Contractor and the Engineer,

temporary telephones and the cost of calls for the use of the Contractor and the Engineer,

temporary roads, hardstandings, crossings and the like,

temporary fencing, hoardings, screens, fans, footways, guardrails, gantries and the like,

giving notices and making applications, including the payment of fees and charges in connection therewith,

safety, health and welfare of workpeople,

compliance with traffic regulations

maintenance of public and private roads, services and adjoining property,

control of noise and pollution, prevention of fire and compliance with all other statutory and general obligations,

removing rubbish, protective casings and coverings and cleaning the Works on completion,

drying the Works,

testing and commissioning of service installations including the provision of fuel,

samples of materials and testing of materials including providing equipment for testing,

design, co- ordination, installation and as- built record drawings and the like,

preparation and submittal of reports, records, certificates, notices, proposals, designs, details, calculations and other information and data required by the Specification,

allow in unit rates for all other requirements, services, provisions, liabilities and obligations contained in the General Requirements and Conditions of Contract.

Maintaining, adapting, clearing away and making good are deemed to be included with the items for temporary works.

Payment of any customs and other import duties, harbour and port dues, wharf age, landing, pilotage and any other charges or dues including demurrage charges on any Goods or other things required for or in connection with the Works entering or leaving the country.

4 SYMBOLS, ABBREVIATIONS AND DEFINITIONS

4.01 The following symbols and abbreviations are used in this Preamble and in the Bills of Quantities:

LS = Lump Sum
m = linear meter
m² = square meter
m³ = cubic meter
cm = centimeter
mm = millimeter
Nr = number
kg = kilogramme
T = tonne
% = percentage
Ø = nominal diameter
Qty = quantity
Drg = drawing
Mpa = Mega Pascal

4.02 The following definitions apply to all work:

'horizontal' means level or sloping work not exceeding 15 degrees from the horizontal

'sloping' means sloping work exceeding 15 degrees but not exceeding 80 degrees to the horizontal,

'vertical' means work exceeding 80 degrees from the horizontal,

'curved' means curved in any direction or in more than one direction and to any radius or radii and includes curved work to domes, vaults and the like.

- 4.03 The term 'extra over' means that work so described involves extra cost over the basic work in which it occurs. No deduction of the quantity of basic work is made for the extra over work.
- 4.04 The item "Operational" means that works so described include all required material, equipment and operation all along the work period, as well as all along the maintenance period.
- 4.05 The item "Complete" means that works so described include all required material, equipment, man power and all related works for the full completion of relevant work item.

5 PRICE ADJUSTMENT FORMULAE: APPLICABLE ITEMS

5.01

Listed below are the major of Bill of Quantity items that are subjected to price adjustment, in accordance with Clause 70.1 of the Conditions of Contract, with their inherent proportion in each of the Price Adjustment Formula as stated hereunder (See attached Schedule).

Schedule of Bill Items and Applicable Price Adjustment Formulae
Formulae in Accordance with Clause 70.1 of Conditions of Contract

Item No	Item Description	Formulae Applicable in Indicated Proportions to each Unit Price								
		A	B	C	D	E	G	J	K	L
		Reinf. St.	Exc., Agg.	Concrete	Ind. Steel	Copper	DI Pipes	GRP Pipes	PE Pipes	Bituminous
II-5	Excavation in preparation for placement of Gabion Walls		100%							
II-6	Rock Size: 0.5T to 1T		100%							
II-7	Cyclopean Concrete including Cast-in-situ cyclopean concrete		30%	70%						
II-8A	Front GALFAN Gabion Walls		60%		40%					
II-8B	Rear GALFAN Gabion Walls		60%		40%					
II-9	Wire Mesh				100%					
II-10	Aggregate For the Formation Of Plateau And Benches at top of landfill for access roads		100%							
III-1-1	Final leveling soil layer		100%							
III-1-2	Geocomposite gas drainage layer								40%	60%
III-1-3	Textured Geomembrane VFPE 1mm									100%
III-1-4	Geocomposite Water Drainage Layer								40%	60%
III-1-5	Top Soil Cultivation layer		100%							
IV-1-1	Leachate Extraction Wells		50%				50%			
IV-1-2	Complete Submersible Pumping System				100%					
IV-2-3	Main Leachate pressure pipe HDPE Diameter 150mm								100%	
IV-2-4	Secondary Leachate pressure pipe HPDE Network diameter 65mm								100%	
V-1-1	Biogas Extraction Well		50%				50%			
V-2-3	HDPE pipe diameter 150mm								100%	
V-2-4	HDPE pipe diameter 90mm								100%	
VI-3	Access Roads 4m minimum width		100%							
VI-4	Bituminous Course, 4cm thickness									100%

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BILL NO. VII- PROVISIONAL

GENERAL SUMMARY

BILL NO. I. GENERAL REQUIREMENTS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
I-1	00000	Mobilization and Demobilization Contractor's mobilization & demobilization (all labor, plant, equipment, and material to undertake all the works), and temporary works. Unit Rate in Letters.....	L.S.	1		
I-2	00000	Bonds and Insurances The rate shall include the cost of providing all required bonds and insurances in accordance with the Contract Documents in general and Conditions of Contract particularly. Based on Time for Completion (540 calendar days including Sundays and Holidays). Unit Rate in Letters.....	L.S.	1		
TOTAL CARRIED TO COLLECTION						
TOTAL FOR BILL NO. I: GENERAL REQUIREMENTS CARRIED FORWARD TO SUMMARY						

BILL NO. II. EARTH WORKS AND STRUCTURAL WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
II-1	01050	Topographic survey of the project area (Waste, Wall and ground around landfill). Unit Rate in Letters.....	L.S.	1		
II-2	01051	Boreholes geotechnical investigation to a depth below original natural ground level but not below sea water level. Unit Rate in Letters.....	m	150		
II-3	02210	Removal of exterior existing backfill that was used for temporary wall support around part of the landfill. Cart away excavated material to approved dump site. Volume of excavation shall be measured: - above cyclopean concrete level within proposed wall limits - beyond wall limits to the limit of excavation shown on drawings. Excavation and Removal of existing exterior backfill to be carried out by phases. Unit Rate in Letters.....	m3	60,000		
II-4	02200	Waste Reshaping including the removal by excavation of solid waste for access road or for reshaping of landfill existing slopes at required level, recompaction, and backfilling for respreading the solid waste to true level. Measurement and Payment shall be carried out for excavated and removed net volume of solid wastes <u>including</u> their backfilling, reshaping and compaction. Unit Rate in Letters.....	m3	40,000		
TOTAL CARRIED TO COLLECTION						

BILL NO. II. EARTH WORKS AND STRUCTURAL WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
II-5	02200	Excavation in preparation for placement of Gabion Walls including the excavation and carrying away of existing ground to required level for the placement of rocks and cyclopean concrete under new gabion walls. Unit Rate in Letters.....	m3	12,000		
II-6	02390	Rock Size:0.5T to1T Provision and placement of rocks in due shape for new wall construction. Unit Rate in Letters.....	m3	2,900		
II-7	03310	Cyclopean Concrete including Cast-in-situ cyclopean concrete on top of rocks for new wall construction comprising 60% by volume concrete using moderate sulphate resistant cement to ASTM C150 Type II, 30 MPa on cylinder, and 40% by volume broken stone spalls ranging in size from 100 to 250 mm, complete including all necessary formwork and accessories, all as specified, shown on the drawings and to the satisfaction of the Engineer. Unit Rate in Letters.....	m3	7,800		
II-8	02761	GALFAN Gabion Walls including the provision and due installation of gabion walls as shown on drawings and specified for new wall construction. 2x1x1m, 10x12 cm openings, 2.7mm wire thickness. Unit Rate in Letters.....	m3	23,300		
TOTAL CARRIED TO COLLECTION						

BILL NO. II. EARTH WORKS AND STRUCTURAL WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
II-9	02761	Wire Mesh including the provision and due installation of wire mesh on the face of the existing walls at top of wall. Due fixation to wall and concrete elements (Steel bars, Stainless steel nails, etc...), wire mesh to be PVC coated (heavy duty, thickness of steel wire 5mm, etc...), shape and color as required by the Engineer. Unit Rate in Letters.....	m2	1,700		
II-10	02270	Aggregate soil layers (0/50mm) for the formation of plateau and benches, as well as access roads. Unit Rate in Letters.....	m3	5,500		
II-11		Concrete Demolition of existing Leachate Plant (LTP) including the demolition of concrete at any depth, removal of demolished concrete, where required and around the Leachate Plant if needed, Complete. Unit Rate in Letters.....	m3	200		
TOTAL CARRIED TO COLLECTION						
COLLECTION						
Total From page 1/3						
Total From page 2/3						
Total From page 3/3						
TOTAL FOR BILL NO. II: EARTH WORKS AND STRUCTURAL WORKS CARRIED FORWARD TO SUMMARY						

BILL NO. III. SEALING WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
III-1		Sealing Works Construction of the sealing surface of the existing landfill, which includes a leveling layer, a separation gas drainage layer, a sealing layer, a water drainage layer and a cultivation layer.				
III-1-1	02250	Final leveling soil layer 0.20m thick (above solid waste). Unit Rate in Letters.....	m3	14,000		
III-1-2	02735	Geocomposite gas drainage layer (Lower Layer). Unit Rate in Letters.....	m2	70,000		
III-1-3	02392	Textured Geomembrane VFPE 1mm thick. Unit Rate in Letters.....	m2	70,000		
III-1-4	02735	Geocomposite Water Drainage Layer (Upper Layer). Unit Rate in Letters.....	m2	70,000		
III-1-5	02265	Top Soil Cultivation layer 0.3m thick. Unit Rate in Letters.....	m3	20,000		
TOTAL CARRIED TO COLLECTION						
TOTAL FOR BILL NO.III: SEALING WORKS						
CARRIED FORWARD TO SUMMARY						

BILL NO. IV. LEACHATE MANAGEMENT WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
IV-1		VERTICAL LEACHATE WORKS				
		The Contractor has to carry out an executable detailed design for the proposed leachate system in order to ensure all environmental and safety requirements based on his own site investigations that are to be carried out and that before starting the works. The Contractor has to also carry out a leachate monitoring program during Execution and the Defect Liability Period.				
IV-1-1	Annex 1	Leachate Extraction Wells (Nr=11), including Non perforated pipe HDPE PN 10, Perforated pipe HDPE PN 10, Gravel Backfill 25/50 and other Items such as Service Manholes, Valves, Flanges, etc..., Complete. Unit Rate in Letters.....	m	200		
IV-1-2	15200	Complete Submersible Pumping System, SP-01 One for each well. Unit Rate in Letters.....	Nr	11		
IV-2		LEACHATE NETWORK				
IV-2-1	Annex 1	Reinforced Concrete Collection Tank (Sumps) minimum capacity 20m3, Complete, with all needed works and accessories. Unit Rate in Letters.....	Item	2		
IV-2-2	15200	Complete Submersible Pumping System, SP-02 One for each collection Tank. Unit Rate in Letters.....	Nr	2		
TOTAL CARRIED TO COLLECTION						

BILL NO. IV. LEACHATE MANAGEMENT WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
IV-2-3	Annex 1	<p>Main Leachate pressure pipe HDPE Diameter 150mm Including:</p> <ul style="list-style-type: none"> - Excavation and Backfilling of Trench for main leachate network pipes (0.50mx0.50m) with related sand layer 20cm, and Backfill material 30cm. - Miscellaneous relevant pipe pieces and accessories such as saddles, supports, couplings, bend, elbows, etc... - Connection to New Leachate Treatment Plant in New Tripoli Landfill Extension with all relevant works. - Miscellaneous Leachate Management Works such as inspecting, testing, cleaning, measuring, by-passing where and when required by all means, etc... <p>Facility to be fully complete and operational all along the Contract period.</p> <p>Unit Rate in Letters.....</p> <p>.....</p>	m	1,300		
IV-2-4	Annex 1	<p>Secondary Leachate pressure pipe HPDE Network diameter 65mm (From top of well to collection tank), Complete.</p> <p>Unit Rate in Letters.....</p> <p>.....</p>	m	1,400		
TOTAL CARRIED TO COLLECTION						
COLLECTION						
Total From page 1/2						
Total From page 2/2						
TOTAL FOR BILL NO.IV: LEACHATE MANAGEMENT WORKS						
CARRIED FORWARD TO SUMMARY						

BILL NO. V. BIOGAS MANAGEMENT WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
V-1		CONSTRUCTION OF BIOGAS VERTICAL WELLS				
		The Contractor has to carry out an executable detailed design for the proposed gas system in order to ensure all environmental and safety requirements based on his own site investigations that are to be carried out and that before starting the works. The Contractor has to also carry out a gas monitoring program during Execution and the Defect Liability Period.				
V-1-1	Annex 2	Biogas Extraction Well (Nr=9), including Non perforated pipe HDPE PN 10, Perforated pipe HDPE PN 10, Non perforated concrete protection pipe, Bentonite Seal, Gravel Backfill 25/50, Galvanized Biogas well heads, Complete. Unit Rate in Letters.....	m	200		
V-2		CONSTRUCTION OF BIOGAS CONVEYANCE NETWORK				
V-2-1	Annex 2	Manifolds (Head station), Complete. Unit Rate in Letters.....	Nr	3		
V-2-2	Annex 2	Condensate Traps, Complete. Unit Rate in Letters.....	Nr	20		
V-2-3	Annex 2	HDPE pipe diameter 150mm from manifolds to existing flare, Complete. Unit Rate in Letters.....	m	700		
TOTAL CARRIED TO COLLECTION						

BILL NO. V. BIOGAS MANAGEMENT WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
V-2-4	Annex 2	HDPE pipe diameter 90mm from wells and from gas drainage geocomposite to manifolds , Complete. Unit Rate in Letters.....	m	1,400		
V-2-5	Annex 2	Miscellaneous Pipe pieces and connection of the 3 existing headwells. Unit Rate in Letters.....	Item	1		
V-2-6	02735	Connection of gas drainage geocomposite to HDPE pipe diameter 90mm, Complete. Unit Rate in Letters.....	m	900		
V-3		BIOGAS SYSTEM MANAGEMENT				
V-3-1	Annex 2	Miscellaneous Biogas management works. Unit Rate in Letters.....	Item	1		
V-3-2	Annex 2	Reconditioning of Existing Biogas Flare, Complete and Operational. Unit Rate in Letters.....	Item	1		
TOTAL CARRIED TO COLLECTION						
COLLECTION						
Total From page 1/2						
Total From page 2/2						
TOTAL FOR BILL NO.V: BIOGAS MANAGEMENT WORKS CARRIED FORWARD TO SUMMARY						

BILL NO. VI. INFRASTRUCTURE WORKS

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
VI-1	02631	Discharge storm Pipes Diam 300mm, including excavation, trench, bedding, backfilling, UPVC SN8 concrete encased, etc... Complete. Unit Rate in Letters.....	m	100		
VI-2	02631	Storm GRP Pipe Diam 600mm Class 5000, including excavation, trench, bedding, backfilling, etc... Complete. Unit Rate in Letters.....	m	50		
VI-3	02270	Access Roads 4m minimum width (Min. 30cm subbase and 20cm base course). Unit Rate in Letters.....	m2	6,400		
VI-4	02740	Bituminous Course , 4cm thickness for existing peripheral road including road gravel. Unit Rate in Letters.....	m2	8,400		
VI-5		Main Distribution Panel Board MDB , including: - Supply, provision and installation of all electrical and power devices, starters, main and secondary switches (3P+N), lighting indicators, etc... - Required Civil Works for due installation and fixing. - Connection to the DDC Panel with all needed accessories. - All required electrical, power and civil works. - Outdoor requirements for all components, material, connections, accessories, protections. Works to be fully complete and operational, all along the Contract period. Unit Rate in Letters.....	Nr	1		
TOTAL CARRIED TO COLLECTION						
TOTAL FOR BILL NO.VI: INFRASTRUCTURE WORKS CARRIED FORWARD TO SUMMARY						

BILL NO. VII. PROVISIONAL

ITEM	Related Measurements & Payment Reference	DESCRIPTION	UNIT	QTY	UNIT PRICE (USD)	AMOUNT (USD)
VII-1		100 KWp Solar Power Plant				
VII-1		<p>The works include:</p> <ul style="list-style-type: none"> - 200 Solar PV Polycrystalline panels, 40V, 500W minimum each, guarantee 25 years. - Inverters 3- Phase, outdoor type IP-65 sinewave (5x20KW for example string), guarantee 5 years. - Panels mounting structures, galvanized steel G90 anti-rust including shallow foundations (concrete prefab blocks), beams, rails, clamps, fixations, supports, bolts, nuts, etc..., designed to sustain a 100km wind speed and ensuring maximum sunlight all over the year. - 4 Lithium batteries for off-grid use, 10 KWH each, Internal Cell Thermal safety Fuse, Automatic Internal Cell Balancing, Automatic Fault Recovery, Explosion proof, Stainless Steel Cell, Guarantee 10 years. - All required Electrical Works including control, boxes, accessories, connections, aluminum cables (AC/DC multistrand UV protected), PVC conduits (Concrete encased where required). - Earthing Points and Lightning arrestors. - Power cables ,wiring connection, integration and configuration to DDC control unit with all needed accessories, civil works where necessary, circuit breaker, weather proof enclosure, cables to MDB (4x120mm2) + 3 PVC duct 160mm with encasement, excavation and backfill, Complete. - Design, prepare shop drawings and calculations, supply, install, operate and commission, all as per latest International standards. - Complete and operational ensuring full performance (>98%). <p>Unit Rate in Letters.....</p> <p>.....</p>	Unit	1		
TOTAL CARRIED TO COLLECTION						
TOTAL FOR BILL NO. VII: PROVISIONAL CARRIED FORWARD TO SUMMARY						

BILLS OF QUANTITIES
SUMMARY

BILL NO.	DESCRIPTION	TOTAL AMOUNT US.\$
I-	GENERAL REQUIREMENTS	
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VII-	PROVISIONAL	
	<u>TOTAL AMOUNT</u>	
	<u>DISCOUNT (%)</u>	
	<u>GENERAL TOTAL</u>	
	<u>GENERAL TOTAL IN LETTERS (EXCL. VAT)</u>	
USD	