



الجمهورية اللبنانية
وزارة الطاقة والمياه

دراسة محطة معالجة مياه بحيرة المسيلحة ومحطات الضخ وخطوط
النقل والدفع والخزانات وتصميم محيط الأشغال أسفل سد المسيلحة بما
فيها القلعة - قضاء البترون

الجزء الأول: دراسة محطة معالجة المياه وضخها إلى الخزانات الرئيسية

1-4 الخرائط التنفيذية وملفات التلزم

1-4-2 دفاتر الشروط الفنية وملفات التلزم

الكشف التخميني

TENDER DOCUMENTS FOR DESIGN, BUILD, OPERATE
AND MAINTAIN CONTRACT

VOLUME 4: BILL OF QUANTITIES

حزيران ٢٠١٧



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PART I: PREAMBLE

PART II: BILLS

1. INTRODUCTION

1.1- GENERAL

The bill of quantities does not purport to be either exhaustive or explanatory of all the obligations and duties of the Contractor who shall be deemed to have satisfied himself as to the correctness and sufficiency of the rates and prices entered by him in the bill of quantities all of which shall cover all his obligations under the Contract (including those in respect of the supply of goods, materials, plant or services or contingencies) and all matters and things necessary for the proper execution and completion of the works and the remedying of any defects therein and which may reasonably be inferred to be necessary for the works as described in the Contract Documents whether expressly mentioned therein or not.

Works in the present bill of quantities will be remeasured on completion and valued at the rates inserted by the Contractor hereinafter in accordance with the Contract Documents.

The Contractor shall be deemed to have visited the Site, to have taken into account all local and existing conditions. The Contractor's attention is drawn to the location of some works without permanent access.

The Contractor shall be responsible for preparing and constructing any necessary associated design and design changes, which shall be submitted to the approval of the Engineer and shall be at no extra cost to the Employer.

The unit prices are to be fully inclusive value of the works described in the specifications, in the drawings or in the bill of quantities for proper execution of the works and Contract.

The unit rates entered against the items defined in this bill of quantities shall cover the construction of all the works that shall include but not be limited to the cost related to the supply of material, labor, tools, equipment and transport to the various parts of the project (easy to access or not) and all costs and profits required for the proper completion of all the works (structures, pipelines, etc ...) under this Contract without any exception and without any reservation. All the works shall be executed as described in the Conditions of Contract, Specifications, Bill of Quantities, Drawings, and technical rules and as directed by the Engineer. All material used in construction shall be of best quality and in compliance with the specifications and shall be approved by the Engineer prior to the beginning of the works. The rates shall also include but not be limited to the following:

- Installation and maintenance of site equipment and temporary facilities, dismantling and removal of site equipment and temporary facilities after completion of the works,
- Construction and maintenance of all access roads including safety measures and traffic regulation,
- Supplying material, labor, tools, equipment, machinery and all the required items for the completion of the works and for the subsequent operation, maintenance and repair. All goods, materials, equipment and accessories shall be submitted to the Engineer for approval,
- Testing of material, testing during construction, testing of water quality, pressure tests for pipes and accessories and all the required tests in conformity with the specifications and as directed by the Engineer,

- Supply, transport, installation, testing, site watching and fencing, etc ... and all related requirements and expenses,
- Preparation of drawings, reports and all the required office work in order to complete the works with the related expenses,
- All trial pits necessary to locate existing services and to determine ground condition and to localize the potential archeological sites.
- Protection of public and private properties, preservation of the existing utilities and indemnification against all damages caused by the construction activities,
- All the necessary safety measures, barriers, signs, lightings, etc ... to ensure the safety of the workers, people and traffic and to settle the boundaries of the work zone day and night,
- Guiding and protecting traffic and pedestrians through areas of construction including the construction of roads and pathways, the erection of signs, barriers and lighting,
- Insurance of works, equipment, personnel and insurance against accidents,
- All costs pertaining to the Contractor work area (stores, workshops, repair zones, etc ...),
- All taxes and customs fees,
- Supply of water and power including piping and wiring to all parts of the project and all related costs,
- Supply of fuel, oil, spare parts, etc ... for all the vehicles, machines and other equipment,
- Providing qualified personnel, technicians, workmen, etc... needed for the proper execution of all works and their related charges (salaries, pensions, etc ...),
- Supply of Survey and inspection facilities for the Engineer and executing all survey works to position pipelines, structures, monitor the progress and verify the locations (X, Y, Z) of all constructions and prepare topographic layouts to be submitted to the Engineer on paper and on floppy disks.

1.2- ITEM DESCRIPTION

A detailed description of the items and of the conditions under which and the manner in which the work is to be done and measured is set out in the preamble to the bill of quantities. Each item in the bills A, B and C is described in a paragraph of identical number and name in this preamble. Reference shall also be made to all other documents forming the Contract (Technical Specifications, Drawings, etc ...). Items entitled "NOT USED" in the bills shall not be included in this Contract.

1.3- RATES AND PRICES

The Contractor shall be deemed to have inserted against each item in the bill of quantities such rates and prices as he may deem necessary to cover the requirements of the Contract. Rates and prices shall be inserted in the rate column of the bill of quantities.

The unit prices inserted in the bill of quantities are to be the full inclusive value of the work described in the specifications and in this preamble and shall cover the cost of all labor subsistence and traveling, materials, temporary work, structural plant, watching and any other cost whatsoever, together with all risks, liabilities and obligations set forth or implied in the Contract Documents.

It should be noted that no payment will be provided by the Client for Materials and Plant brought to the site by the Contractor for incorporation in the Permanent Works.

1.4- MEASUREMENT

The price shall include all necessary for completion of the works and shall include the prices for all necessary building work such as forming box outs, supports plinths, cable trenches, and the like and all necessary safety and access works including guards, handrails, fire fighting equipment and the like.

All measurements in the bill of quantities are strictly net. The principle of net measurements shall apply to all works executed. All quantities measured for payment shall be measured by the Engineer on the basis of actual net quantities of work fixed in position.

Net measurements shall be done according to the net dimensions. The net dimensions are the dimensions shown on the contract drawings. In case of lack of details on some drawings and in case of design changes approved by the Engineer, the Contractor shall prepare and submit to the approval of the Engineer any necessary associated drawings, and accordingly, the net dimensions shown on the above drawings and approved by the Engineer shall be the base for the measurements.

Lump sum items shall not be subject to remeasurement and shall include the prices of all necessary equipment, construction, installation, testing and commissioning among others. The lump sum entered in the bill of quantities shall include the price for a complete installation as described in the bill of quantities, specifications and other documents forming this Contract.

The quantities given in the bill of quantities are the estimated quantities. In no sense shall such quantities be considered as limiting or extending the amount of the work to be done by the Contractor and of the materials to be supplied by him. The Contractor shall be responsible for checking quantities and for making any necessary surveys and investigations prior to placing any order for materials.

1.5- ITEMS TO BE FULLY INCLUSIVE

Unless otherwise stated, the rates and prices for all items shall be fully inclusive of all that is necessary to fulfill the liabilities and obligations arising out of the Contract and shall include but will not be limited to:

- Survey and Design where expressly required by the Contract,
- Labor and all associated costs,
- Materials, goods, equipment, all consumable, accessories and all associated costs,
- Temporary works (including all safety measures to be taken by the Contractor for a 24/24h whole protection on the site),

- Establishment charges, overheads and Contractor's profit,
- All bonds and insurances,
- Tests and all associated costs (if not included in separate items),
- Payments of duty and taxes on imported materials and equipment,
- Protection of public and private properties,
- All access roads (temporary or not: allowing free passing over or across for vehicles and personnel in the neighborhood),
- Succeed running and moving of all equipment in perfect conditions,
- Provide operation and maintenance manuals,
- All work, services and materials which according to the true intent and meaning of the Contract may be reasonably inferred as necessary for completion of the works as described in the drawings, specifications, bill of quantities, or in the Contract, whether expressly mentioned or not,
- All duties, obligations, liabilities and responsibilities which the Contract places upon the Contractor in connection with or in relation to the Contract,
- All costs of detailed survey, design, royalties and supply to the Engineer of all necessary drawings and documents. All necessary drawings, as-built drawings and documents will also be computerized by the Contractor and supplied to the Engineer as well,

1.6- COVERAGE

Where the bill of quantities does not include separate items for Contractor's equipment, temporary works, facilities for the Engineer and the like, the Contractor shall be deemed to have covered his obligations in these respects in the rates and prices for permanent works.

1.7- ABBREVIATIONS

The following abbreviations are used in the Bill of Quantities:

Sq.	Square	mm	Millimeter
Cu.	Cubic	m	Meter
unit	Unit	km	Kilometer
hr	Hour	%	Per Cent
kg	Kilogram	dia.	Diameter
Day	Day	ha	Hectare
DN	Nominal Diameter	L	Linear

PN	Flange Pressure Rating	EO	Extra Over
L.S.	Lump Sum	PI	Provisional Item
kW	Kilowatt	BOQ	Bill Of Quantities
m ³	Cubic Meter	month	Month
m ²	Square Meter	HVAC	Heating Ventilation & Air Conditioning
dm ³	Cubic Decimeter	set	set
O&M	Operating & Maintenance	l.m.	Linear meter

1.8- DEFINITION OF RANGE OF DIMENSIONS

A hyphen between two dimensions means a range of dimensions, which includes all dimensions exceeding that preceding the hyphen but not exceeding that following the hyphen.

1.9- PRICE SCHEDULES

Where in the bill of quantities or specification there is a schedule or subsidiary bill setting out the quantities of materials, plant and work which comprise a unit of work measured as a lump sum under a single item in a part of the bill of quantities, the said quantities shall not be subject to measurement but may be used by the Engineer in valuing any variation to the lump sum item and for the purpose of scheduling payments.

1.10- SOME DEFINITIONS

The following definitions shall apply to items in the bill of quantities:

Extra-Over

Any "Extra-Over" (EO) item shall be measured and paid in addition to the measurement of the basic item to which it relates.

Included

Where the term included is used in the Preamble or in the bills any items stated to be included within another item shall not be subject to measurement and their costs shall be deemed to be included within the rates of the billed item.

1.11- DEALING WITH WATER

Items in the bill of quantities shall be deemed to include for dealing with water flows and keeping the works free of water.

1.12- WATER AND POWER

Unless otherwise explicitly stated in the Contract, water and power for the purpose of constructing, cleaning, testing, and commissioning the works shall be provided by the Contractor at his own expense, and shall not be measured separately.

1.13- DISPOSAL SITES

All disposal sites shall be provided by the Contractor in accordance with the local authorities and shall not be used by the Contractor prior to the approval of the Engineer. Preparatory works shall be carried out by the Contractor if required by the local authorities or by the Engineer.

1.14- TRANSPORT OF MATERIAL

All materials shall be transported at the Contractor's expense from and to all works sites (including Contractor work area, storage areas, etc ...) whether these sites are accessible or not. The Contractor shall bear all charges related to access roads construction unless a separate item for access roads construction is included in the bill of quantities.

1.15- TESTS

The Contractor shall conduct all required tests (pressure test for the piping system, pumping tests for wells, etc ...) and shall supply all necessary labour, measuring equipment, instruments and accessories to complete the tests as specified in the technical documents and as directed by the Engineer.

2. PREAMBLE TO BILL A: General Requirements

ITEM A.1: DETAILED GEOTECHNICAL, CIVIL, ARCHITECTURAL, PROCESS AND ELECTROMECHANICAL DESIGN

This price shall include the topographic survey, geotechnical investigation, design and detailed engineering, process design, hydraulic design, structural design, mechanical, electrical, instrumentation and automation design and drawings to the satisfaction of the Engineer. This price shall be paid as Lump Sum.

ITEM A.2: OPERATION AND MAINTENANCE FOR THE WATER TREATMENT PLANT AND MAIN PUMPING STATION

Refer to Volume 2 – Section7: OPERATION & MAINTENANCE REQUIREMENT.

This price shall be paid as Lump Sum.

ITEM A.3: TRAINING OF STAFF

Refer to Volume 2 – Section7: OPERATION & MAINTENANCE REQUIREMENT.

This price shall be paid as Lump Sum.

ITEM A.4: MOBILIZATION / DEMOBILIZATION

The rate shall include the full mobilization / demobilization of all resources and equipment necessary for the execution and completion of the works. The rate shall also include the design and construction of offices, stores, workshops, clinics and all other facilities required for the completion of the works under this Contract. The price shall be paid as a lump sum and the works shall include but not be limited to:

- Insurance of works, equipment and personnel,
- Protection of public and private properties,
- All necessary procedures for the supply and testing of material in conformity with the specifications and as directed by the Engineer,
- Temporary works and site protection, watching, fencing and lighting,
- Supplying the required equipment in order to execute all the required works including but not limited to:
 - Transport material and equipment to the different parts of the project,
 - Ensure storage areas and disposal sites,
 - Generate compressed air,

- Supply water and power to complete the works,
- Keep the site free of water for excavation, backfilling and concrete works,
- Supply compressed water (not less than 2 bars),
- Accomplish excavation including removal of excavated material and backfilling,
- Mix, transport and cast concrete including reinforcement steel works,
- Supply, install and test pipes and related fittings and accessories,
- Install wrought steel
- Perform geotechnical investigations,
- Supply, install and test mechanical, electrical, hydraulics and electromechanical equipment,
- Providing water (including potable water), power, sanitary facilities and communication means (telephones, cellular phones, ...
- Management, operation and maintenance of site equipment,
- Construction and maintenance of access and service roads for reservoir sites, pumping station sites, disposal sites, pipelines, Contractor working area, concrete batch plant, etc ... Access and service roads shall be constructed prior to the beginning of the works and shall be kept in good condition for traffic for the whole duration of the project. Unless the bill of quantities includes separate items for construction and maintenance of access and service roads, all costs pertaining to this matter shall be deemed to be included by the Contractor in his unit rates for this item and shall not be paid for separately,
- 1 Nr 4x4 off road vehicle, (with a 4 cylinders engine, Latest made, Automatic transmission and including AC) and 1 Nr. Car (with a 2,000 cc engine, latest made, Automatic transmission and including AC) to be provided to the Supervision staff,
- Indemnification and remedying of all damages caused by the execution of the works to the private or public properties,
- Guiding and protecting traffic and pedestrians through areas of construction including the erection of signs, barriers and lighting,
- Removal of utilities, plants, machinery and all other facilities after the completion of the works including reinstatement to the Engineer's satisfactory,
- Construction of all necessary structures (pipes, canals, ...) or supplying the necessary equipment (pumps, machines, ...) to divert water from the work zone throughout the period of the project,
- Ensuring that all parts of the project are operating as required after the completion of the works and after testing and remedying of all defects that may appear while testing,
- Completion of all procedures necessary for the taking over and commissioning,

- All items necessary to complete the mobilization / demobilization including all related costs.

The rate shall also cover providing, furnishing, maintaining and cleaning of the Resident Engineer's office including all related costs. The Resident Engineer's office shall be suitably located in the project zone and shall be composed of 6 offices, a meeting room, a WC and a kitchen and shall be equipped with all the necessary items for the good performance of the supervision team, these items shall include but not be limited to:

- Tables, desks, rolling chairs, chairs, shelves, cabinets, etc., ...
- 2 Computers (recent processor), network installation, internet DSL connection, printer (A3), photocopier, fax machine, stationery, ...
- Coffee machine and refrigerator
- Electrical supply, potable water supply, toilet, sewage disposal system, ...
- Air conditioners, heaters,
- Telephones and related charges including 1 central for telephone and one land line, 2 cellular lines with a maximum monthly expense of 250US\$.

ITEM A.5: PREPARATORY WORKS, SHOP DRAWINGS AND AS-BUILT DRAWINGS

The price shall be paid as a lump sum and shall include but not be limited to:

- Revision and Verification of all drawings and other Contract document.
- Visiting the work sites, checking the quantities of the different items in the bill of quantities and comparing the quantities with the quantities of the Contract drawings. If discrepancies occur, the Contractor shall inform the Engineer in writing and in details of the discrepancies in a period less than one month from the date of the commencement of the work. If the Contractor fails to do so then the Engineer may ask the Contractor to modify the drawings according to the bill of quantities and to the project budget.
- Complete new topographic survey for all access roads, transmission and pumping lines in addition to the pumping station and for all the proposed works locations.
- Submitting shop drawings including all the designs and details necessary for the execution of all parts of the works (for which the shop drawings are not included in other items). Shop drawings shall be submitted to the Engineer for approval prior to the commencement of the works. The Contractor shall be solely responsible for the correctness of the shop drawings.
- Primary survey works and necessary measures and stakes to locate structures on the ground,
- Continuous survey works throughout the project period for evaluation of quantities and for insuring work location.
- Final survey works and furnishing of as-built drawings (three copies on paper and one copy on computer diskettes) within a period of four weeks following the completion of the works.

Note: Survey works shall be carried out by a well known surveyor accepted by the Engineer. Accepted surveyor(s) shall use Total Station equipment.

ITEM A.6: ENSURING THE SERVICEABILITY OF UTILITIES DURING CONSTRUCTION

The price shall be paid as a lump sum and shall include supply of material, design and construction of any diversion or structure necessary for the preservation of all utilities (potable water pipes, drains, irrigation canals and pipes, channels, telephone and power lines, etc ...) in a good and serviceable condition during the construction of the works.

The contractor shall submit his approach to preserve and to ensure the serviceability of the existing utilities throughout the project period to the Engineer for approval. The Contractor shall immediately repair any damage caused by construction works to any utility and shall be solely responsible for the preservation and serviceability of all the utilities during construction.

ITEM A.7: 5 YEARS RECOMMENDED SPARE PARTS

The price shall be paid as a lump sum and shall include procuring and retaining on Site sufficient spare parts for five years operation of all Plant, equipment, machinery and apparatus. The levels and numbers of spare parts shall be based upon the suppliers' and manufacturers' recommendations initially and later based on experience of operation and plant reliability. Replacement components are to be fit for purpose and of the technology that is current at the time of replacement.

Spares used during the O&M period shall be replaced by the Operator as part of the O&M contract at the Operator's cost. All spare parts provided shall become the property of the Employer regardless of whether they are used or not.

3. PREAMBLE TO BILL B: Water Treatment Plant

1. Civil Works

Refer to Volume 2 – Section3: Civil Requirement

Refer to Volume 3 – Technical Specifications

2. Mechanical / Process Equipment

Refer to Volume 2 – Section2: Process Requirement

3. Electrical and Instrumentation Equipment

Refer to Volume 3 – Technical Specifications

4. PREAMBLE TO BILL C: Main Pumping Station

ITEM C.1: EARTHWORK

ITEM C.1.1: UNCLASSIFIED EXCAVATION

This item shall consist of excavating and disposing materials of any kind and type encountered during work. This item shall pertain but not limited to pumping stations, reservoirs, retaining walls, roads, underground walls, etc. Excavation works shall be carried out in all the indicated locations on the drawings (easy to access or not), where needed and instructed by the Engineer. This item shall include the following works:

- Blasting as specified in technical specification subject to the Engineer approval,
- Temporary disposition of water and electricity necessary for the work execution,
- Remove, seal, re-route existing utilities, if any, as required subject to Engineer consent,
- Excavation in any type of soil, to any depth, whatever found to be: Soft, Hard, Clay, Rock, Hard rock etc,
- Removal of top soil to the required depth as indicated and specified on the drawings and as directed by the Engineer,
- Keeping excavation free of water by any means,
- Any additional excavation to provide working space for structural works,
- Planking, strutting, shoring, sheet piling etc. necessary to support the vertical excavation edges,
- Retrieving excavated material by any means, depositing in temporary heaps, selecting and setting aside approved excavated material to be used in backfilling around structures and as directed by the Engineer, including multiple handling of material,
- Cart-away surplus material to disposal sites where permitted or on tips allocated by the contractor at his own responsibility.

This item shall be measured in cubic meter and shall be the net volume according to the excavation limits indicated on Contract Drawings and as directed and approved by the Engineer. Wherever excavation limits are not indicated on Contract Drawings, the limits shall be 50cm away of blinding edges.

ITEM C.2: CONCRETE & MASONRY

Note: In case the concrete is to be supplied by a batch plant outside the site, computerized delivery note should be issued by the batching plant and delivered to the Engineer for each transit mixer.

ITEM C.2.1: REINFORCED CONCRETE CLASS A

This item shall consist of executing reinforced concrete class A which is composed of minimum 350 kg cement/m³ for foundations, beams, retaining walls, columns, slabs, canals, manholes, reservoirs, underground walls and any other reinforced concrete element. This item shall include the following works:

- Specifying design mix to be followed subject to Engineer approval,
- Supplying, transporting and storing of the concrete ingredients,
- Mixing, Pouring, transporting, placing, vibrating and curing and depicting areas of pouring against earth or un-blinded hardcore if any,
- Horizontal, sloped, vertical and curved work,
- Placing or finishing to falls and cross falls,
- Smooth finish,
- Construction and contraction joints, water bars, dowels and caps,
- Working around pipes, reinforcements, cutting channels, chases, mortises, pockets and holes including grouting, filling and making good,
- Form-work main frames, plywood and timber and polystyrene layers where needed,
- Form-work design and construction if any,
- Supports, battens, struts, bracing, wedging and fixing, easing, striking and removing of formwork,
- Overlaps, passing at angles and re-propping if approved,
- Supporting concrete of any thickness at any height,
- Any width or height of formwork,
- Any concrete section or profile, projection or recesses including sealing open ends,
- All cutting, splayed edging or alike,
- Forming grooves, chamfers, ribs, mortises, pockets, pipe holes, duct holes, cable holes and providing battens and boxing,
- Supplying and placing PVC pipes for drainage in retaining walls,
- Adaptation to accommodate projecting pipes, reinforcing bars and alike,
- Access openings and temporary openings,
- Precast concrete elements with all necessary elements joints treatment,
- Mould release agents and surfaces curing,
- Re-using formwork and or removing formwork from site,

- All necessary additives (Air Entrainment Agent, plasticizers, protection of concrete in contact with water, waterproofing for reservoirs ...) as indicated on the drawings, in the specifications or as directed by the Engineer.
- Supplying, transporting, storing and placing reinforcing steel (deformed and plain) for concrete structures.
- Submission of detailed bar bending schedule,
- Shop Drawings of structure and revision thereto if any,
- Fixing bars in any position and in any member,
- Fixing bars horizontally, vertically and sloped,
- Work to any diameter, section and length,
- Forming straight, bent, and curved bars and links,
- Cutting, tying wires, spacers, chairs and the like.
- All necessary works for dowel bars placement (Drilling, filling with mortar...).

This item shall be measured in cubic meter and shall be the net volume in accordance with the drawings.

ITEM C.2.2: BLINDING CONCRETE

This item shall consist of executing blinding concrete of class "C" or "D" which is composed of minimum 250 kg of cement/m³ underneath the structures and where needed and as directed by the Engineer. This item shall include the following works:

- Specifying design mix to be followed subject to Engineer approval,
- Furnishing, transporting and storing of the concrete ingredients,
- Mixing, Pouring, transporting, placing, vibrating and curing and depicting areas of pouring against earth or un-blinded hardcore if any,
- Horizontal, sloped, vertical and curved work,
- Placing or finishing to falls and cross falls,
- Basic plain finish, tamped finish or wrought finish,
- Formwork to edges and sloping tops,
- Any width or height of form-work,
- Form-work main frames, plywood and timber,
- Supports, battens, struts, bracing, wedging and fixing, easing, striking and removing of formwork,
- All cutting, splayed edging or alike,
- Re-using formwork and or removing formwork from site.

This item shall be measured in cubic meter and shall be the net volume in accordance with the drawings.

ITEM C.2.3: FAIR FACED CONCRETE

This item shall consist of applying formed finishes for exposed concrete smooth finish with construction grooves and beveled edge where needed and or directed by the Engineer. The rate shall also include all the necessary for the proper completion of works (Appropriate formwork, greasy oil, surface treatment, scaffolds, etc...).

This item is considered to be an extra over on the concrete prices and shall be measured in square meter of smooth finished exposed concrete surface which shall be the actual area without including opening surfaces in accordance with the drawings, as directed and approved by the Engineer.

ITEM C.2.4: WAFFLE SLAB

This item shall be measured in square meter of roof slab surface, which shall be the net area in accordance with the drawings, as directed and approved by the Engineer.

This item shall include but not limited to the following works:

- Waffle frame: Waffle slab shall have a thin topping slab and narrow ribs spanning in both directions between column heads or band beams. The slab overall height shall be 50 cm divided into 40 cm for the waffle mold and 10 cm for the top concrete layer. The narrow rib shall be 30 cm wide in the longitudinal direction and 20 cm wide in the transversal direction.
- Reinforced concrete class A for the slab (Refer to ITEM E.2.1)

ITEM C.3: WATERPROOFING

ITEM C.3.1: WATERPROOFING WITH THERMAL ISOLATORS

This item shall consist of furnishing, transporting and placing waterproofing system with thermal isolators for horizontal roofs and terraces as required and as directed by the Engineer. This item shall include the following works:

- Cleaning the surface and plugging all holes with a non-shrink mortar type Vandex Uni-mortar or equivalent,
- Applying of G.P. primer 0.125 l/m² type Rooftex or equivalent,
- Applying of polyurethane resin 1.5 kg/m² type Rooftex or equivalent,
- Installation of geotextile protection 150 gr/m²,
- Placing 5 cm thick thermal insulation extruded polystyrene,
- Placing polyane film,
- Placing a protection layer of 5cm. thick of sand when needed

- Casting minimum 5cm thick (90 x 90cm) reinforced concrete screed (350kg of cement/m³) laid to fall with a slope of 0.5% including 1x1 cm groove,
- All the necessary for the proper completion of works as per specification.

This item shall be measured in square meter of waterproofing membrane, thermal isolator and concrete screed quantity as indicated on the drawings and as directed and approved by the Engineer.

Note: The measurement shall be according to the horizontal surfaces only and no excess shall be paid for vertical surfaces.

ITEM C.4: DOORS, WINDOWS AND FALSE CEILING

ITEM C.4.1: STEEL & WOOD DOORS & STEEL PROTECTION

The item shall include the following:

1. Submission of work shop drawings to the Engineer's approval
2. Supply and installation of fixed frames in walls, wedges, plasters, etc.... Frame width shall be same as the width of the wall.
3. Supply and installation of all necessary steel parts, stainless steel ironmongery and hardware, locks, frames to install glass including hinges and all accessories as specified in the drawings or where needed and as directed by the Engineer.
4. Paintings of all kinds not less than four coats. Two minimum protective coats (corrosion protection coats for steel or base for wood) and two minimum final coats of color designated by the Engineer, except for some types that should be galvanized according to the technical specifications and the Engineer instructions.
5. Transportation and scaffolds.
6. Glass and glazing (6cm or 8cm thick).

Steel works and wood / steel door works shall meet the requirements specified in the drawings and in the technical specifications.

ITEM C.4.1.1: STEEL DOORS

This item shall be measured in unit of steel doors as indicated on the drawings and as directed and approved by the Engineer.

This item shall be measured per unit of doors installed in situ in accordance with the drawings, as indicated in the doors schedule, as directed and approved by the Engineer.

ITEM C.4.2: ALUMINUM DOORS AND WINDOWS

This item shall include all necessary members and major components for aluminum doors, windows and louvers such as aluminum vertical exterior mullions, horizontal rails in addition to

labor, tools and all components needed to complete the work in accordance with the requirement of the Engineer and as described on drawings.

The work is deemed to include but not be limited to the following:

- All aluminum works shall be powder coated.
- Complying with the Shop Drawings.
- Materials and workmanship.
- Work at any height above ground floor level.
- All framing including heads, sills, abutments internal and external angles.
- Reinforcement whenever needed to avoid deflections.
- Architrave and accessories
- Glazing beads, gaskets, weather-strips
- Glass and glazing (6cm or 8cm thick).
- Movement joints.
- Brackets, bolts, fixing and fastening.
- Jointing and sealant externally and internally between the Aluminum frame and its perimeter.
- Cutting and fitting around obstructions.
- Ironmongery and operating gears.
- Aluminum rolling shutters.
- All aluminum works shall be weather proofed and heavy duty.

Samples of the proposed aluminium and glass profiles shall be submitted to the Engineer's approval.

This item shall also include the submission of workshop drawings to be approved by the Engineer.

Aluminium works shall meet the requirements specified in the drawings as required and directed by the Engineer.

This item shall be measured per unit of doors, windows or louvers installed in situ in accordance with the drawings, as indicated in the windows schedule, as directed and approved by the Engineer.

ITEM C.5: FINISHES

ITEM C.5.1: CEMENT PLASTER WORK

This item shall consist of furnishing, transporting, and placing streaked or flat plaster with a minimum thickness of 15 mm for internal plastering and 20mm for external plastering, in two or three layers where needed and as directed by the Engineer.

Plaster for this item shall be composed of 600 kg cement per cubic meter of sand.

This item shall include the following works:

- Mixing plaster components without using lime,
- Providing plaster protecting by special mastering,
- Wetting the plaster components with water.

This item shall be measured in square meter and shall be the net area in accordance with the drawings, as directed and approved by the Engineer.

ITEM C.5.2: FLOOR TILES

This item shall be measured in square meter and shall be the net area in accordance with the drawings, as directed and approved by the Engineer.

a- Colored Ceramic Tiles 30x30cm

This item shall be measured in square meter and shall be the net area in accordance with the drawings, as directed and approved by the Engineer.

This item shall include the following works:

- Installing 7cm sand and 3cm cement sand mortar,
- Installing white cement,
- Tile cleaning and polishing,
- All the necessary for the proper completion of works.

b- Internal Floor Finishing Screed With Hardener:

This item shall be measured in square meter and shall be the net area in accordance with the drawings, as directed and approved by the Engineer.

This item shall consist of casting 15 cm thick concrete floor finishing class B, where needed or directed by the Engineer. This item shall include the following works:

- Preparation works: Sub-grade preparation, finishing grading, setting of forms and screed, and furnishing of reinforcement.
- Providing and placing 10 cm thick concrete class B.
- Providing and applying 0.5 mm color grade hardener including sodium silicate solution to provide hardness, dust proof and all proofing to the screed floors.
- Including bituminous putty joints 3x3cm wherever and dimmed to be necessary according to the instructions of the Engineer.
- Providing shop drawings before installation to be approved by the Engineer.

- All the necessary for the proper completion of works.

ITEM C.5.3: WALL PAINT

This item shall include supplying, transporting, storing and executing paints without counting for openings and gaps internal and external finishes needed in compliance with the technical specifications, the drawings and as directed by the Engineer.

This item shall include the following works:

- Cleaning before and after paint,
- Applying two base coats,
- Applying minimum two coats of paints on concrete with or without concrete plaster with or without two layers of mastic,
- All the necessary for proper completion of the works.

Three (3) Types of Paints are to be applied:

- a- Washable Emulsion Paint Or Enamel Paint
- b- Epoxy (For Fair Faced Concrete Protection)
- c- Coarse Scratched Paint

This item shall be measured in square meter and shall be the actual painted surface area without including opening surfaces in accordance with the drawings, as directed and approved by the Engineer.

ITEM C.6: EXTERNAL WORKS

ITEM C.6.2: COLORED CEMENT TILES 40x40x4cm THICK

This item shall consist of supplying, transporting, storing and placing 40x40x4cm thick colored cement tiles with a tile face grooved in square of 5cm where needed and as directed by the Engineer.

Tiles to be used shall be in compliance to the following standards and subject to the Engineer's approval.

Tile shall consist of two layers:

An ordinary cement layer tile face with a minimum thickness of 15 mm (at a rate of 500 kg of cement per m³ of sand).

And a second layer with a minimum thickness of 25 mm (at a rate of 350 kg of cement per m³ of aggregates).

A special mix design for the concrete should allow minimal presence of air within the concrete and improve its compactness. The cement layer tile face should be vibrated and the two layers compressed up to 150kg/cm².

Dimensions tolerances are the following:

Tiles sides shall not exceed 1mm for 20cm (horizontally).

Tiles thickness (vertically) shall not exceed 4mm including relative thickness variation at center and edges.

This item shall also include:

- All necessary machinery and tools for bed leveling, filling with approved granular material up to the required datum level (thickness not to exceed 20 cm), moisturizing and compacting the fill by mean of plate compactor or steel tandem roller 500 kg.
- Not less than 4 cm thick sand supply, spreading and compacting above the granular fill as well as the supply of (1:3) mortar mix to be applied below tiles at a thickness of 3 cm.
- Polishing and joint filling by approved means with a fluid mix of water and cement to be approved by the Engineer.

This item shall be measured in square meter of colored cement tiles net area in accordance with the drawings, as directed and approved by the Engineer.

ITEM C.7: METAL WORKS

ITEM C.7.1: STAINLESS STEEL CAT LADDER

This item shall consist of fabricating, supplying, transporting, storing, and fixing a stainless steel cat ladder where needed and as directed by the Engineer.

This item shall be composed of:

- 2 numbers of 3" stainless steel tube fixed to concrete with anchors and steel plates,
- 1" stainless steel steps welded to stainless steel tube at 35cm center to center,
- 2 numbers of 2" stainless steel tube,
- 1" stainless steel ring at 50cm center to center for protection,
- All the necessary for proper completion of the works as per specification.

This item shall be measured per linear meter of stainless steel cat ladder installed as indicated on drawings and as directed and approved by the Engineer.

ITEM C.7.2: STEEL WORKS

This item shall consist of supplying, transporting, storing and installing all kind of steel works (stainless steel) such as: reservoirs and valve chambers access openings, reservoirs vent pipes, hand rails, steps, cable trenches covers, grills, checkered plates, grating etc... as shown on drawings and as deemed to be necessary and as requested by the Engineer on site. The works shall include the following:

- Submission of application details and revision thereto if any subject to Engineer consent.

- Supply and installation of all components, elements, fixing devices, supports, fittings, coverings and accessories.
- Fabrication, erection, including temporary support and bracing.
- Any number, section type, size or length of components and fittings.
- Axle, locks, rails, operating mechanism, bolts, nuts, washers, rivets, anchor bolts, fixing devices and the like.
- Cleaning, painting (3 layers of epoxy painting or galvanizing or Zink coating) of all equipment and fittings as described in the technical specifications and as requested by the Engineer.
- All necessary welding works and piping works with fitting and supports.
- All that is necessary for proper execution and completion of the works.

This item shall be measured in kilogram of steel works installed as indicated on drawings and as requested by the Engineer.

ITEM C.8: ELECTROMECHANICAL WORKS

Refer to Volume 2 – Section 2: Process Requirement

Refer to Volume 2 – Section 4: Mechanical Requirement

Refer to Volume 2 – Section 5: Electrical Requirement

Refer to Volume 3 – Technical Specifications

Bill A - GENERAL REQUIREMENTS

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
A.1	<u>DETAILED GEOTECHNICAL, CIVIL, ARCHITECTURAL, PROCESS AND ELECTROMECHANICAL DESIGN</u> This item shall be paid as a lump sum value.	1	L.S.		Only..... USD	
A.2	<u>OPERATION AND MAINTENANCE FOR 1 YEAR FOR THE WATER TREATMENT PLANT AND MAIN PUMPING STATION</u> This item shall be paid as a lump sum value.	1	L.S.		Only..... USD	
A.3	<u>TRAINING OF STAFF</u> This item shall be paid as a lump sum value.	1	L.S.		Only..... USD	
A.4	<u>MOBILIZATION / DEMOBILIZATION</u> This item shall be paid as a lump sum value. 65% of the lump sum value will be paid upon mobilization completion, and the remaining 35% after the termination of site clearance upon completion of works. The unit rate of this item should not exceed 250,000USD (Two hundred fifty thousands US Dollar), under the risk of bid cancellation.	1	L.S.		Only..... USD	
A.5	<u>PREPARATORY WORKS, SHOP DRAWINGS AND AS-BUILT DRAWINGS</u> This item shall be paid as a lump sum value.	1	L.S.		Only..... USD	
A.6	<u>ENSURING THE SERVICEABILITY OF UTILITIES DURING CONSTRUCTION</u> This item shall be paid as a lump sum value.	1	L.S.		Only..... USD	
A.7	<u>5 YEARS RECOMMENDED SPARE PARTS</u> This item shall be paid as a lump sum value.	1	L.S.		Only..... USD	
Total BILL A (USD)						

Only

UNITED STATES DOLLARS

BILL B - Water Treatment Plant

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
B.1	Civil Works					
B.1.1	Site Works	1	L.S.		Only..... USD	
B.1.2	Flow Meter	1	L.S.		Only..... USD	
B.1.3	Cascade Aerator	1	L.S.		Only..... USD	
B.1.4	Valves Chamber	1	L.S.		Only..... USD	
B.1.5	Flash mixer	1	L.S.		Only..... USD	
B.1.6	Distribution / Collection Box	1	L.S.		Only..... USD	
B.1.7	Chemical Building	1	L.S.		Only..... USD	
B.1.8	Clariflocculators	1	L.S.		Only..... USD	
B.1.9	Gravity Filter	1	L.S.		Only..... USD	
B.1.10	Clear Water Tank	1	L.S.		Only..... USD	
B.1.11	Pre-Chlorination System	1	L.S.		Only..... USD	
B.1.12	Post-Chlorination System	1	L.S.		Only..... USD	
B.1.13	Sludge Tank	1	L.S.		Only..... USD	
B.1.14	Administration Building	1	L.S.		Only..... USD	
B.1.15	Store and Workshop Building	1	L.S.		Only..... USD	
B.1.16	Guard House and Guard Room	1	L.S.		Only..... USD	
B.1.17	Transformers and Generators Building	1	L.S.		Only..... USD	

BILL B - Water Treatment Plant

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
B.1.18	Inter-Process Pipework and Connections to dam intake and downstream water course (Including valves, meters, dosing and sampling points, chambers,...)	1	L.S.		Only..... USD	
B.1.19	Chemical dosing pipe works (Including dusts and draw pits)	1	L.S.		Only..... USD	
B.1.20	Service Water and Firefighting Pipework (Including fittings and Chambers)	1	L.S.		Only..... USD	
B.1.21	Overflow Pipework and all Site Drainage	1	L.S.		Only..... USD	
B.1.22	Landscaping and Planting	1	L.S.		Only..... USD	
B.1.23	Fencing	1	L.S.		Only..... USD	
B.2	<u>MECHANICAL/PROCESS EQUIPMENT</u>					
B.2.1	Flow Meter	1	L.S.		Only..... USD	
B.2.2	Valves Chamber	1	L.S.		Only..... USD	
B.2.3	Flash mixer	1	L.S.		Only..... USD	
B.2.4	Distribution / Collection Box	1	L.S.		Only..... USD	
B.2.5	Alum Feed System	1	L.S.		Only..... USD	
B.2.6	Polymer Feed System	1	L.S.		Only..... USD	
B.2.7	Clariflocculator	1	L.S.		Only..... USD	
B.2.8	Gravity Filter	1	L.S.		Only..... USD	
B.2.9	Storage Tank	1	L.S.		Only..... USD	
B.2.10	Pre-Chlorination System	1	L.S.		Only..... USD	

BILL B - Water Treatment Plant

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
B.2.11	Post-Chlorination System	1	L.S.		Only..... USD	
B.2.12	Sludge Tank	1	L.S.		Only..... USD	
B.2.13	Mechanical Installation for Buildings	1	L.S.		Only..... USD	
B.3	<u>ELECTRICAL AND INSTRUMENTATION EQUIPMENT</u>					
B.3.1	PLC and SCADA system	1	L.S.		Only..... USD	
B.3.2	Trenching, Ducting and Cabling	1	L.S.		Only..... USD	
B.3.3	Earthing and Lightning Protection	1	L.S.		Only..... USD	
B.3.4	Site Lighting	1	L.S.		Only..... USD	
B.3.5	Telephone System	1	L.S.		Only..... USD	
B.3.6	Analogue Addressable Fire Alarm System	1	L.S.		Only..... USD	
B.3.7	Flow Meter	1	L.S.		Only..... USD	
B.3.8	Valves Chamber	1	L.S.		Only..... USD	
B.3.9	Flash mixer	1	L.S.		Only..... USD	
B.3.10	Distribution Chamber	1	L.S.		Only..... USD	
B.3.11	Alum Feed System	1	L.S.		Only..... USD	
B.3.12	Polymer Feed System	1	L.S.		Only..... USD	
B.3.13	Clariflocculator	1	L.S.		Only..... USD	
B.3.14	Gravity Filter	1	L.S.		Only..... USD	

BILL B - Water Treatment Plant

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
B.3.15	Storage Tank	1	L.S.		Only..... USD	
B.3.16	Pre-Chlorination System	1	L.S.		Only..... USD	
B.3.17	Post-Chlorination System	1	L.S.		Only..... USD	
B.3.18	Transformer and Generators Building (For the WTP and Pumping Station)	1	L.S.		Only..... USD	
B.3.19	Laboratory	1	L.S.		Only..... USD	
B.3.20	Store	1	L.S.		Only..... USD	
B.3.21	Guard Room	1	L.S.		Only..... USD	
B.3.22	Administration	1	L.S.		Only..... USD	
Total BILL B (USD)						

Only.....
 **USD**

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.1	EARTHWORK					
C.1.1	UNCLASSIFIED EXCAVATION This item shall be measured in cubic meter and shall be the net volume according to the excavation limits indicated on Contract Drawings and as directed & approved by the Engineer. Wherever excavation limits are not indicated on Contract Drawings, the limits shall be 50cm away of blinding edges.	250	m ³		Only..... USD	
C.2	CONCRETE & MASONRY					
C.2.1	REINFORCED CONCRETE CLASS A This item shall be measured in cubic meter and shall be the net volume in accordance with the drawings.	500	m ³		Only..... USD	
C.2.2	BLINDING CONCRETE This item shall be measured in cubic meter and shall be the net volume in accordance with the drawings.	75	m ³		Only..... USD	
C.2.3	FAIR FACED CONCRETE This item shall be measured in square meter of concrete floor finishing surface which shall be the net area in accordance with the drawings, as directed and approved by the Engineer.	800	m ²		Only..... USD	
C.2.4	WAFFLE SLAB This item shall be measured in square meter of roof slab surface which shall be the net area in accordance with the drawings, as directed and approved by the Engineer.	650	m ²		Only..... USD	
C.3	WATERPROOFING					
C.3.1	WATERPROOFING WITH THERMAL ISOLATORS This item shall be measured in square meter of waterproofing membrane, thermal isolator and concrete screed quantity as indicated on the drawings and as directed and approved by the Engineer.	650	m ²		Only..... USD	

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.4	DOORS, WINDOWS AND FALSE CEILING					
C.4.1	<u>STEEL & WOOD DOORS & STEEL PROTECTION</u>					
C.4.1.1	<u>STEEL DOORS</u> This item shall be measured in unit of steel doors as indicated on the drawings and as directed and approved by the Engineer.					
	a. TYPE D1 (100x300) - This item shall be measured per unit of Steel door with louvers installed in situ in accordance with the drawings, as indicated in the doors schedule, as directed and approved by the Engineer.	5	unit		Only..... USD	
	b. TYPE SD1 (400x460) - This item shall be measured per unit of Steel door with louvers installed in situ in accordance with the drawings, as indicated in the doors schedule, as directed and approved by the Engineer.	2	unit		Only..... USD	
C.4.2	<u>ALUMINUM DOORS AND WINDOWS</u>		unit			
	a. TYPE W10 90x80cm - This item shall be measured per unit of windows installed in situ in accordance with the drawings, as indicated in the windows schedule, as directed and approved by the Engineer.	22	unit	Review of WWTP land impact on the project	Only..... USD	
C.5	FINISHES					
C.5.1	<u>CEMENT PLASTER WORK</u> This item shall be measured in square meter and shall be the net area in accordance with the drawings, as directed and approved by the Engineer	630	m ²		Only..... USD	
C.5.2	<u>FLOOR TILES</u> INTERNAL FLOOR FINISHING SCREED WITH HARDENER. This item shall be measured in square meter and shall be the net area in accordance with the drawings, as directed and approved by the Engineer.	460	m ²		Only..... USD	

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.5.3	WALL PAINT					
	a. WASHABLE EMULSION PAINT OR ENAMEL PAINT. This item shall be measured in square meter and shall be the actual surface area without including opening surfaces in accordance with the drawings, as directed and approved by the Engineer.	630	m ²		Only..... USD	
	b. EPOXY (FOR FAIR FACED CONCRETE PROTECTION). This item shall be measured in square meter and shall be the actual surface area without including opening surfaces in accordance with the drawings, as directed and approved by the Engineer.	800	m ²		Only..... USD	
	c. COARSE SCRATCHED PAINT. This item shall be measured in square meter and shall be the actual surface area without including opening surfaces in accordance with the drawings, as directed and approved by the Engineer.	580	m ²		Only..... USD	
C.6	EXTERNAL WORKS					
C.6.1	COLORED CEMENT TILES 40x40x4cm THICK This item shall be measured in square meter of colored cement tiles net area in accordance with the drawings, as directed and approved by the Engineer.	460	m ²		Only..... USD	
C.7	METAL WORKS					
C.7.1	STAINLESS STEEL CAT LADDER This item shall be measured per linear meter of stainless steel cat ladder installed as indicated on drawings and as directed and approved by the Engineer.	6	l.m.		Only..... USD	
C.7.2	STEEL WORKS This item shall be measured in kilogram of steel works installed as indicated on drawings and as requested by the Engineer.	1,000	kg		Only..... USD	
C.8	ELECTROMECHANICAL WORKS					
C.8.1	GENERAL					
C.8.1.1	MECHANICAL INSTALLATION FOR BUILDINGS This item shall be paid as lump sum for mechanical installation for building completed and tested.	1	LS		Only..... USD	

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.8.2	<u>Pumping Station</u>					
C.8.2.1	<i>W.T.P pumpset (from pumping station to flowmeter chamber)</i>					
C.8.2.1.1	Horizontal Centrifugal End Suction pump, capacity 690 m ³ /hr at 20 m head, 1450 rpm, suitable for 2 ppm chlorine content. Complete with all motor and pump built in protection devices as per specifications (PTC thermistor, overload, Oil leak detector, motor bearing temperature, pumps bearing temperature). Pumps shall be fitted with mechanical shaft seal type spring loaded flat faces arranged such that replacement of wearing components can be carried out without the need to dismantle the pump.	3	unit		Only..... USD	
C.8.2.1.2	Anti Water Hammer System	1	unit		Only..... USD	
C.8.2.1.3	Suction Pipe, Valves, Instruments and Accessories including: - Main suction header, DN700, Ductile Iron, PN16, including fittings and wall inserts from intake pipe of Mseilha dam to pumps suction pipes - One DN700 Motorized Gate Valve, DI, PN16 - Three Suction pipes, DN600, Ductile Iron, PN16, including fittings, wall inserts, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Three DN600 Motorized Gate Valve, DI, PN16 - Three Low pressure switches (or Vacuum switch) / Transmitters - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	
C.8.2.1.4	Discharge Piping, Valves, Instruments and Accessories including: - Three Discharge pipes, DN400, Ductile Iron, PN16, including fittings, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Three DN400 automatic butterfly valves, DI, PN16 - Three DN400 Non slam check valves, complete with lever and limit switch, DI, PN16 - Main Discharge header, DN700, Ductile Iron, PN16, including fittings and wall inserts from Pump Discharge Piping to flow meter - Three High Pressure Switches/Transmitters - Three Vibration sensors / Analyzers - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.8.2.2	Irrigation Pumpset					
C.8.2.2.1	From Pumping Station to irrigation canal, Horizontal Split case double suction pump, capacity 612 m3/hr at 70 m head, 1500 rpm, suitable for 2 ppm chlorine content. Complete with all motor and pump built in protection devices as per specifications (PTC thermistor, overload, Oil leak detector, motor bearing temperature, pumps bearing temperature). Pumps shall be fitted with mechanical shaft seal type spring loaded flat faces arranged such that replacement of wearing components can be carried out without the need to dismantle the pump.	2	unit		Only..... USD	
C.8.2.2.2	Anti Water Hammer System	1	LS		Only..... USD	
C.8.2.2.3	Suction Pipe, Valves, Instruments and Accessories including: - Main suction header, DN400, Ductile Iron, PN16, including fittings and wall inserts from intake pipe of Mseilha dam to pumps suction pipes - One DN400 Motorized Gate Valve, DI, PN16 - Two Suction pipes, DN400, Ductile Iron, PN16, including fittings, wall inserts, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Two DN400 Motorized Gate Valve, DI, PN16 - Two Low pressure switches (or Vacuum switch) / Transmitters - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	
C.8.2.2.4	Discharge Piping, Valves, Instruments and Accessories including: - Two Discharge pipes, DN400, Ductile Iron, PN16, including fittings, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Two DN400 motorized double flanged gate valves, DI, PN16 - Two DN400 Non slam check valves, complete with lever and limit switch, DI, PN16 - Main Discharge header, DN400, Ductile Iron, PN16, including fittings and wall inserts from Pump Discharge Piping to the limits of the Water Treatment Plant - Two High Pressure Switches/Transmitters - Two Vibration sensors / Analyzers - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.8.2.3	Ras Nhach pumpset					
C.8.2.3.1	From Pumping Station to Ras Nhach Reservoir Horizontal Split case double suction pump, capacity 57 m3/hr at 338 m head, 1500 rpm, suitable for 2 ppm chlorine content. Complete with all motor and pump built in protection devices as per specifications (PTC thermistor, overload, Oil leak detector, motor bearing temperature, pumps bearing temperature). Pumps shall be fitted with mechanical shaft seal type spring loaded flat faces arranged such that replacement of wearing components can be carried out without the need to dismantle the pump	2	unit		Only..... USD	
C.8.2.3.2	Anti Water Hammer System	1	LS		Only..... USD	
C.8.2.3.3	Suction Pipe, Valves, Instruments and Accessories including: - Main suction header, DN150, Ductile Iron, PN16, including fittings and wall inserts from the Clear Water Tank to pumps suction pipes - One DN150 Motorized Gate Valve, DI, PN16 - Two Suction pipes, DN150, Ductile Iron, PN16, including fittings, wall inserts, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Two DN150 Motorized Gate Valve, DI, PN16 - Two Low pressure switches (or Vacuum switch) / Transmitters - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	
C.8.2.3.4	Discharge Piping, Valves, Instruments and Accessories including: - Two Discharge pipes, DN150, Ductile Iron, PN40, including fittings, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Two DN150 motorized double flanged gate valves, DI, PN40 - Two DN150 Non slam check valves, complete with lever and limit switch, DI, PN40 - Main Discharge header, DN150, Ductile Iron, PN40, including fittings and wall inserts from Pump Discharge Piping to the limits of the Water Treatment Plant - Two High Pressure Switches/Transmitters - Two Vibration sensors / Analyzers - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.8.2.4	Hamat pumpset					
C.8.2.4.1	Horizontal Centrifugal End Suction pump, capacity 418 m3/hr at 250 m head, 2900 rpm, suitable for 2 ppm chlorine content. Complete with all motor and pump built in protection devices as per specifications (PTC thermistor, overload, Oil leak detector, motor bearing temperature, pumps bearing temperature). Pumps shall be fitted with mechanical shaft seal type spring loaded flat faces arranged such that replacement of wearing components can be carried out without the need to dismantle the pump.	3	ea		Only..... USD	
C.8.2.4.2	Anti Water Hammer System	1	LS		Only..... USD	
C.8.2.4.3	Suction Pipe, Valves, Instruments and Accessories including: - Main suction header, DN500, Ductile Iron, PN16, including fittings and wall inserts from the Clear Water Tank to pumps suction pipes - One DN500 Motorized Gate Valve, DI, PN16 - Three Suction pipes, DN350, Ductile Iron, PN16, including fittings, wall inserts, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Three DN350 Motorized Gate Valve, DI, PN16 - Three Low pressure switches (or Vacuum switch) / Transmitters - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	
C.8.2.4.4	Discharge Piping, Valves, Instruments and Accessories including: - Three Discharge pipes, DN300, Ductile Iron, PN25, including fittings, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Three DN300 motorized double flanged gate valves, DI, PN25 - Three DN300 Non slam check valves, complete with lever and limit switch, DI, PN25 - Main Discharge header, DN500, Ductile Iron, PN25, including fittings and wall inserts from Pump Discharge Piping to the limits of the Water Treatment Plant - Three High Pressure Switches/Transmitters - Three Vibration sensors / Analyzers - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.8.2.5	Batroun pumpset					
C.8.2.5.1	Horizontal Centrifugal End Suction pump, capacity 338 m3/hr at 223 m head, 2900 rpm, suitable for 2 ppm chlorine content. Complete with all motor and pump built in protection devices as per specifications (PTC thermistor, overload, Oil leak detector, motor bearing temperature, pumps bearing temperature). Pumps shall be fitted with mechanical shaft seal type spring loaded flat faces arranged such that replacement of wearing components can be carried out without the need to dismantle the pump.	3	unit		Only..... USD	
C.8.2.5.2	Anti Water Hammer System	1	LS		Only..... USD	
C.8.2.5.3	Suction Pipe, Valves, Instruments and Accessories including: - Main suction header, DN500, Ductile Iron, PN16, including fittings and wall inserts from the Clear Water Tank to pumps suction pipes - One DN500 Motorized Gate Valve, DI, PN16 - Three Suction pipes, DN350, Ductile Iron, PN16, including fittings, wall inserts, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Three DN350 Motorized Gate Valve, DI, PN16 - Three Low pressure switches (or Vacuum switch) / Transmitters - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	
C.8.2.5.4	Discharge Piping, Valves, Instruments and Accessories including: - Three Discharge pipes, DN300, Ductile Iron, PN25, including fittings, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Three DN300 motorized double flanged gate valves, DI, PN25 - Three DN300 Non slam check valves, complete with lever and limit switch, DI, PN25 - Main Discharge header, DN500, Ductile Iron, PN25, including fittings and wall inserts from Pump Discharge Piping to the limits of the Water Treatment Plant - Three High Pressure Switches/Transmitters - Three Vibration sensors / Analyzers - Any other item to make the suction piping complete in all aspects	1	LS		Only..... USD	

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.8.2.6	Backwash pumpset					
C.8.2.6.1	Horizontal Centrifugal End Suction pump, capacity 1240 m3/hr at 15 m head, 2900 rpm, suitable for 2 ppm chlorine content. Complete with all motor and pump built in protection devices as per specifications (PTC thermistor, overload, Oil leak detector, motor bearing temperature, pumps bearing temperature). Pumps shall be fitted with mechanical shaft seal type spring loaded flat faces arranged such that replacement of wearing components can be carried out without the need to dismantle the pump.	2	unit		Only..... USD	
C.8.2.6.2	Anti Water Hammer System	1	LS		Only..... USD	
C.8.2.6.3	Suction Pipe, Valves, Instruments and Accessories including: - Main suction header, DN500, Ductile Iron, PN16, including fittings and wall inserts from the Clear Water Tank to pumps suction pipes - One DN500 Motorized Gate Valve, DI, PN16 - Two Suction pipes, DN500, Ductile Iron, PN16, including fittings, wall inserts, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Two DN500 Motorized Gate Valve, DI, PN16 - Two Low pressure switches (or Vacuum switch) / Transmitters - Any other item to make the suction piping complete in all aspects	1	LS			
C.8.2.6.4	Discharge Piping, Valves, Instruments and Accessories including: - Two Discharge pipes, DN500, Ductile Iron, PN16, including fittings, supports, SS316 Bolts, Nuts, washers, Gaskets, etc. - Two DN500 motorized double flanged gate valves, DI, PN16 - Two DN500 Non slam check valves, complete with lever and limit switch, DI, PN16 - Main Discharge header, DN500, Ductile Iron, PN16, including fittings and wall inserts from Pump Discharge Piping to the filters - Two High Pressure Switches/Transmitters - Two Vibration sensors / Analyzers - Any other item to make the suction piping complete in all aspects	1	LS			

BILL C - Main Pumping Station

ITEM No.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT RATE IN FIGURES USD	UNIT RATE IN LETTERS USD	AMOUNT USD
C.8.2.7	Electrical Works					
	Electrical installation, complete including but not limited to the following:					
	- Main Control Center Panel MCCP-HLP complete including protection devices, starters, monitoring devices, ventilation, power and control cables, connections, cable glands, control equipments, disconnecting switches to the mechanical equipments, with all needed accessories, fittings and related works all as specified, shown on drawings and to the satisfaction of the engineer.	6	LS		Only..... USD	
	- Secondary distribution board SDB-HLP complete with Cabinet, bus bars, circuit breakers, cable glands, power cables, conduits and all related accessories and fittings, all as specified, shown on drawings and to the satisfaction of the engineer.	1	LS		Only..... USD	
	- Lighting and power installation, complete including, lighting fixtures, switches, socket outlets, power outlets, boxes wires, cover plates, chassis, with all needed accessories and fittings, all as specified, and to the satisfaction of the engineer.	1	LS		Only..... USD	
	- Telephone and Data installation, complete including, telephone outlets, Data outlets, boxes, cables and wires, cover plates, chassis, with all needed accessories and fittings, all as specified, and to the satisfaction of the engineer.	1	LS		Only..... USD	
	- Fire Alarm installation, complete including, manual call station, fire alarms, fire detectors, boxes, fire cables and wires, cover plates, chassis, with all needed accessories and fittings, all as specified, and to the satisfaction of the engineer.	1	LS		Only..... USD	
C.8.3	Telemetry Cables (Fiber optic wire) for all pumping lines including Telemetry ducts and Telemetry manholes inside the limits of the Water Treatment Plant as shown on the drawings	1	LS		Only..... USD	
Total BILL C (USD)						

Only.....
..... USD

COLLECTION SHEET

SECTION	AMOUNT IN FIGURES USD	AMOUNT IN LETTERS USD
TOTAL BILL A		Only.....USD
TOTAL BILL B		Only.....USD
TOTAL BILL C		Only.....USD
<u>TOTAL</u>		Only.....USD
<u>DISCOUNT</u>		Only.....USD
<u>DISCOUNTED TOTAL</u>		Only.....USD
<u>VAT</u>		Only.....USD
<u>GRAND TOTAL</u>		Only.....USD

Only

UNITED STATES DOLLARS