

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NORTH SINAI DEVELOPMENT ORGANIZATION
MINISTRY OF WATER RESOURCES AND IRRIGATION
THE ARAB REPUBLIC OF EGYPT

THE NORTH SINAI INTEGRATED RURAL DEVELOPMENT PROJECT
(PHASE III)

(DETAILED DESIGN STUDY)

VOLUME III : TENDER DOCUMENT OF PACKAGE 2
(KM 108.466 TO KM 118.560)

(VOL. III-4 : BILL OF QUANTITIES)

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PACIFIC CONSULTANTS INTERNATIONAL

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ARAB REPUBLIC OF EGYPT

**MINISTRY OF WATER RESOURCES AND IRRIGATION
MECHANICAL AND ELECTRICAL DEPARTMENT
ON BEHALF OF
NORTH SINAI DEVELOPMENT ORGANIZATION**

NORTH SINAI DEVELOPMENT PROJECT

**CONVEYANCE SYSTEM OF
EL SHEIKH GABER EL SABBABH CANAL
BETWEEN KM 108.466 AND KM 118.560
EL SALAAM NO.7 (BIR EL ABD) PUMPING STATION**

TENDER DOCUMENTS

VOLUME III

BILL OF QUANTITIES

(month) 200x

NORTH SINAI DEVELOPMENT PROJECT

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PREAMBLE TO BILL OF QUANTITIES

1. General

All Tender Documents shall be read in conjunction with this Bill of Quantities. The Contractor shall allow in his rates for all costs incurred in completing the Works in accordance with the requirements of the Contract Document.

The following notes are given to assist in pricing the Bill of Quantities and to enable the Contractor to arrive at the amount of his tender.

2. Application of Preamble to Additional Work

The clauses of this Preamble shall also apply to any additional or varied work, which the Contractor may be required to execute under this Contract except where specifically amended or supplemented by the instructions given to him to carry out such work.

3. Method of Measurement

(1) The Bill of Quantities have been measured in accordance with the methods, which are described herein or in the description in the Bill of Quantities, and the items shall be priced accordingly. The quantities contained in the Bill of Quantities shall be remeasured on completion of the Works.

(2) The Works as executed shall be measured for payment in accordance with the method adopted in the Bill of Quantities and under the items as therein set forth notwithstanding any custom to the contrary. The net measurement or weight of the finished work in place shall always be taken unless otherwise specified.

4. Rates to be for Works Complete

(1) Notwithstanding any limits which may be implied by the wording of the individual items and the explanations in this Preamble, the rates and sums entered in the Bill of Quantities shall include for all requirements, responsibilities and obligations whether expressed or implied, and for incidental and contingent expenses and risks of every kind necessary to partially complete and/or complete and maintain the Works in every respect in accordance with the Contract.

(2) The rates for items in the Bill of Quantities for units of composite work of construction involving several classes of materials and workmanship shall provide for the completion of all component parts, although they may not be specifically described in the items, Preamble or Specifications.

(3) If no rate is entered by the Contractor against an item whether a quantity is stated or not, the item will not be paid for when expended and will be deemed to be covered by other rates in the Bill of Quantities.

- (4) The Contractor shall have no claim for further payment in respect of any work or method of execution, which may be described in the Contract although apparently no corresponding item is given in the Bill of Quantities.
- (5) The quantities for work and materials stated in the Bill of Quantities shall not be considered as limiting or extending the amount of work to be done or material to be supplied by the Contractor.

5. Rates and Sums to bear proper relation to work described

(1) Rates and Sums

The rates and sums entered by the Contractor against the items in the Bill of Quantities shall bear a proper relationship to the cost of carrying out the work described and unless stated otherwise, shall include for all materials required for the Works. On-costs and similar charges, which are applicable to the Contract as a whole, shall be spread over all the rates in the Bill of Quantities; those, which are applicable only to particular sections of the Contract, shall be spread over the items to which those sections refer.

(2) Constructional Plant and Equipment

The rates and prices inserted against the various items in the Bill of Quantities shall include for all constructional plant and equipment necessary to complete the construction of the Works. The rates entered in the Bill of Quantities shall include all costs incurred in the provision, customs duties, transportation to Site, testing, licensing, insurance, complying with relevant regulations, setting to work, operation including all fuel and consumable stores, maintenance, and removal from the Site upon completion of the Works, as well as overhead and profits, unless otherwise noted elsewhere.

6. Currency Components of Rates

The rates for items in the Bill of Quantities have two components the first being the Local Currency which is the Egyptian pound, the second being the Foreign Currency as included by the Contractor in his Tender. The Contractor may insert his rates in either or both currencies.

7. Breakdown of Rates

- (1) The Contractor shall provide with his Tender, detailed Supplementary Schedules breaking down all Tender rates for units of work and lump sums in the Bill of Quantities into their component parts of labor, plant, materials, temporary works and overheads and profit with full analyses of each part.
- (2) The rates set out in the Schedules of Rates, if any, shall be used where appropriate throughout the Bill of Quantities and no variation from these rates shall be allowed.

8. Provisional Items

- (1) Items or groups of items which are designated Provisional shall be used only where they form part of the permanent works and are specifically required by the Engineer. Work carried out under Provisional Sums shall be priced in accordance with the Contract.

- (2) Any claims in respect of overhead charges or other costs, which may allegedly result from the omission of work covered by such Provisional Items shall not be allowed. Expenditure under Provisional Sums shall not be taken into account in calculating any entitlement under Clause 52.3 <Variations Exceeding 25 Per Cent> of the Conditions of Contract.

9. Adjustment Item

Any adjustment item inserted by the Contractor on the Summary Page shall be expressed as a percentage to be applied to all rates and lump sum items. Such adjustments shall not apply to the rate for dayworks. Payment shall be in relation to the amounts included in interim payment certificates.

10. Lump Sum Items and Interim Payment

Unless expressly indicated in the Specification, payment against the item of a lump sum (L.S.) unit in the Bill of Quantities will be made by equal monthly installments commencing from the time the work, service or obligation included in the item has started, and spread over the remainder of the completion of the Works or any extended time. If the Contractor is involved in expenses greater than the aggregated monthly payments on any date the Employer/Engineer may authorize payment of such additional expenses provided that the aggregated payments in respect of the item do not exceed the sum in the Bill of Quantities and that any resulting payments outstanding after payment of the aforementioned expenses will be spread over the remainder of time for completion of the Works or any extended time. If the unit in the Bill of Quantities is shown in L.S. but it needed the shop drawings and their quantities and costs can be calculated, then at the request of the Contractor, the Employer/Engineer may approve to pay for the shop drawings which shall not exceed the L.S. cost. Payment of these costs will be made after the approval of the shop drawings.

11. General and Preliminary Items

General and Preliminary items are not billed separately. The rates and sums inserted against the various measured items shall be deemed to cover the cost of the Contractor's responsibilities for General and Preliminary items.

12. Demolitions and Site Clearance

- (1) The rates for demolition and site clearance shall be deemed to include disposal of the materials arising.
- (2) The rates for this work shall include for clearing the Site of all natural vegetation of any kind and the demolition, dismantling and clearing from the site to designated disposal areas of any artificial material of whatever kind including buildings and similar constructions whether they be above ground, on the ground or below ground. For structures below the ground the rates shall include for excavating out of the ground by whatever means and for backfilling any remaining holes with suitable material all in accordance with the Specification and to the approval of the Engineer.

13. Temporary Works

- (1) Costs for all kinds of common temporary works specified in Sub-Sections 1101 to 1118 of Technical Specifications will not be separately paid as Pay Items but shall be distributed to

other Pay Items in the Bill of Quantities, and the prices included in such other Pay Items shall cover supply, installation, operation, maintenance and removal of all kinds of temporary facilities and temporary works except otherwise particularly itemized in the Bill of Quantities. The Engineer reserves the right to approve the design, shop drawings and the construction schedule of temporary facilities and works.

- (2) For the Temporary works in Division 2 to 9 of Technical Specifications, the Contractor shall submit the detailed schedule of works and the shop drawings of the expected Temporary works to the Engineer.
- (3) The rates entered in the Bill of Quantities shall include temporary works to complete the construction of the Works. Particular temporary works (dewatering) for the construction of No.7 Pumping Station shall be included in Pay Items PC-0303 (Excavation), PC-0306 (Backfill), PC-0327 and PC-0328 (Reinforced Concrete) in this Bill of Quantities. Dewatering period for each Pay Items shall be based on the construction schedule. Dewatering system should consist of deep wells, generator with distribution panel, header pipes for drain and so on, and the Contractor shall submit this system to the Engineer and this system shall be approved by the Engineer before the commence of the Works for No.7 Pumping Station.

14. Employer's and Engineer's Facilities

All the stipulations of Section 1200 <EMPLOYER'S AND ENGINEER'S FACILITIES> of the Technical Specifications shall be performed and fulfilled by the Contractor. The payment for the whole of the Works of this Section will not be made separately under specialized Pay Items. All the costs of the above- mentioned works are to be distributed over other Pay Items of the Bill of Quantities of the Contract.

15. Earth and Stone Works

(1) Excavation Works

- (a) Measurement, for payment, of stripping will be made of the areas stripped to the lines shown on the shop drawings and on the basis of the nominal thickness shown on the shop drawings or prescribed by the Engineer.

Payment for stripping will be made at the unit price per cubic meter, which unit price shall include the costs of clearing, stripping, stocking, disposing of the unsuitable stripped materials by burying, and incidental works necessary for the completion of stripping.

- (b) Excavation (1) shall be measured excavated earth volume above the elevation of operation and maintenance road along with open canal/ pipeline sections and vicinity of pumping station. Excavation (2) shall be also measured excavated earth volume below the elevation of operation and maintenance road and vicinity of pumping station. Excavation (3) shall be measured excavated earth volume below the elevation 2.50 m above mean sea level at the No. 7 pumping station.
- (c) All required and accepted excavation shall be measured in the volume determined in cubic meters computed from the shop drawings of required and completed work. Interim payment may be made on actually executed. Measured excavation shall include excavation for removal of slides, breakage and cave-ins except where caused by carelessness or improper

methods by the Contractor.

- (d) The unit prices for excavation shall include the cost of all labor, equipment, materials, timbering and sheeting, machinery for excavating and of all pumping, bailing, draining, and all other work necessary to maintain the excavations in good order during construction and of removing such temporary construction where required.

The unit prices for excavation shall also include the cost of transportation of materials from the excavation to points of final use, to spoil banks, to temporary stockpiles, and from temporary stockpiles to points of final use or spoil banks and also disposal of excavated waste materials.

All excavated materials actually placed in compacted fill and backfill constructions will again be measured for payment under appropriate pay items covering such fill and backfill constructions.

Cost of stripping and excavation required for the following works and to complete the following structures shall be included in the respective unit prices or prices.

- Common temporary works
- Temporary works
- Guardrail
- Curbs
- Fence, Entrance gates
- Traffic sign, Lighting post, Guide post

(2) Fill and Backfill

- (a) Measurement, for payment, of fill will be made of the materials in place in completed fill to the lines, grades, slopes, and thickness shown on the drawings or established by the Engineer.

Measurement, for payment, of backfill about structures will be made only for the volume actually placed within the limits of the established pay lines for excavation for structures.

- (b) Fill (1) shall be measured the fill volume of concrete lining portion of connecting canal of sand settling basin and discharge tank. Fill (2) shall be measured the fill volume of embankment portion of operation and maintenance road. Fill (3) shall be measured the fill volume of embankment portion of vicinity of steel pipeline laid.

- (c) Backfill (1) shall be measured the backfill volume above elevation 2.50 m above mean sea level at the No. 7 pumping station, and backfill (2) shall be measured the backfill volume below 2.50 m above mean sea level at No. 7 pumping station. Backfill (3) shall be measured the backfill volume at vicinity of main steel pipeline laid.

- (d) The fill and backfill caused by the extra excavation made to insure the Contractor's working spaces beyond pay lines shall not be measured for payment, and be deemed to be included in the rate of fill and backfill.

No allowance will be made in measurement for payment for settlement, shrinkage, and consolidation of the foundation or of the material in the fill and backfill.

- (e) No separate measurement will be made between fill and backfill. Payment for fill and backfill will be made at the unit prices per cubic meter, which unit prices shall include all the expenses for labor, equipment, machinery, right or royalty of material acquisition in quarry or borrow area, excavating, hauling, loading, unloading, spreading and compacting of materials, shaping and trimming of fill and backfill, cleaning and treatment of quarry or borrow area after worked out and incidental works necessary for the completion of fill and backfill works.

Cost of fill and backfill required for the following works and to complete the following structures shall be included in the respective unit prices or prices.

- Common temporary works
- Temporary works
- Guardrail
- Curbs
- Fence, Entrance gates
- Traffic sign, Lighting post, Guide Post

(3) Stone Works

- (a) Measurement, for payment, of stone pitching (riprap) will be made in cubic meter on the basis of the area in place and the nominal thickness shown on the drawings or prescribed by the Engineer.
- (b) Measurement, for payment, crushed gravel bedding for structure will be made in volume completed and accepted in accordance with the specifications, lines, levels, grades and cross sections shown on the drawings or ordered in writing by the Engineer.
- (c) No allowance will be made in measurement for payment for loss of material by flowing, settlement, shrinkage, and consolidation of the foundation or of the material in the riprap and crushed gravel bedding for structure.
- (d) Payment for riprap and crushed gravel bedding for structure, sand bedding will be made at the respective unit prices per cubic meter, which unit prices shall include all the expenses for labor, equipment, machinery, right or royalty of material acquisition in quarry or borrow area, extracting, hauling, loading, unloading, spreading and compacting of materials, shaping and trimming, and cleaning and treatment of quarry or borrow area after worked out and incidental works necessary for the completion of the works.

16. Concrete Works

(1) Concrete

Measurement for payment of concrete cast in situ shall be made by volume in cubic meters of respective classes of concrete placed as computed from the dimensions shown on the

Drawings.

Payment for concrete will be made at the unit price per cubic meter, which unit price shall include the cost for supply and storage of all necessary materials including cement, coarse and fine aggregates, water, admixtures and additives, formwork, reinforcement bars and for testing all necessary materials, all measures necessary for batching and mixing of all materials, transportation of concrete, site preparation prior to pouring and casting, provision of joints, finishing, protection, curing and temperature control of concrete, supply and transportation of the specimens, and incidentals in order to complete the production and placement of concrete.

Measurement and payment for other miscellaneous materials to be embedded in or installed on the concrete cast in situ shall be separately made as described in Section 3300 "Waterstop, Contraction Joint, Expansion Joint Filler and Dowel Bar".

(2) Formwork

Payment for formwork shall be included in the unit price of the plain or reinforced concrete in Pay Item SB-0210, SB-0211, PC-0324, PC-0325, PC-0326, PC-0327, PC-0328, PC-0329, PB-0401, PP-0779, PP-0780, PP-0781, DT-0811 and DT-0812 which shall include the supply and storage of all materials and for all measures necessary for preparation, fabrication, transportation, placing and erection, supporting, scaffolding, removal, cleaning and incidentals.

Separate payment shall not be made for respective kinds of formwork to complete the relevant finishing as specified in Sub-Section 3016 "Finishing" of Technical Specifications.

(3) Reinforcement Bar

Payment for reinforcement bar shall be included in the unit price of the reinforced concrete in Pay Item SB-0211, PC-0325, PC-0326, PC-0327, PC-0328, PC-0329, PB-0401, PP-0780, PP-0781 and DT-0812 which shall include the cost for supply, bending, cutting and erection of reinforcement bar, provision and using of tie wire, metal and concrete support, spacers and other fixing devices, coupling or welding, and other incidentals.

Reinforcement bar weight included in reinforced concrete will be as follows:

- Reinforced concrete (1) for Intake and Pipe Protector (Pay Item: PC-0325); Surge Tank and Air Valve Chamber (PP-0780): Maximum 80 kg/m³.
- Reinforced concrete (2) for Gate Section and Settling Basin (SB-0211); Pump Room and Chamber (PC-0326); Valve Pit and Blow Off Chamber (PP-0781); Discharge Tank (DT-0812): Maximum 100 kg/m³.
- Reinforced concrete (3) for Building Works (PB-0401): Maximum 170 kg/m³.

In case of excess of the above-mentioned weight, "Pay Item: Additional Reinforcement" shall be applied under the approval of the Engineer.

(4) Waterstop, Contraction Joint, Expansion Joint Filler, Dowel Bar, and Polyethylene Sheet

(a) Waterstop

Measurement, for payment, for furnishing and installing the various sizes of waterstops will be made of the number of meter of waterstop measured along the centerline of the waterstop

as shown in the approved Shop Drawings or prescribed by the Engineer with no allowance for lap at splices and intersections.

Payment for furnishing and installing the various sizes of waterstops will be made at the unit price per linear meter, which unit price shall include the cost of furnishing all materials, preparing and submitting drawings and data, making field splices and intersections, and installing the waterstops; and of furnishing and installing coverings for protecting waterstops from damage.

(b) Contraction Joint

Measurement, for payment, of contraction joint will be based on the area of contraction joint shown on the approved Shop Drawings. Payment for forming contraction joint will be made at the unit price per square meter, which unit price shall include the cost of furnishing rubber bitumen paint or oil paint and of painting.

(c) Expansion Joint Filler

Measurement, for payment, of expansion joint filler including sealant will be made of the area of material shown in the approved Shop Drawings or prescribed by the Engineer. Payment for furnishing and placing joint filler will be made at the unit price per square meter, which unit price shall include the cost of furnishing and placing joint sealer, joint filler and other materials required to complete the expansion joint.

(d) Dowel Bar

Measurement, for payment, of dowel bar will be made of the number of dowel bars shown in the approved Shop Drawings or prescribed by the Engineer. Payment for furnishing and installing the dowel bar will be made at the unit price per number, which unit price shall include the cost of furnishing all materials and installing the dowel bars, and of protecting the dowel bars from damage.

(e) Polyethylene Sheet

Measurement, for payment, of polyethylene sheet will be based on the area of polyethylene sheet shown on the approved Shop Drawings or prescribed by the Engineer with no allowance for lap at splices and intersections.

Payment for furnishing and installing of the polyethylene sheet will be made at the unit price per square meter, which unit price shall include the cost of furnishing all materials, preparing and submitting drawings and data, making field splices and intersections, and installing the polyethylene sheets.

17. Steel Pipe

(1) Fabrication and Construction of Steel Pipe

(a) Earthworks for Steel Pipeline

Measurement for payment of earthworks of pipeline shall be the length of pipeline alignment excavated as computed in meters including the length of straight pipes and bend pipes but excluding the length of valve chambers for surge tanks, air valve chambers and flexible joints.

Payment of earthworks for pipeline shall cover clearing and grubbing of site, stripping and removal of top soil, excavation, borrow area development, transportation of materials, all kind of fill and backfill with selected materials, necessary protections shown on the Contract Drawings and any other earthworks for pipeline.

(b) Steel Pipes

Measurement for payment for steel pipe shall be the length of pipe installed as computed centerline of the alignment of pipeline. The rate shall cover supply and installation of pipes including manufacturing, transportation, jointing, internal and external coatings, and all kind of testing with necessary materials, equipment and facilities.

Payment for steel pipes shall be made respective Pay Item shown in below including bends and fittings of the steel pipeline.

<u>Pipe Diameter</u>	<u>Pay Item</u>
D=2,400 mm	PP-0701
D=1,500 mm	PP-0711
D=700 mm	PP-0727
D=400 mm	PP-0706
D=200 mm	PP-0716, PP-0720, PP-0736
D=100 mm	PP-0732

(c) Flexible Joints, Pipe Specials, Loose Flanges and any kinds of Valves

Measurement for payment for flexible joints, pipe specials including manhole pipe, blow off pipe and T shape joint and all kinds of valves shall be the number of each pipes.

Payment for above shall cover manufacturing, transportation, jointing with welding or flanged, internal and external coatings, and all kind of testing with necessary materials, equipment and facilities.

<u>Flexible Joint</u>	<u>Pay Item</u>
D=2,400 mm	PP-0702
D=1,500 mm	PP-0710
D=700 mm	PP-0726
D=400 mm	PP-0708

<u>Pipe Specials</u>	<u>Pay Item</u>
Manhole Pipe	PP-0703, PP-0714, PP-0730
Blow Off Pipe	PP-0705
T-Shape Joint	PP-0709, PP-0725

(2) Appurtenant Facilities

Measurement and payment for the valves, PVC Pipe and Cathodic protection system shall be made under respective Pay Item shown in below. The payment shall be full compensation for supply, installation, testing for every component work, all of the related works, concrete and incidental required in order to complete the respective component works.

(a) Valves

<u>Valves</u>	<u>Pay Item</u>
Air Valve	PP-0704
Stop Valve D=400mm with a loose flange	PP-0707
Stop Valve D=200mm	PP-0717, PP-739
Stop Valve D=300mm	PP-0723
Stop Valve D=100mm	PP-0733

<u>Butterfly Valve</u>	<u>Pay Item</u>
Butterfly Valve D=1,500mm	PP-0712
Butterfly Valve D=700mm	PP-0728

<u>Loose Flange</u>	<u>Pay Item</u>
D=1,500mm	PP-0713
D=700mm	PP-0729
D=400mm	PP-0707

<u>Swing type Check Valve</u>	<u>Pay Item</u>
D=1,500mm	PP-0715
D=700mm	PP-0731

<u>Strainer</u>	<u>Pay Item</u>
D=200mm	PP-0718
D=100mm	PP-0734

<u>Float Valve</u>	<u>Pay Item</u>
D=200mm	PP-0719
D=100mm	PP-0735

(b) PVC Pipe

Measurement for payment for PVC Pipe shall be the length of pipe installed as computed the alignment of pipeline. The rate shall cover supply and installation of pipes including jointing works with a socket and spigot assembly sealed by an elastometric sealing ring or flange or mechanical coupling or solvent welding.

Payment for PVC Pipe shall be made under respective items shown below.

<u>PVC Pipes</u>	<u>Pay Item</u>
D=300mm	PP-0722
D=200mm	PP-0721, PP-0737, PP-0738

(c) Measurement and Payment for Cathodic Protection Device

<u>Work Description</u>	<u>Pay Item</u>
- Supply and Installation of Insulating Flange Accessories	PP-0741
- Drilling Bore Holes D=200mm, L=6.3m	PP-0742

- Supply and Installation of Transformer Rectifier	PP-0743
- Supply and Installation of High Silicon Anode	PP-0744
- Supply and Installation of Positive (Anode) J B	PP-0745
- Supply and Installation of Negative J B	PP-0746
- Supply and Installation of Test Box	PP-0747
- Supply and Installation of Reference Electrode	PP-0748
- Supply and Installation of Standard Probe	PP-0749
- Supply and Installation of Switch Board	PP-0750
- Supply and Installation of Cables XLPE /Steel Armoured Type 1C 35mm ²	PP-0751
- Supply and Installation of Cables XLPE /Steel Armoured Type 1C 6 to 14mm ²	PP-0752
- Supply and Installation of Negative and Test Terminal	PP-0753
- Supply and Installation of Bond Accessories	PP-0754
- Supply of Insulation Checker	PP-0755
- Supply and Installation of Cables XLPE /Steel Armoured Type 3C 70mm ²	PP-0756
- Supply of Corrosion Test Set	PP-0757

18. Pavement Work

(1) Lower Sub-grade

Measurement, for payment, of the lower sub-grade will be made on the basis of actual compacted volume in square meter to the design lines, and grades as shown on the drawings or as directed by the Engineer.

Payment for the lower sub-grade will be made at the unit price per square meter, which unit price shall include the cost of all labor, equipment and materials required for hauling to the site, placing, spreading, wetting or drying as required, compacting, shaping, finishing and testing, and all other costs necessary to complete the works.

(2) Upper Sub-grade

Measurement, for payment, of the upper sub-grade will be made on the basis of actual compacted volume in square meter to the design lines, and grades as shown on the drawings or as directed by the Engineer.

Payment for the upper sub-grade will be made at the unit price per square meter, which unit price shall include the cost of all labor, equipment and materials required for obtaining the materials, hauling to the site, placing, spreading, wetting or drying as required, compacting, shaping, finishing and testing, and all other costs necessary to complete the works.

(3) Asphalt Surface Course for Pavement

Asphalt concrete to be used as a surface course, of thickness specified in the drawings, shall be measured on a square meter basis, the dimensions of which shall comprise the thickness and width specified on the typical cross section and the length of completed and accepted construction. Side road intersections, curve widening, fillets and other smaller areas required to be paved shall also be measured on a square meter basis. Pavement thickness shall be

within the limit specified in paragraph (4) (e) of Sub-Section 5005 of Technical Specifications. Additional payment will not be considered for thickness greater than those specified.

Payment for asphalt concrete surface shall be made at the unit price per square meter, which unit price shall include the cost of all material, labor, equipment and tools required for constructing and maintaining the asphalt concrete surface. The unit price shall also include the cost of prime coat and all other materials and operation necessary to complete the work.

(4) Concrete Curb

Measurement and payment for concrete curbs shall be separately made under individual pay items as specified in Division 2 and 3 of Technical Specifications.

19. Building Works

The rates for buildings shall be for the complete functioning of the building and fully inclusive and shall include for all building structural works, internal and external finishing works, galleries, electrical lighting and socket outlet system, earthing and lightening protection, plumbing, air-conditioning and ventilation. Each work item shall be paid based on items as described in the Bill of Quantities and method of measurement and payment as described in the Technical Specifications.

(1) Metal Decking Works

Measurement for metal decking shall be by square meters of steel structural decking fabricated, furnished and installed as calculated from approved shop drawings. The unit price shall include galvanizing. Such payment is understood to cover all expense in connection with the works, including transportation and storage of the materials as required etc.

(2) Brick Works and Plastering

Brick works will be paid per cubic meter of brick walls erected. Plastering will be paid per square meter of plastered surfaces

(3) Structural Steel Works

Measurement for payment for design, fabrication and erection of structural steel will be on the number of metric ton of structural steel, furnished and installed as shown on the drawings. Those unit prices shall include all materials including welds and bolts, fabrication, welding, coating, testing work, shop and field finish painting, labor, transportation, erection and other works required for completion of the structural steel works. The weight of welds and bolts shall not be included in the calculated weight submitted for payment. Payment for structural steel will be made at the contract unit price per metric ton of structural steel fabricated and erected.

(4) Gallery Works

(a) Handrails and Ladders

- a. Measurement for payment for handrail will be made by length in meters. Measurement for payment for ladders will be made on kilogram (kg) of ladder fabricated, furnished and installed as calculated from the approved Shop Drawings.
- b. The unit price shall include the cost of handrail posts, top and intermediate rails, ladder

cage, side rails and rungs, and coating of the handrails and ladder. Payment for handrails and ladder will be made at the contract unit price per linear meter. Payment for ladder will be made at the contract unit price per kg.

(b) Other Items

- a. Measurement for payment other structural steel items will be on the number of ton of structural steel, furnished and installed as shown on the approved Shop Drawings.
- b. The unit price shall include the costs of materials, fabrication and coating.

(5) Painting

The Costs of all painting works, including supplying of materials and deemed to be included in the prices of the structured steel, galleries such as ladders, handrails and doors except for the items listed in the following:

Separate payment will be made for painting works on the following surfaces:

- a. Concrete walls and ceilings
- b. Plastered walls

Measurement will be made per square meter of wall or/and ceiling surface plastered or in concrete.

(6) Architectural Finishing

(a) Doors, Windows and Louvers

Measurement for payment will be based on the number of square meter (interior or exterior). Measurement for payment for windows and louvers of each type furnished and installed as approved by the Engineer will be made on the square meter installed, including flashing on all sides. Payment will be made at the Contract unit price per unit of each type furnished and installed. The unit price shall include but not be limited to all labor, design, accessories, caulking painting, galvanizing, cleaning and testing etc. as required for complete installation of each of the items.

(b) Floor Finish

Measurement for payment will be based on the number of square meters of each thickness and type of floor finish installed as approved by the Engineer. Payment will be made at the Contract unit price per square meters of each type furnished. The unit price shall include but not be limited to all labor, reinforcing steel, insulation, concrete etc. as required to complete the work as required by the Engineer or as indicated on the approved drawings.

(c) Floor and Wall Tiles

Measurement for payment will be based on the number of square meters of each type of Tiles furnished and installed as approved by the Engineer. Payment will be made at the Contract unit price per square meters of each type of tile furnished and installed. The unit price shall include but not be limited to all labor, cutting materials including, adhesives, grouts, etc. as required for complete furnishing and installation of work as required by the Engineer or indicated on the approved drawings.

(d) Roof Waterproofing and Insulation

Measurement for payment will be based on the number of square meters of built-up waterproofing and insulation as installed and as approved by the Engineer. Payment will be made at the Contract unit price per square meter of each type furnished and installed. The unit price shall include but not be limited to all labor, materials including accessories, mortar screed, etc. as required for complete furnishing and installation of the Work.

(e) Ceiling Work

Measurement for payment will be based on the number of square meters of each type of ceiling installed as approved by the Engineer. Payment will be made at the Contract unit price per square meters of each type of ceiling furnished and installed. The unit price shall include but not be limited to all labor, cutting, materials, etc. as required for complete furnishing and installation of work.

(7) Lighting, Socket Outlets and Lightning Protection Systems

(a) Lighting and Socket Outlets

- a. Measurement and payment will be based on the number of lighting fixtures or socket outlets
- b. Payment will be made at the Contractor unit price of each type furnished and installed.
- c. The unit price shall include but not limited to all labor, design, fixture, ballast, lamps, supporting devices switches, outlet boxes and etc. as required for complete installation of each of the items.

(b) Lightning Protection System

Separate payment shall not be made for lightning protection work as such shall be considered lump sum works.

(8) Plumbing and Sanitary Installation Works

(a) For Water Supply System

- a. The plant equipment shall consist of the following items.
 - Submersible Water Feed Pumps
 - Submersible Water Supply Pumps
 - Elevated Water tank
 - Water Reservoir
 - Filtration facility
 - Chlorination facility
 - Piping
- b. Measurement for payment will be based on the progress and number of unit installed as approved by the Engineer.
- c. Payment will be made under lump sum items of water supply system as each item furnished and installed.
- d. The unit price shall include but not limited to all labor, materials, etc. as required for complete furnishing and installation of work.

(b) For Sewage Treatment System

- a. The plant equipment may consist of the following items.

- Septic tank
 - Evaporation pit
 - Piping
- b. Measurement for payment will be based on the progress and number of unit installed as approved by the Engineer.
 - c. Payment will be made under lump sum items of sewage treatment system as each item furnished and installed.
 - d. The unit price shall include but not limited to all labor, materials, etc. as required for complete furnishing and installation of work.
- (c) Plumbing Fixtures and others
- a. Measurement for payment will be based on the number of each type of unit furnished and installed as approved by the Engineer.
 - b. Payment will be made at the contract unit price for each item furnished.
 - c. The unit price shall include but not limited to all labor, materials, all piping to main connection headers, all drains, hardware testing, etc. as required for complete furnishing, transporting and installation of work.
- (d) Drainage Devices and Pipe Fittings
- a. The following items are included.
 - Floor drains
 - Roof drains
 - Piping
 - Valves
 - b. Measurement for payment will be based on the progress of each item furnished or installed as approved by the Engineer.
 - c. Payment will be made at the Contract unit price per meter or item furnished.
 - d. The unit price shall include but not be limited to all labor, material, necessary attachments, testing etc., as required for complete furnishing, transporting and installation of work.
- (e) Kitchen Unit for Pantry
- a. One compact kitchen element may consist of an one-bowl stainless steel sink, faucet, cooking range, with all accessories encased in a cupboard-link element; size: L=180 cm, D=63 cm with the height: 87.5 cm and top hung wall cupboard 100 x 60 x 40 cm.
 - b. Measurement for payment will be based on the progress of each item furnished or installed as approved by the Engineer.
 - c. Payment will be made under lump sum items of kitchen unit as each item furnished and installed.
 - d. The unit price shall include but not be limited to all labor, material, necessary attachments, testing etc., as required for complete furnishing, transporting and installation of work.

(9) Ventilation and Air Conditioning Works

Measurement and payment for ventilation and air-conditioning works shall be based on the number of ventilation and air-conditioning equipment provided include all wall openings,

penetrations, ducts and electrical facilities or the works.

20. Gate, Valves and Metal Works

(1) Gates

Separate measurement or payment shall not be made for the work required under Section 7000 of Technical Specifications. Only when, all equipment or devices related to the gates have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 7000 will be considered to be included with the related item of work in the Bill of Quantities.

(2) Valves

Separate measurement or payment shall not be made for the work required under the Section 7100 of Technical Specifications. Only when, all equipment or devices related to the valves have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 7100 will be considered to be included with the related item of work in the Bill of Quantities.

(3) Metal Works

(a) Handrails

- a. Measurement for payment of handrail shall be made by length in meters.
- b. Payment for handrail will be made at the unit price per meter, which unit price shall include the cost for design, assembly, welding, painting or galvanized coating, supply and storage of all necessary materials, installing and testing, and all other costs necessary to complete the works.

(b) Steel Ladder and Ladder Rung

- a. Measurement for payment of steel ladders and ladder rungs shall be made by weight in tones of steel ladders and ladder rungs installed as computed from the dimensions shown on the Shop Drawings.
- b. Payment for steel ladders and ladder rungs will be made at the unit price per ton, which unit price shall include the cost for design, supply and storage of all necessary materials, assembly, welding, painting or galvanized coating, installing and testing, and all other costs necessary to complete the works.

(c) Checkered Plate Cover, Steel Plate Cover and Grating Cover

- a. Measurement for payment of checkered plate covers, steel plate covers and grating covers shall be made by weight in tones of checkered plate covers, steel plate covers and grating covers installed as computed from the dimensions shown on the Shop Drawings.
- b. Payment for checkered plate covers, steel plate covers and grating covers will be made at the unit price per ton, which unit price shall include the cost for design, supply and storage of all necessary materials, assembly, welding, painting or galvanized coating, installing and testing, and all other costs necessary to complete the works.

(d) Steel Pipe and Duct

- a. Measurement for payment of steel pipes shall be made by length in meters of steel pipes. And measurement for payment of ducts shall be made by weight in kilograms of ducts installed as computed from the dimensions shown on the Shop Drawings.
- b. Payment for steel pipes and ducts will be made at the unit price per meter or kilogram, which unit price shall include the cost for design, supply and storage of all necessary materials, assembly, welding, painting or galvanized coating, installing and testing, and all other costs necessary to complete the works.

21. Mechanical Works

(1) Main Pumps

Separate measurement or payment shall not be made for the work required under Section 8100 of Technical Specifications. Only when, all equipment or devices related to the main pump have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 8100 will be considered to be included with the related item of work in the Bill of Quantities.

(2) Valves

Separate measurement or payment shall not be made for the work required under Section 8200 of Technical Specifications. Only when, all equipment or devices related to the valves have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 8200 will be considered to be included with the related item of work in the Bill of Quantities.

(3) Auxiliary Equipment

Separate measurement or payment shall not be made for the work required under the Section 8300 of Technical Specifications. Only when, all equipment or devices related to the Water supply, De-watering, Lubrication and Pipeline filling systems, have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 8300 will be considered to be included with the related item of work in the Bill of Quantities.

(4) Trash Removal Equipment

Separate measurement or payment shall not be made for the work required under the Section 8400 of Technical Specifications. Only when, all equipment or devices related to the main pump have been installed, connected and completed it is accepted by the Engineer

All costs in connection with the work specified in Section 8400 will be considered to be included with the related item of work in the Bill of Quantities.

(5) Gantry Crane

Separate measurement or payment shall not be made for the work required under the Section 8500 of Technical Specifications. Only when, all equipment or devices related to the gantry

crane have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 8500 will be considered to be included with the related item of work in the Bill of Quantities.

(6) Overhead Traveling Crane

Separate measurement or payment shall not be made for the work required under the Section 8600 of Technical Specifications. Only when, all equipment or devices related to the overhead traveling crane have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 8600 will be considered to be included with the related item of work in the Bill of Quantities.

(7) Metal Works in the Pump Room

Separate measurement or payment shall not be made for the work required under the Section 8700 of Technical Specifications. Only when, all equipment or devices related to the metal works described in the Sub-Section 8701, Clause (2) Scope of Works of this Section, have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 8700 will be considered to be included with the related item of work in the Bill of Quantities.

(8) Spare Parts

The Spare Parts prices shall include in each Pay Item for the mechanical equipment items in the Bill of Quantities. The rates paid for these spare parts shall be entered by the Contractor in the Spare Parts Schedule in Appendix B. Other recommendable Spare Parts, if any, shall be entered by the Contractor in the Schedule in Appendix B. These rates shall be used for the additional Spare Parts requested by the Engineer/Employer.

22. Electrical Works

(1) Main Motors

Separate measurement or payment shall not be made for the work required under the Section 9100 of Technical Specifications. Only when, all equipment or devices related to the main motor have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 9100 will be considered to be included with the related item of work in the Bill of Quantities.

(2) Low Voltage Motors

Separate measurement or payment shall not be made for the work required under the Section 9200 of Technical Specifications. Only when, all equipment or devices related to the LV motor has been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 9200 will be considered to be included with the related item of work in the Bill of Quantities.

(3) Main Pump Motor Control Equipment

Separate measurement or payment shall not be made for the work required under the Section 9300 of Technical Specifications. Only when, all equipment or devices related to the main motor control equipment have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 9300 will be considered to be included with the related item of work in the Bill of Quantities.

(4) Low Voltage Distribution Control Panels

Separate measurement or payment shall not be made for the work required under the Section 9400 of Technical Specifications. Only when, all equipment or devices related to the low voltage distribution and control panels, have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 9400 will be considered to be included with the related item of work in the Bill of Quantities.

(5) Emergency Generator System

Separate measurement or payment shall not be made for the work required under the Section 9500 of Technical Specifications. Only when, all equipment or devices related to the emergency generator system have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 9500 will be considered to be included with the related item of work in the Bill of Quantities.

(6) DC Power Source Panel

Separate measurement or payment shall not be made for the work required under the Section 9600 of Technical Specifications. Only when, all equipment or devices related to the DC Power source panels have been installed connected and completed, it is accepted by the Engineer.

All costs in connection with the work specified in Section 9600 will be considered to be included with the related item of work in the Bill of Quantities.

(7) Auxiliary Substation and Grounding System

Separate measurement or payment shall not be made for the work required under the Section 9700 of Technical Specifications. Only when, all equipment or devices related to the auxiliary substation have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 9700 will be considered to be included with the related item of work in the Bill of Quantities.

(8) Cables and Wiring System

The quantity of cable or wiring works, cable tray work and underground conduit work shall be

the meters installed complete including conduits, bends, couplings, rock nuts, pull boxes, outlet boxes, flexible conduits, supporting materials and all fittings and incidentals and certified by the Engineer for payment.

(9) Central Monitoring System

Separate measurement or payment shall not be made for the work required under the Section 9900 of Technical Specifications. Only when, all equipment or devices related to the central monitoring system have been installed, connected and completed it is accepted by the Engineer.

All costs in connection with the work specified in Section 9900 will be considered to be included with the related item of work in the Bill of Quantities.

(10) Spare Parts

The Spare Parts prices shall include in each Pay Item for the electrical equipment items in the Bill of Quantities. The rates paid for these spare parts shall be entered by the Contractor in the Spare Parts Schedule in Appendix B. Other recommendable Spare Parts, if any, shall be entered by the Contractor in the Schedule in Appendix B. These rates shall be used for the additional Spare Parts requested by the Engineer/Employer.

23. Plantation along No.7 Pumping Station, Delivery Pressured Pipeline and Discharge Tank

(1) Excavation of Pits for Planting Trees

Digging pits shall be excavated with diameter 50 cm and depth of 50 cm for Planting Trees, on both sides of the O/M roads or the places to be defined by the Engineer, according to the Shop Drawings, and instructions, shall be provided that the pits line is straight and parallel to the road edge exactly, or with the engineering shape requested by the Engineer. The number of pits should be 1000 (One Thousand) pits in each linear kilometer for the one row. The unit price includes and is charged with leveling the soils - the outcome of excavation, and moving them outside the pits. The unit price is to be given including everything by one linear kilometer for the one row of pits.

(2) Supply of Clayey Soil for Pits

Clayey soil for pits shall be supplied agricultural clay free from salt and harmful materials for the growth of plants and free from the seeds of harmful gross, or any other impurities. The rate of clay therein should not be less than 70%, from a known source to be approved by the Engineer, and filling each of the pits mentioned in the previous item to the higher level of the pit. The unit price is given including everything by a longitudinal kilometer for the one row of pits.

(3) Plantation of Gasuarina Trees

Plantation of Gasuarina Trees shall be supplied and planting transplants of Gasuarina, whose green part with a height of at least 70 cm and less than or equal to 90 cm., measured from the surface of soil of the plastic bags containing the transplant, provided that it has a well growing capability to be accepted by the Engineer. These transplants will be planted inside the pits mentioned in the previous items. The unit price will be given including everything by one linear kilometer for the one row, or at a rate of 500 transplants in one linear kilometer of the

one row. Type and kind of tree will be changed by the Engineer.

(4) Plantation of Acacia Trees

Plantation of Acacia Trees shall be supplied and planting Acacia transplants for fixing sand dunes, the green part of it with a height of at least 40 cm and less than or equal to 70 cm, measured from the soil surface of the plastic bags containing the transplant, and provided that they have a well growing capability to be accepted by the Engineer. These transplants will be planted alternately with the Gasuarina trees inside the pits mentioned in the previous items. The unit price will be given including everything by linear kilometer for the one row, at a rate of 500 transplants in the linear kilometer for the one row. Type and kind of tree will be changed by the Engineer.

(5) Care of Trees

Care of trees shall be provided irrigation works, service care and protection for the planted transplants, including replacement of damaged transplants with others new, one by one. It also includes adding fertilizers, maintenance and guarding works. The unit price is given inclusive by linear kilometer for the one row for each year as of the completion of planting the kilometer.

(6) Drip Irrigation System

This system shall be supplied and installed according to the Shop Drawings and the instructions. The unit price includes and is charged with all works required to complete such process perfectly, as well as all what is required of workmanship and tests. The Contractor shall submit the Shop Drawings to be approved by the Engineer before supplying and installing it. The unit price for one system shall be given in lump sum.

24. Dayworks

The Engineer may order works to be carried out on dayworks, and the costs shall be recovered in accordance with the following:

(1) Labor

The rates paid for labor including charge hands and working gangers shall be those entered by the Contractor in the Dayworks Schedule in Appendix A. The rates shall include for wages, bonus, travel allowance, tool allowance and all other prescribed payments and shall provide for the costs of supervision, including foremen and working gangers, paid holidays, overtime, insurance, sick pay, establishment costs, profit and for the use of temporary works erected for other negotiated works. The rates will be applied to the net hours worked irrespective of timings. Rates for classes of labor other than those in the schedule shall be agreed by the Engineer and the Contractor and approved by the Employer.

(2) Constructional Plant

The rates paid for constructional plant shall be those entered by the Contractor in the Dayworks Schedule in Appendix A. The rates shall apply to the Contractor's own plant for working hours only, and shall include for fuel and consumable stores, overhead, repairs, maintenance, replacement, insurance, establishment costs and profit. The costs of drivers and attendants shall be recovered under labor. Minor constructional plant not entered by the

Contractor in the Schedule shall be deemed to be included in the rates for the constructional plant listed. In the event that major constructional plant not listed is required to be used the rate shall be negotiated between the Engineer and the Contractor and approved by the Employer.

(3) Materials

The cost of materials shall be the supplier's invoiced charge for locally obtained items, or the CIF invoiced price at the port of entry for imported items.

The percentage addition to be entered by the Contractor in the Dayworks Bill shall include for the costs of unloading, clearing customs, port charges, agency fees, insurance, transportation, handling, storage and establishment costs and profit and all other costs of any kind.

25. Abbreviations

The following abbreviations are used in the Bill of Quantities:

Cu.m	Cubic meter
Sq.m	Square meter
L.S.	Lump Sum
t	Metric ton
Kg	Kilogram
pc	Piece
mm	Millimeter
cm	Centimeter
m	Meter
Km	Kilometer
No.	Number

**Conveyance System of El Sheikh Gaber El Sabbah Canal
Between KM 108.466 and KM 118.560
El Salaam No.7 (Bir El Abd) Pumping Station**

SUMMARY AND TOTAL

Pay Item No.	Item of Works	Local Currency Amount Egyptian Pound	Foreign Currency Amount
SB-0200	Sand Settling Basin		
PC-0300	Pumping Station (Civil Works)		
PB-0400	Pumping Station (Building Works)		
PM-0500	Pumping Station (Mechanical Equipment)		
PE-0600	Pumping Station (Electrical Works)		
PP-0700	Delivery Pressured Pipeline		
DT-0800	Discharge Tank		
OR-0900	No.3 Access Road		
Total			