Operation:

Under overload conditions, thermal tripping is to provide close protection on insulated conductors. Under short-circuit conditions; magnetic trip is to operate at 7-10 times normal rated current. Magnetic operation is to be in the current limiting region and opening time is not to exceed 5 milliseconds.

Water Flow Meter

Electrical Type:

Scope of Work:

The Contractor shall supply, install, calibrate, test and operate flow meters (magnetic, cleaning less flow meter type with recorder, folded chart type) to measure the flow in the water main. It shall be installed on the delivery pipeline as indicated on the drawings.

The locations and nominal working pressure of the flow meters shall be as shown on the drawings.

The Contractor shall install the magnetic meter at the water mains by using drilling and he shall supply, install and operate the flow meter in the pump station control panel, and supply and install all equipment and materials.. etc. needed for this work.

Specifications:

The transducers must be fitted to the water mains inside socket and isolated from process stream, and must be easily replaced without shutdown. The transducers can be mounted on horizontal or vertical water mains.

Transmitter/signal converter: the supply voltage shall be 230 V, 50 Hz. The operating signal of the flow water shall be 4-20 mA.

The flow meter shall operate using a pulse D.C. field generated by a signal converter. The signal converter shall be separately housed in an enclosure to IP65. Where necessary a separate power driver unit shall be employed and housed in an enclosure to IP65.

Connections between the flow meter and the signal converter, which shall be mounted to the flow meter, shall be using special screened transmission cable.

The signal converter shall provide a suitable output to drive a digital indicator displaying the actual flow rate and an electronic counter indicating the flow volume. A rechargeable battery pack shall be incorporated to prevent loss of the volume count in the event of mains failure to the instrument.

The digital indictor, chart recorder, totalizer and the electronic counter shall be in one box and located in the control room in wells or the pump houses as approved by the Engineer.

The transmitter shall be packaged in rugged enclosure, water and weather proof.

The flow meter must be equipped with sensor, signal converter, transducer, transmitter, chart recorder (12 cm chart width, folded type), non restable totalizer, all the remote mounting and every thing to make the flow meter system to be complete. The chart shall cover a period of minimum 3 months; it shall be regarded in hour intervals along the chart.

The recorder gear shall be of adjustable variable speed type.

Water meters which will be installed in a horizontal steel pipe shall be of the Woltman dry dial type, with rotary vane or turbine, magnetic coupling and
Waterproof encased gear trains and register. The inlet and outlet shall have
a common axis suitable for water up to 40 °C.
The bodies of bulk water meters shall be manufactured from best quality cast iron with integrally cast flanges PN 16, designed for a maximum internal pressure (p) of 16 bars.

Registration shall be in cubic meters. For ease and accuracy of calibration and adjustment dials shall register so as to permit accurate readings of 0.05 % of the nominal maximum discharge. Dial covers shall provide an airtight seal. They shall be provided with a non translucent (not painted) lid, which shall be recessed and shall overlap the registration box to protect the lens.

Registers shall have a minimum capacity of 1,000,000 cubic meters for sizes 80 and 100 mm and 100,000,000 cubic meters for sizes above.

Markings shall be provided on the meters such as arrow indicating direction of flow, nominal size, type N°, year of manufacture and manufacturer's name.

The Contractor shall submit performance data to include head losses and minimum operating head to obtain the required accuracy.

Contents

وزارة المياه والري
سلطنة عمان
مديرية العطاءات والمشتريات

1. ACRONYMS

Acronyms	
ANSI	American National Standards Institute
AWWA	American Water Works Association
BS	British Standards
BSP	British Standards Pipe
DAP	Delivered At Place
DI	Ductile Iron
DMA	District Meter Area
DN	Nominal Diameter
DZ	District Zone
EPDM	Ethylene Propylene Diene Methylene
GIS	Geographic Information System
ISO	International Organization for Standardization
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MID	Measuring Instruments Directive
NBR	Nitrile Butadiene Rubber
NRW	Non-Revenue Water
NSF	National Science Foundation
OIML	The International Organization of Legal Metrology
PN	Nominal Pressure
QA	Quality Assurance
QC	Quality Control
RSS	Royal Scientific Society
SS	Stainless Steel
X7	PURCHASER Billing System
TRC	Telecommunication Regularity Commission
JSMO	Jordan Standard and Metrology Organization
Q1	Minimum flow rate, according to OIMLR 49
Q2	Transitional flow rate, according to OIMLR 49
Q3	Permanent flowrate, according to OIMLR 49
Q4	Overload flow rate, according to OIMLR 49

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

2. GENERAL TECHNICAL SPECIFICATIONS

All certificates (approval certificates, manufacturer experience certificate, etc) must be submitted for the same place/factory where the meters to be manufactured, for all sizes required and for all flow ranges.

2.1. SCOPE OF APPLICATION

The water meter will be used for measuring and billing of residential and non-residential consumption of water subscribers. The supply of the water meters shall include all the necessary accessories for installation and operation. The water meters will be used for the measurement of cold water.

2.1.1. Water Supply Regime

يتم تحديدها من قبل الجهة الطالبة

2.1.2. Network Condition

يتم تحديدها من قبل الجهة الطالبة

2.1.3. Meter Installation Condition

يتم تحديدها من قبل الجهة الطالبة

2.1.4. Water Quality

يتم تحديدها من قبل الجهة الطالبة

2.1.5. Ambient Conditions

All the water meters and accessories shall be in every respect suitable for storage, installation, use and operation in the conditions of temperature, humidity, and the pH and water quality appertaining in Jordan.

Atmospheric temperature in Jordan varies between -15°C and 55°C

يتم تحديدها من قبل الجهة الطالبة

IMPORTANT NOTE:

ALL TYPES OF METERS OFFERED FOR THIS TENDER SHOULD BE FIT FOR ABOVE MENTIONED CONDITIONS AND ENVIRONMENT.

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

2.2. GENERAL APPLICATIONS

- All water meters and accessories supplied under this Contract must be of first quality, free from scale, lamination, honeycombs and other defects, and shall be designed to withstand the stated pressures and temperatures.

The Contract shall include the supply, delivery to and unloading into the required warehouse, of all water meters and accessories. Delivery and unloading shall take place within the working hours of the Purchaser.

All water meters and accessories shall belong to a class, which can withstand the max. Pressure, they will attain in service including any surge pressure.

Before being dispatched from the place of manufacture the ends of the water meters, shall be suitably capped and covered to prevent any accumulation of dirt or damage.

2.3. REFERENCE TO STANDARDS

In general, the relevant ANSI/AWWA, ISO or OIML or EN standards (latest version) shall be applied. Reference to any other national standard or publication in these Specifications is intended to indicate general configuration, type and quality only.

The following general standards shall apply in addition to those specially indicated in the other chapters of the Technical Specifications.

Standard	Description
ISO 4064-1 /OIML R49-1	Water meters for cold potable water and hot water Part 1: Metrological and technical requirements
ISO 4064-2 / OIML R49-2	Water meters for cold potable water and hot water Part 2: Test methods
ISO 4064-3 / OIML R49-3	Water meters for cold potable water and hot water Part 3: Test report format
ANSI/AWWA standard C715	Standard for cold water meters—electromagnetic and ultrasonic type for revenue applications
ANSI/AWWA standard C750	Transit-time flow meters in full closed conduits

The water meters shall comply with respectively latest revision of ANSI/AWWA standard C715 and C750 or shall comply with the latest revision of respectively ISO 4064, OIML R 49.

2.4. APPLICABLE MATERIALS

Only the best quality and type of materials shall be used, which shall be suitable for the purpose intended. Unless otherwise specified, materials shall be selected by the Supplier but subject to Purchaser's representative's approval.

The materials shall be approved both mechanically and chemically to the operating conditions. In connecting units, they shall be mechanically, chemically and electro-chemically compatible with one another and with the environment.

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

Materials shall be selected to have adequate resistance against abrasion and corrosion, where necessary protective coating and lining shall be applied.

Materials in contact with the water shall be non-toxic and shall not affect the quality of the water.

The Supplier shall provide an analysis of the materials of manufacturer when requested to do so by the Purchasers representative.

For certain items specific materials are required as nominated in these specifications in such case, no alternative material will be accepted.

2.5 MARKING

Each meter shall be marked on the casing or display with the following information:

- At least one arrow to indicate the direction of flow.
- Nominal thread size
- Permanent flow rate
- Working Pressure
- Model identification
- Year of manufacture
- Serial number
- Approval or registration number
- Manufacturer's name
- Initials of purchaser name permanently affixed on the meter case.
- Tender number.
- country of origin

In case not indicated differently the information shall be cast onto the body or engraved on the lid or painted onto the counter housing or otherwise suitably marked.

2.6 WARRANTY

*This clause should be embedded in the tender special conditions

The bidder shall submit:

1. Two (2) years defect liability for all items by bank guarantee equal to 5% (to be determined according to the utility conditions but not less than 5%) of the contract amount for each batch, and to be valid for two (2) years from accepted HANDED OVER date.
2. Life time professional liability warranty for the performance (covered by a commitment letter from the bidder/ supplier and manufacturer) (NOTARY PUBLIC) as per the following:

   a. 10 years for Ultrasonic & Electromagnetic water meters: Defected item/items, is/are to be replaced at a cost taking in account a depreciation of 10% of the defected item/items value per year, running from the handed over date.

b. 10 years for the battery without taking in account any depreciation.

Defect item/items, is/are to be replaced free of any charge including cost of return delivery, customs, and taxes (if applicable)

2.7 DOCUMENTS TO BE PROVIDED AT TIME OF TENDER

- Proof of conformity to the standard, as follows:
  - If the meters comply with ISO 4064, OIML R 49 standards:
    Type Approval Certificate (from related authority), or Certificate of Conformity or MID Certificate to the relevant Standard from an accredited certified third party to prove the compliance with the ISO 4064, OIML R49.
  - If the meters comply with ANSI/AWWA standard C715:
    - Affidavit from the manufacturer that the meters provided comply with the latest revision ANSI/AWWA C715
    - Third party conformity test report to prove compliance with all the required specifications in this document, Upon delivery

  Approval from JSMO/TRC are the supplier sole responsibility

- Certificate (from related authority or accredited certified third party) to show that the product can be used safely for potable water.
- Quality assurance certificate (ISO 9001).
- Durability or wear test certificate (back dated not exceeding (5) years.
- Manufacturer experience certificates; a certificate from the manufacturer (self-declaration) that he has at least 5 years in the field of Ultrasonic/Electromagnetic water meters.
- The supplier shall supply full technical specifications and catalogues in addition to compliance sheet for the items to be supplied at the time of tender.
- Certificate and test results for number of samples to be assigned by an accredited certified international laboratory. Certificates and test results (back dated not exceeding (3) Three months) to be submitted with the offers, and shall including the following testsaccording to the international standard IAO 17025 or American Association for laboratory Accreditation
  - Static pressure test
  - Error of indication /Accuracy

All above documents must be valid and in English.
All above mentioned certificates shall be verified by JSMO (Jordan Standard and Metrology Organization) (all expenses must be borne by the contractor/Supplier)

- No objection from TRC
- Compliance sheet
- A sample of one piece (1 Pc) of the smallest diameter of each offered type must be shown by the tendering; the Bidder shall submit the samples with the technical offer

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

for visual inspection, samples shall be retained by the purchaser. And it is the bidder responsibility to coordinate with JISMO to approve the samples.

- All certificates (ISO 17025, approval certificates, manufacturer experience certificate,...etc) must be submitted for the same place/factory where the meters to be manufactured, for all sizes required and for all flow ranges.

2.8 DOCUMENTS TO BE PROVIDED UPON DELIVERY

The Supplier shall submit at least the following documents:

- Certificate of origin
- Packing list
- Third Party inspection certificates
- Any other documents requested by the Purchaser and the hand over committee
- Manufacturer Installation recommendations
- Manuals and any software required to configure and extract the data from the meters (Any additional requirement to be added by the utility).
- All above documents must be valid and in English.

Approval from JSMO/TRC are the supplier sole responsibility

2.9 SUPPLY & QUALITY OF MATERIALS

All materials supplied shall be subjected to the following:

- Approval of the "master list" provided by the Supplier for all supplies and certified by the Engineer prior to shipment
- Pre-shipment inspection and certified quality and quantity of the supplies must be approved including verification of all shipment documents. A pre-dispatch inspection by the third party shall be done in the factory prior to supply to the utility stores.
- Inspection and approval of all supplied materials on arrival on site, of quality and quantity by the Purchaser taking over committee. And these activities will not cancel any test deemed to be necessary to verify that the characteristics and performance of the goods comply with the technical specifications and standard under this contract.

All information and specifications relating to products and materials proposed for this Contract, must accompany each tender submission.

2.10 HANDLING AND TRANSPORTATION

The handling and transportation shall be in accordance with the manufacturer's recommendations.

The cost shall be included for in the bidder rates.

2.11 THIRD PARTY INSPECTION

The supplier is requested to provide in his technical offer three options for accredited international third-party companies; the purchaser will choose one of them to perform the needed inspections.

The supplier is requested to call the chosen company to attend and witness the tests to be done at the manufacturer's testing premises or any place the manufacturer chooses.

Tests in table below must be performed in an accredited laboratory according to ISO/IEC 17025 or American Association for laboratory Accreditation.

The call for Third Party Company must include the main task of this company to ensure 100% complete matching between the product and what is required in tender/contract documents in terms of standards, specifications and conditions in addition to **contractual specifications for third-party involvement in manufacturing process**

1. Presence during Manufacturing:

The third-party entity shall be present during the entire manufacturing process to ensure compliance with the required standards and Specifications Factory. And provide necessary approvals and at each phase of production.

2. Submission of Approval List – check list for Manufacturing Process:

The third-party shall provide a detailed approval list for the manufacturing process, which includes Certificates, material selection, production techniques, and quality control measures .....ect. This list must be reviewed and accepted by third party.

3. Review of Third-Party Qualifications and submitted CV in advance:

The third-party entity must submit detailed qualifications and resumes of their personnel to demonstrate their competence in supervising the manufacturing process. The purchaser reserves the right to review and approve the submitted qualifications prior to assigning responsibilities.

4. Approval before Inspection:

Prior to conducting inspections, the third-party must ensure that all required documentation and processes comply with agreed-upon standards and specifications Factory. Inspection cannot proceed without obtaining formal approval from the third-party.

The third party is obligated to provide all the required and send it to the purchaser.

This clause shall apply specifically to the manufacturing of water meters and must be adhered to strictly to ensure product quality and compliance with regulatory and contractual requirements.

The course of inspection must include the following tests:

1. Static pressure test according to ISO 4064, OIML R49 or AWWA C715 and its addendums

2. Error of indication/Accuracy Test according to ISO 4064, OIML R49 or AWWA C715 and its addendums

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

A sample (size specified in the table below) is to be randomly chosen by the owner or third party representatives for the above mentioned tests; those tests must be witnessedby the third party representative and attended by (4) four representatives of the purchaser.

Acceptance/rejection criteria for those tests:

Static pressure

Error of indication

Test Sample Size (For each DN requested in the BoQ)	
The number of Samples depend on number of meters in the BoQ as indicated in the table below	
Quantity as per BoQ	Number of Samples to be tested
Number of meters ≤5	1
5< Number of meters ≤20	2
20 < Number of meters ≤50	3
50 < Number of meters ≤100	4
100< Number of meters≤150	5
150< Number of meters≤200	6
200< Number of meters≤250	7
250< Number of meters≤300	8
Number of meters>300	3% of meters number

The inspection will include visual inspection, testing the accuracy under rated operating conditions at zero- and 45-degrees rolling angle in addition to the magnetic effect.

Failure to achieve these criteria will result in rejecting the whole batch with the same sequence of serial numbers will be rejected and the supplier to manufacture a new batch and all the above procedure will be repeated.

Purchaser's representatives have the right to object or reject at any stage of testing and inspection.

The supplier is requested to inform the purchaser in written of the production time schedule and of testing time, duration and location in advance allowing enough time (not less than 2 months) for travel arrangements.

The Supplier shall provide the Purchaser with full reports and results of all tests performed during this inspection, for the performance tests specified above the report format should be according to Test Report Format OIML R 49-3 or ANSI/AWWA Standard

The Purchaser may require the Supplier to carry out any test and/or inspection not required by this Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications and standards under this Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to this Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Supplier's performance of its

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

other obligations under this Contract, due allowance will be made in respect of the delivery dates and completion dates and the other obligations so affected.

The Supplier shall provide the Purchaser with full reports and results of all tests performed during this inspection, for the performance tests specified above the re-port format shall be according to Test Report Format OIML R 49-3 or ANSI/AWWA Standard.

The goods shall be inspected before each shipment; the supplier is requested to call the chosen Third Party Company and purchaser's representatives to attend and witness the inspection to verify quality, quantity, packing, marking and loading and delivery to purchaser warehouse.

The supplier shall bear all costs of inspection including (fees of third party, all travelling and accommodation plus per diems for the purchaser's representatives, the cost should be included in the tender unit price.

The third party inspection tests certificates shall include the following stages:

- Testing at the factory
- Packing, And the kind of inspection:
- Review document
- Witness inspection at least (visual and tests) and the test certificates must show the results.
- Before dispatching the supplies another visual inspection shall be done in respect of proper packing and to certify the Bill of Lading for each shipment.
- Loading and proper delivery to Purchaser warehouses.
- Acceptance and approval from JSMO is the supplier sole responsibility.

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

3. MECHANICAL BULK WATER FLOW METER FOR LARGE CONSUMERS

The Mechanical water meters have to comply with respectively ISO 4064, OIML R 49 or equivalent ANSI/AWWA Standard.

3.1. DIMENSIONS

- Diameter: as specified in the bill of quantity.
- The water meter dimensions shall be preferably as per ISO 4064-1

3.2. CONFIGRATION

The water meter shall be compact version.

3.3. TOTALIZER

1. It shall be straight reading type.

2. The totalizer shall register in cubic meter units.

3. The totalizer shall be set at 0 (Zero).

4. The totalizer shall consist of a row minimum of six on-line consecutive digits to read at least 999,999 m^3.

(Ninety-nine thousand, nine hundred and ninety-nine m^3) In addition to dials to register the liters. It is preferred the totalizer to be consisting of a row minimum of eight on-line consecutive digits to read at least 99,999.99 (Ninety-nine thousand, nine hundred and ninety-nine m^3.

5. Totalizer must be capable of being tested using an electronic test bench.

6. The totalizer shall be equipped with integrated measurement pulse outputs as standard.

3.4. FLOW RATES

meter size(inch)	3/4"	1"	1.25"	1.5"	2"	3"
meter size(mm)	20	25	30	40	50	80
Nominal flow rate Qn (m3/hr) >=	4	6	6	15	30	50
maximum flow rate Q max (m3/hr) >=	5	7	7	20	50	75
Minimum flow rate Qmin (l/hr)<=	25	40	70	400	1000	1700
Transitional flow rate Qt (l/hr)<=	40	70	100	1000	2000	3000

meter size(inch)	4"	5"	6"	8"	10"	12"

meter size(mm)	100	125	150	200	250	300
Nominal flow rate Qn (m3/hr) >=	100	150	250	300	900	1200
maximum flow rate Q max (m3/hr) >=	200	250	300	500	1200	1500
Minimum flow rate Qmin (l/hr)<=	2000	2500	3500	6000	12000	20000
Transitional flow rate Qt (l/hr)<=	4000	5000	6000	10000	18000	30000

• General performance and accuracy shall be as indicated below. The range of measured flow rates is subdivided into 3 reaches, the limits being defined by the following rates:

• Qmin = Lower limit of the measuring range, the error shall not exceed +/- 5%.

• Qt = Limiting flow rate for increased accuracy of registration.

• For flow rates above Q1 the error shall not exceed +/- 2%.

• Qn = Nominal flow rate for continuous or intermittent function of the water meter.

The error at Qn shall not exceed +/- 2%.

• Qmax = Maximum flow rate at which the meter may function for limited time without damage, without exceeding a metering error of +/- 2% and without exceeding the permissible head loss.

3.5. DESIGN CONDITIONS

- Water working temperature: 0.1°C up to 50°C.
- The nominal working pressure is not less than 16 bars/25 bar (حسب الجهة الطالبة)
- Pressure loss through the water meter shall not be greater than 0.63 bar.

3.6. METER DESIGN AND PERFORMANCE

- The water meters shall be of the dry dial type, with rotary vane or turbine, magnetic coupling, and water proof encoded gear trains and register. The inlet and outlet shall have a common axis.
- Register shall have the capability to produce and transmit a signal (Pulse) in order data logger or any telemetry system such as (SCADA).
- Registration shall be by digital counters, with a single pointer to show the smallest measurement. The pointer shall move in a clockwise direction.
- Dials shall register so as to permit accurate readings of 0.05%of the nominal discharge.
- Meters shall have a modular design, consisting of an outlet case and separate measuring chamber. The measuring chamber shall be removable and rapidly exchangeable without removing the body.
- Rotors:
- The measuring impellers, vanes or rotors for all meters shall be polypropylene, nylon, hard rubber or other suitable engineering polymer and shall be mounted on a

horizontal axis in the center of the measuring element with rotations of the turbine to the register by means of magnets.

- Register Housings:
- Hermetically sealed register
- The register housing shall be constructed of (a suitable engineering polymer) /(bronze) and provide full protection of the register assembly.
- Register assemblies shall be secured to the main case in a tamper resistant fashion to prohibit unauthorized removal. Seal screws, tamperproof screws, or locking devices are acceptable.

3.7. CONNECTIONS

Threaded or flanged as below:

For DN>=2"

The connection must be Flanged according to ISO 4064 equivalent ANSI/ AWWA Standard.

For DN < 2"

The connection must be threaded end union and non-return valve must be supplied with the meter according to ISO 4064 equivalent ANSI/ AWWA Standard.

3.8. WATER METER BODY (HOUSING)

For DN>=2":

The water meter housing shall be epoxy coated cast iron, epoxy coated ductile iron, 304 Stainless Steel All external bolts and nuts are made of stainless steel.

For DN<2": The water meter housing shall be made of brass (preferred), composite material is allowed given that the measuring tube and threaded end connection must be of stainless steel, brass or bronze alloy.

3.9. DELIVERY CONDITIONS

- All meters must be calibrated and sealed
- Meter must be supplied including:
  - One set of Klinger seal gaskets, the gaskets for joints shall be of rubber or adequate material, with a minimum thickness of one and a half (1.5) mm.
  - Rubber ring gaskets shall be of vulcanised natural or synthetic rubber material. Reclaimed rubber must not be used.
  - Internal non-return valve for DN <2" and Flanges for DN>=2"
  - Any specific tools, equipment, software's or materials needed for the programming, calibration and installation shall be delivered within the package in sufficient quantities with a rate not less than 1/2000 meter, and included in the price of the meter.
  -

3.10. PACKING, TRANSPORT AND STORAGE

- Each meter and its accessories should be supplied in separate individual box and packed in a captive form.
- All meters shall be adequately protected for the whole period of transport and storage against corrosion and accidental damage. The vendor/manufacturer shall be held responsible for the water meters and ensure that it reaches Miyahuna store intact and undamaged. Meters shall be packed to withstand rough handling during transportation and all packages shall be suitable for storage.
- All packages shall have an indelible identification mark corresponding to the packing list.
- Meters shall be protected from exposure to sun light and against the effect of windblown sand and humidity from place of manufacture until delivery to Miyahuna warehouse.

3.11. FACTORY WARRANTY

- Defect liability period and amount: refer to Warranty Section
- Separate warranty documents should be submitted upon delivery.

3.12. UNIONS (FOR DN< 2")

DESCRIPTION

Two threaded tail pieces' unions shall be used to couple the water meter inlet and outlet to water lines supply and delivery. Each Union shall consist of: Coupling nut with holes for sealing wire, gasket and 2 tail pieces.

The union size shall be suitable to fit the customer meter and house connection threaded size.

The union shall be a rotating nut for connecting the meter sides. The tail pieces shall have male thread in accordance with BSP-21 thread for connecting the meter with the supply and delivery pipelines.

MATERIAL

Brass or Bronze.

SIZE

Both unions shall conform with ISO 228-1 standards for threaded end meters.

WORKING PRESSURE

The working pressure shall be not less than 16 Bars.

4. STATIC WATER FLOW METER FOR LARGE CONSUMERS

Water meters shall be designed for use in Mediterranean climate. Meters shall have a static design with no moving parts and mostly unrestricted flow conditions. In addition, following facts shall be met.

- Battery operated (AC powered selection to be determined by the utility if required as 220 Volt
- Restricted to or hindered tampering
- Improved lime resistance
- Improved sand resistance or High resistance to impurities
- Register with protective cover
- Unaffected by solids contained in fluids
- The water meter accuracy will not be affected by the effect of magnetic field or stray current.
- Suitable for outdoor use.
- Suitable for any position installation
- In-line meter, Compact version or as required.
- No measurement of air.
- Protection class IP 68.
- Ability to store data up to 3 months for billing purposes.
- Meters must be Equipped with communication modules supports the Automatic meter reading/ AMI (Advance metering system), The communication module must be approved from the TRC according to their regulations and the frequencies range adopted in our region, The module must be according to standard protocol with a possibility to cooperate with the equipment from various manufacturers, No objection from TRC should be provided for the offered water meter or any supplementary devices if needed by TRC.
- separate battery for the Communication module is preferable
- The interface of water flow meter should be universal and not limited for certain provider according to TRC requirements.

4.1. DIMENSIONS

Diameter: as specified in the bill of quantity.

The meter total length (meter body and tail pieces of unions/Flanges) shall be as specified in AWWA standard C715 latest revision or shall be as specified in latest version of ISO 4064

4.2. CONFIGRATION

The water meter shall be compact version or as required.

If AC powered :

- the output is digital for tantalization 4-20 m A analog output for instantaneous readings and the version is Remote with 10 m cable must be provided by manufacturer.
- The communication = Modbus,HART,Ethernet,DNP3 (تحدد من الجهة الطالبة)

4.3 TOTALIZER

The Static water meter shall be equipped with LED, LCD or comparable kind of display showing at least 5 + 4 readable digits.

The meter register shall have minimum 5 digits and maximum 9 digits + prompts and the unit of Cumulative flow measurement shall be in cubic meters, instantaneous flow shall be (m3/h)). There shall be minimum 3 decimals places 1/1000 cubic meter for verification and testing.

The display shall be equipped with flow direction, low battery alarm, output mode, and leak detection.

The meter shall incorporate devices for elimination of condensation, where there is a risk of condensation forming on the underside of the window of the register.

4.4 OPERATING CHARECTERSITICS

1. **If the meters comply with ISO 4064, OIML R 49 standards**
   - Metrological class" 2 according to ISO 4064, OIML R49 Standards.
   - The water meter has to provide very high measuring accuracy, especially at low flow conditions. The volume measuring component must conform to the requirements OIML R49 /ISO 4064
   - The accuracy of the water meter shall not be affected by variation of flow rates, air flow and rolling.
   - Metrological class R>=250, where R = Q3/Q1

     Q1, Q2, andQ4 shall be as follows
     - The ratio Q2 / Q1 shall be 1.6.
     - The ratio Q4 / Q3 shall be 1.25.

If the meters comply with ANSI/AWWA standard C715

- The static meters shall be type I for meters up to 200mm and shall be type II for meters above 200mmlow flow accuracy as per the latest revision of ANSI/AWWA C715.
- The meter accuracy and capacity shall meet or exceed the accuracy requirements specified in the latest revision of ANSI/AWWA C715standard.
- The water meter has to provide very high measuring accuracy, especially at low flow conditions. The volume measuring component must conform to the requirements of ANSI/AWWA C715 Standard
- The accuracy of the water meter shall not be affected by variation of flow rates, air flow and rolling.

سلطة المياه
مديرية العطاءات والمشتريات

4.5. DESIGN CONDITIONS

- Water working temperature: 0.1°C up to 50°Ctemperature class T 50..
-
- The nominal working pressure is not less than 16 bars or as required in BOQ
- Pressure loss through the water meter shall not be greater than 0.7 bar

4.6. BATTERY

The Ultrasonic water meters shall be battery operated. The battery can be non- replaceable with a life time not less than ten years or replaceable with a life time not less than five years.

Replaceable battery: The manufacturer shall give precise rules for the replacement of the battery locally on site without affecting the protection class (IP 68).

The replacement of the battery shall be indicated on the meter and provide the possibility of indicating the next date of replacement after replacing the battery.

The properties and parameters of the meter shall not be affected by the interruption of the electrical supply when the battery is replaced.

The operation of replacing the battery may be carried out in a way that does not necessitate breaking the statutory metrological seal. When the battery can be removed without breaking the statutory seal, the battery compartment shall be protected by a tamper proof device, such as a seal authorized by the meter manufacturer or controlling authority.

Note: For water meter DN 50 and above battery should be replaceable

4.7. GROUNDING (EARTHING)

The Ultrasonic meters shall be capable to operate accurately without a need for grounding system.

4.8. CONNECTIONS

- -For DN>=2"
- The connection must be Flanged according to ISO 4064 standard
- -For DN<2"
- The connection must be threaded end union and non-return valve must be supplied with the meter according to ISO 4064 standard;
- For Meters comply wit ANSI /AWWA standard C715 flanged design in accordance with (EN1092-2 / ISO 7005 or equivalent) according to the required pressure rating.

4.9. MATERIALS

- For DN>=2":

For Ultrasonic meters

وزارة المياه والري
مديرية العطاءات والمشتريات

The water meter housing shall be epoxy coated cast iron, epoxy coated ductile iron, 304 Stainless Steel, copper alloy or better.

All external bolts and nuts are made of stainless steel.

The reflectors if applicable shall be made of 316/316L Stainless Steel or better.

For Electromagnetic meters:

Nominal Pressure	Not less than 16 bar
Medium Electrical Conductivity	≥20 us/cm
Lining Material	Rubber, Polyurethane or better
Electrode Material	316L SS, Hastelloy B, or better
Body Material	Measuring tube: Hastelloy or stainless steel or better Housing: carbon steel or better
Protection Class	IP68 If AC Power IP67 for transmitter and IP 68 for sensor

- For DN<2":

The water meter housing shall be made of brass (preferred): lead-free copper alloy, stainless-steel grade 304 or 316.Composite material is allowed given that the measuring tube and threaded end connection must be of stainless steel, brass or bronze alloy.

For Ultrasonic meters the reflectors if applicable shall be made of 316/316L Stainless Steel or better.

4.10. DELIVERY CONDITIONS

- All meters must be calibrated and sealed according to EEC regulation or equivalent.
- Meter must be supplied including:
- One set of Klinger seal gaskets, the gaskets for joints shall be of rubber, with a minimum thickness of one and a half (1.5) mm.
- Rubber ring gaskets shall be of vulcanized natural or synthetic rubber material. Reclaimed rubber must not be used.
- Internal non return valve for DN <2" and flanges for DN >=2"
- Any specific tools, equipment, software or materials needed for the programming, calibration, battery replacement and installation shall be delivered within the package in sufficient quantities with a rate not less than 1/2000 meter, and included in the price of the meter.

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

4.11 PACKING, TRANSPORT AND STORAGE

- Each meter and its accessories should be supplied in separate individual box and packed in a captive form.
- All meters shall be adequately protected for the whole period of transport and storage against corrosion and accidental damage. The vendor/manufacturer shall be held responsible for the water meters and ensure that it reaches Purchaser store intact and undamaged. Meters shall be packed to withstand rough handling during transportation and all packages shall be suitable for storage.
- All packages shall have an indelible identification mark corresponding to the packing list.
- Meters shall be protected from exposure to sun light and against the effect of windblown sand and humidity from place of manufacture until delivery to Purchaser warehouse.

4.12 FACTORY WARRANTY

- Defect liability period and amount: refer to Warranty Section
- The battery life time shall be guaranteed by the manufacturer from the date of delivery, if the battery life expires before the provisioned life time the battery shall be replaced at no cost to the purchaser:
- Separate warranty documents should be submitted upon delivery.
- Warranty shall cover the total cost and the cost of proper replacement and commissioning.
- The accuracy of the meter shall be guaranteed by the manufacturer from the date of delivery for the whole provisioned life time, if the meter's accuracy degraded the meter shall be replaced at no cost to the purchaser, separate warranty documents shall be submitted upon delivery.
- The measuring element (reflector, mirrors, transducers, etc...) shall be guaranteed from the supplier and manufacturers that it will not be affected by the water passes through it and will not affect the durability and stability of the meter; the water meters shall be guaranteed against the water quality (solid particles, dirt's and sedimentation) that no layer will be formed on the reflectors and it will not affect the accuracy or stability of the water meter during the period of meters warranty.

TABLE OF CONTENTS

1. GENERAL

1.1. SCOPE OF APPLICATION

The water meter will be used for measuring and billing of residential and non-residential consumption of the Purchaser water subscribers. The supply of the water meters shall include all the necessary accessories for installation and operation. The water meters will be used for the measurement of cold water.

1.1.1. Water Supply Regime

يتم تحديدها من قبل الجهة الطالبة

1.1.2. Network Condition

يتم تحديدها من قبل الجهة الطالبة

1.1.3. Water Meters at House Connection

يتم تحديدها من قبل الجهة الطالبة

1.1.4. Meter Installation Condition

يتم تحديدها من قبل الجهة الطالبة

1.1.5. Water Quality

يتم تحديدها من قبل الجهة الطالبة

ALL TYPES OF METERS OFFERED FOR THIS TENDER SHOULD BE FIT FOR ABOVE MENTIONED CONDITIONS AND ENVIRONMENT.

1.1.6. Ambient Conditions

All the water meters and accessories shall be in every respect suitable for storage, installation, use and operation in the conditions of temperature, humidity, the pH and water quality appertaining in Jordan.

Atmospheric temperature in Jordan varies between -15°C and 55 °C.

يتم تحديدها من قبل الجهة الطالبة

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

1.1.7. Water Meter and Accessories Length

The meter total length (meter body and tail pieces of unions) shall be 265mm including tail piece.

1.2. GENERAL APPLICATIONS

All water meters and accessories supplied under this Contract must be of first quality, free from scale, lamination, honeycombs and other defects, and shall be designed to withstand the stated pressures and temperatures.

The Contract shall include the supply, delivery to and unloading into the warehouse of purchaser, of all water meters and accessories. Delivery and unloading shall take place within the working hours of the Purchaser.

All water meters and accessories shall belong to a class, which can withstand the max. Pressure, they will attain in service including any surge pressure.

The ends of water meters to accommodate couplings shall be faced and sized to the tolerances recommended by the manufacturer of the coupling.

Couplings (tail pieces) shall be provided with gaskets to give a true angle of 180° to the centre line of the coupling or fitting.

Before being dispatched from the place of manufacture the ends of the water meters, shall be suitably capped and covered to prevent any accumulation of dirt or damage.

1.3. REFERENCE TO STANDARDS

In general, the relevant ANSI/AWWA, ISO or OIML or EN standards (latest version) shall be applied. Reference to any other national standard or publication in these Specifications is intended to indicate general configuration, type and quality only.

The following general standards shall apply in addition to those specially indicated in the other chapters of the Technical Specifications.

Standard	Description
ISO 4064-1 /OIML R49-1	Water meters for cold potable water and hot water Part 1: Metrological and technical requirements
ISO 4064-2 / OIML R49-2	Water meters for cold potable water and hot water Part 2: Test methods
ISO 4064-3 / OIML R49-3	Water meters for cold potable water and hot water Part 3: Test report format
ANSI/AWWA standard C715	Standard for cold water meters—electromagnetic and ultrasonic type for revenue applications
ANSI/AWWA standard C750	Transit-time flow meters in full closed conduits

The water meters shall comply with respectively latest revision of ANSI/AWWA standard C715 and C750 or shall comply with the latest revision of respectively ISO 4064, OIML R 49.

1.4. APPLICABLE MATERIALS

Only the best quality and type of materials shall be used, which shall be suitable for the purpose intended. Unless otherwise specified, materials shall be selected by the Supplier but subject to Purchaser's representative's approval.

The materials shall be approved both mechanically and chemically to the operating conditions. In connecting units, they shall be mechanically, chemically and electro- chemically compatible with one another and with the environment.

Materials shall be selected to have adequate resistance against abrasion and corrosion, where necessary protective coating and lining shall be applied.

Materials in contact with the water shall be non-toxic and shall not affect the quality of the water.

The Supplier shall provide an analysis of the materials of manufacturer when requested to do so by the Purchasers representative.

For certain items specific materials are required as nominated in these specifications in such case, no alternative material will be accepted.

Except where specific materials are called for, Bidders are permitted to offer variant materials, which are suitable to the class and performance of the specifications listed.

- Independently from these Specifications given in these Tender Documents, it's the Suppliers sole responsibility that all material supplied is fully compatible and complete with all necessary adapters, if differing materials and standards are proposed for different sections of goods, the Supplier must demonstrate and guarantee that it is possible to interconnect all pre-fabricated parts under consideration in all prevailing conditions and regarding required quality and performance.
- Details of configuration, materials, design and arrangement shall be submitted to the Purchasers representative for approval prior to fabrication.

1.5. MARKING

Each meter shall be marked on the casing or display with the following information:

- At least one arrow to indicate the direction of flow.
- Nominal thread size
- Permanent flow rate
- Working Pressure
- Model identification
- Year of manufacture
- Serial number
- Approval or registration number
- Manufacturer's name

- Initials of (Purchaser Name) permanently affixed on the meter case.
- Tender number.
- Country of origin

In case not indicated differently the information shall be cast onto the body or engraved on the lid or painted onto the counter housing or otherwise suitably marked.

1.6. THIRD PARTY INSPECTION

The supplier is requested to provide in his technical offer three options for accredited international third-party companies. The purchaser will choose one of them to perform the needed inspections the requirements.

The supplier is requested to call the chosen company to attend and witness the tests to be done at the manufacturer's testing premises or any place the manufacturer chooses.

Tests in table below must be performed in an accredited laboratory according to ISO/IEC 17025.

The call for Third Party Company must include the main task of this company to ensure 100% complete matching between the product and what is required in tender/contract documents in terms of standards, specifications and conditions in addition to **contractual specifications for third-party involvement in manufacturing process**

1. Presence during Manufacturing:

The third-party entity shall be present during the entire manufacturing process to ensure compliance with the required standards and Specifications Factory. And provide necessary approvals and at each phase of production.

2. Submission of Approval List – check list for Manufacturing Process:

The third-party shall provide a detailed approval list for the manufacturing process, which includes Certificates, material selection, production techniques, and quality control measures .....ect. This list must be reviewed and accepted by third party.

3. Review of Third-Party Qualifications and submitted CV in advance:

The third-party entity must submit detailed qualifications and resumes of their personnel to demonstrate their competence in supervising the manufacturing process. The purchaser reserves the right to review and approve the submitted qualifications prior to assigning responsibilities.

4. Approval before Inspection:

Prior to conducting inspections, the third-party must ensure that all required documentation and processes comply with agreed-upon standards and specifications Factory. Inspection cannot proceed without obtaining formal approval from the third-party.

The third party is obligated to provide all the required and send it to the purchaser.

This clause shall apply specifically to the manufacturing of water meters and must be adhered to strictly to ensure product quality and compliance with regulatory and contractual requirements.

وزارة المياه والري
سلطة تنظيم المياه
للعطاءات والمشتريات

The course of inspection must include the following tests:

1. Static pressure test according to ISO 4064, OIML R49 or AWWA C715 and its addendums

2. Error of indication/Accuracy Test according to ISO 4064, OIML R49 or AWWA C715 and its addendums

A sample (size specified in the table below) is to be randomly chosen by the third-party representative for the above mentioned tests; those tests must be witnessed by the third part representative and attended by (4) four representatives of the purchaser.

Acceptance/rejection criteria for those tests

Test	Test Sample Size	Acceptance Criteria
Static pressure	0.5% of each production batch	98% of tested meters should pass the test
Error of indication /Accuracy Test	0.5% of each production batch	98% of tested meters should pass the test

The inspection will include visual inspection, dimensions check, testing the accuracy under rated operating conditions, and 45 degrees rolling angle in addition to the magnetic effect).

Failure to achieve these criteria will result in rejecting the whole batch with the same sequence of serial numbers will be rejected and the supplier to manufacture a new batch and all the above procedure will be repeated.

Purchaser's representatives have the right to object or reject at any stage of testing and inspection.

The supplier is requested to inform the purchaser in written of the production time schedule and of testing time, duration and location in advance allowing enough time (not less than 2 months) for travel arrangements.

The Supplier shall provide the Purchaser with full reports and results of all tests performed during this inspection, for the performance tests specified above the report format should be according to Test Report Format OIML R 49-3 or ANSI/AWWA Standard

The Purchaser may require the Supplier to carry out any test and/or inspection not required by this Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications and standards under this Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to this Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Supplier's performance of its other obligations under this Contract, due allowance will be made in respect of the delivery dates and completion dates and the other obligations so affected.

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

The Supplier shall provide the Purchaser with full reports and results of all tests performed during this inspection, for the performance tests specified above the report format shall be according to Test Report Format OIML R 49-3 or equivalent ANSI/AWWA Standard.

The goods shall be inspected before **each shipment**; the supplier is requested to call the chosen Third Party Company and purchaser's representatives to attend and witness the inspection to verify quality, quantity, packing, marking and loading and delivery to Purchaser warehouses in Amman-Jordan.

The supplier shall bear all costs of inspection including (all travelling and accommodation plus per diems for the purchaser's representatives, the cost should be included in the tender unit price.

The third party inspection tests certificates shall include the following stages:

- Testing at the factory
- Packing
- And the kind of inspection:
- Review document
- Witness inspection at least (visual and tests)
- And the test certificates must show the results.
- Before dispatching the supplies another visual inspection shall be done in respect of proper packing and to certify the Bill of Lading for each shipment.
- loading and proper delivery to Purchaser.

NOTE:

ALL COST TESTS BEFORE AND AFTER THIS ITEM AND WETHER LOCAL OR ABROAD SHALL BE BORNE BY THE SUPLLYER AND THE COSTS SHALL BE INCLUDED IN THE TENDER UNIT RATES.

1.7. PACKING, TRANSPORT AND STORAGE

- Each meter and its accessories should be supplied in separate individual box and packed in a captive form.
- Screwed threads of meter ends shall be protected by plastic cap and other suitable materials covering the entire length of threads.
- Each meter shall be packed in a box containing 10 meters max.
- All meters shall be adequately protected for the whole period of transport and storage against corrosion and accidental damage. The vendor/manufacturer shall be held responsible for the water meters and ensure that it reaches Purchaser store intact and undamaged. Meters shall be packed to withstand rough handling during transportation and all packages shall be suitable for storage.
- All packages shall have an indelible identification mark corresponding to the packing list.
- Meters shall be protected from exposure to sun light and against the effect of windblown sand and humidity from place of manufacture until delivery to Purchaser warehouse in Amman-Jordan.

1.8. WARRANTY

The bidder shall submit:

1. At least two (2) years defect liability for all items covered by maintenance (bank) guaranty equal to 5% of the contract amount for each patch, and to be valid for two (2) years from delivery accepted date.

2. Life time professional liability warranty for the performance (covered by a commitment letter from the bidder/ supplier and manufacturer) as per the following:

   a. 10 years For Ultrasonic & Electromagnetic water meters: defected item(s) are to be replaced at a cost taking in account a depreciation of 10% of the defected item value per year, running from the year of supply.

   b. 10 years for the battery without taking in account any depreciation.

Defected item/items, is/are to be replaced free of any charge including cost of return, delivery, customs, and taxes (if applicable).

1.9. DOCUMENTS TO BE PROVIDED AT TIME OF TENDER

- Proof of conformity to the standard (latest version), as follows:
  - If the meters comply with ISO 4064, OIML R 49 standards:
    Type Approval Certificate (from related authority), or Certificate of Conformity or MID to the relevant Standard from an accredited certified third party to prove the compliance with the ISO 4064, OIML R49.
  - If the meters comply with ANSI/AWWA standard C715:
    - Affidavit from the manufacturer that the meters provided comply with the latest revision ANSI/AWWA C715
    - Third party conformity test report to prove compliance with all the required specifications in this document ‹Upon delivery

  Approval from JSMO/TRC are the supplier sole responsibility

- Certificate to show that the product can be used safely for potable water
- Manufacturer experience certificates; a certificate from the manufacturer (self-declaration) that he has at least 5 years in the field of residential Ultrasonic/Electromagnetic water meters.
- Quality assurance certificate (ISO 9001).
- Internal Quality System
- The supplier shall supply full technical specifications and catalogues in addition to compliance sheet for the items to be supplied at the time of tender.
- Method of traceability system followed by the manufacturer.
- Durability or wear test certificate (back dated not exceeding (5) years.
- Certificate and test results for number of samples to be assigned by an accredited certified international laboratory. Certificates and test results (back dated not exceeding (3) Three months) to be submitted with the offers, and shall including the following testsaccording to the international standard ISO 17025 or American association for laboratory accreditation A2LA

- Static pressure test
- Error of Indication /Accuracy

- All certificates (ISO 17025 , approval certificates, manufacturer experience certificate,...etc) must be submitted for the same place/factory where the meters to be manufactured, for all sizes required and for all flow ranges.

All above documents must be valid and in English.

All above mentioned certificates shall be verified by JSMO (Jordan Standard and Metrology Organization) (all expenses must be borne by the contractor/Supplier)

- No objection from TRC
- Compliance sheet
- A sample of five pieces (5 Pcs) of each offered type must be shown by the tendering; the Bidder shall submit the samples with the technical offer for visual inspection, samples shall be retained by the purchaser. And it is the bidder responsibility to coordinate with JSMO to approve the samples and submit the approval letter from JSMO for the samples includes the serial number of the meters.

1.10 DOCUMENTS TO BE PROVIDED UPON DELIVERY

The Supplier shall submit at least the following documents:

- Certificate of origin
- Packing list
- Third Party inspection certificates
- Any other documents requested by the Purchaser and the hand over committee
- Manufacturer Installation recommendations
- Manuals and any software required to configure and extract the data from the meters (Any additional requirement to be added by the utility).
- All above documents must be valid and in English.

Approval from JSMO/TRC are the supplier sole responsibility

1.11 TRACEABILITY SYSTEM

At the time of tender the manufacturer shall clearly mention the method by which he can keep records and trace of the manufactured water meters and accessories to ensure the capability of going back to the records for the manufactured items in case any problems accrues after the installation.

1.12 SUPPLY & QUALITY OF MATERIALS

All materials supplied shall be subject to the Engineer's approval as following:

- Approval of the "master list" provided by the Supplier for all supplies and certified by the Engineer prior to shipment

وزارة المياه والري
مديرية العطاءات والمشتريات

- Pre-shipment inspection and certified quality and quantity of the supplies must be approved including verification of all shipment documents. A pre-dispatch inspection by the third party shall be done in the factory prior to supply to purchaser stores.
- Inspection and approval of all supplied materials on arrival on site, of quality and quantity by the Committee. And these activities will not cancel any local required test.
- Locally manufactured materials in Jordan must be tested and marked by RSS. Inspection or approval by the Committee of any equipment or materials shall not release the Contractor from any of his obligations under this Contract.

All information and specifications relating to products and materials proposed for this Contract, must accompany each tender submission.

1.12.1. Handling and Transportation

The handling and transportation shall be in accordance with the manufacturer's recommendations.

The cost of packing shall be included for in the contractor rates.

2. TECHNICAL SPECFICATIONS

2.1. GENERAL

Water meters shall be designed for use in Mediterranean climate. Meters shall have a static design with no moving parts and mostly unrestricted flow conditions. In addition, following facts shall be met.

- Restricted to or hindered tampering
- Improved lime resistance
- Improved sand resistance or
- High resistance to impurities
- Register with protective cover
- Battery operated.
- Unaffected by solids contained in fluids
- The water meter accuracy will not be affected by the effect of magnetic field or stray current.
- No calming section required.
- Suitable for outdoor use.
- Suitable for any position installation
- In-line meter, Compact version.
- Meters must be Equipped with communication modules supports the Automatic meter reading/ AMI (Advance metering system), The communication module must be approved from the TRC according to their regulations and the frequencies range adopted in our region, The module must be according to standard protocol with a possibility to cooperate with the equipment from various manufacturers, No objection from TRC should be provided for the offered water meter or any supplementary devices if needed by TRC.
- No measurement of air.
- Protection class IP 68
- Ability to store data up to 3 months for billing purpose.
- Bi-directional flow measurement.
- Tambar detection.
- Low battery alarm.
- Reverse flow detection.
- Leak indicator.
- Communication off indicator.
- Directional flow indicator.
- For EM meters the Medium Electrical Conductivity ≥20 us/cm

2.2. DIMENSIONS

- Diameter: 15 mm.
- Thread connections: 3/4"

- Total Length of meter shall be265 mm with Unions (tail pieces)

2.3. TOTALIZER

The Ultrasonic water meter shall be equipped with LED, LCD or comparable kind of display showing at least 5 + 4 readable digits.

The meter register shall have minimum 5 digits and maximum 9 digits and the unit of measurement shall be in cubic meters. There shall be minimum 3 decimals places 1/1000 cubic meter for verification and testing.

The meter shall incorporate devices for elimination of condensation, where there is a risk of condensation forming on the underside of the window of the register.

2.4. OPERATING CHARECTERSITICS

If the meters comply with ISO 4064, OIML R 49 standards

- Metrologicall class" 2" according to ISO 4064, OIML R49 Standards, shall secure that only correct signals passing through the measuring chamber/tube are measured.
- The water meter has to provide very high measuring accuracy, especially at low flow conditions. The volume measuring component must conform to the requirements OIML R49 /ISO 4064
- The accuracy of the water meter shall not be affected by variation of flow rates, air flow and rolling.
- Metrological class (not less than R 250, Q3 ≥ 2.5 m3/hr, Q1< 10 l/h), R>=250, where R = Q3/Q1
  Q1, Q2, andQ4 shall be as follows
  - The ratio Q2 / Q1 shall be 1.6.
  - The ratio Q4 / Q3 shall be 1.25.
- The water meter shall be capable of registering low flow conditions according to table.
  - Start-up registration at Q0+: 3 l/h;
  - Max. Permissible error at Q1: < ±5 %
  - Max. Permissible error at Q2: < ±2 %
  - Max. Permissible error at Q3: < ±2 %
  - Max. Permissible error at Q4: < ±2 %
  - Falling registration at Q0: <=3 l/h;

The accuracy of the water meter shall not be affected by variation of flow rates, air flow and rolling.

If the meters comply with ANSI/AWWA standard C715

- The static meters shall be type I low flow accuracy as per the latest revision of ANSI/AWWA C715.
- The meter accuracy and capacity shall meet or exceed the accuracy requirements specified in the latest revision of ANSI/AWWA standard C715.
  - Normal flow limits = (0.045to 4.5) m3/h (wider range is acceptable)
  - The limit of permissible error at normal flow limits ≤±1.5 %
  - Safe maximum flow rate = 4.5 m3/h (20) gpm
  - Minimum flow rate = 0.0295 m3/h (0.13) gpm
  - The limit of permissible error at minimum flow rate ≤ ±5%

- The water meter has to provide very high measuring accuracy, especially at low flow conditions. The volume measuring component must conform to the requirements of ANSI/AWWA C715 Standard
- The accuracy of the water meter shall not be affected by variation of flow rates, air flow and rolling.

2.5. DESIGN CONDITIONS

- Water working temperature: 1°C up to 50°C temperature class T 50.
- The nominal working pressure is not less than 12 bars. (It is the responsibility of the bidder to verify the Pressure during design stage) يتم تحديدها من قبل الجهة الطالبة
- Pressure loss through the water meter shall not be greater than 0.7 bar.

2.6. BATTERY

The Ultrasonic water meters shall be battery operated. The battery can be non- replaceable or replaceable with a life time not less than10-years.

Replaceable battery: The manufacturer shall give precise rules for the replacement of the battery locally.

The replacement of the battery shall be indicated on the meter and provide the possibility of indicating the next date of replacement after replacing the battery.

The properties and parameters of the meter shall not be affected by the interruption of the electrical supply when the battery is replaced.

The operation of replacing the battery may be carried out in a way that does not necessitate breaking the statutory metrological seal. When the battery can be removed without breaking the statutory seal, the battery compartment shall be protected by a tamper proof device, such as a seal authorized by the meter manufacturer or controlling authority.

2.7. GROUNDING (EARTHING)

The Ultrasonic meters shall be capable to operate accurately without a need for grounding system.

2.8. MATERIALS

The water meter housing shall be made of brass (preferred), lead-free copper alloy, stainless-steel grade 304 or 3016 composite material is allowed given that measuring tube and threaded end connection must be of stainless-steel grade 304 or 316, brass or bronze alloy.

The reflectors shall be made of 316 Stainless Steel or Brass

2.9. ACCESSORIES

- Two Brass Unions (coupling nuts, gaskets and two tail pieces). The total Length of the water meter with unions (tail pieces) shall be: 265 mm.

2.10. DELIVERY CONDITIONS

- All meters must be calibrated and sealed according to EEC regulation or equivalent.
- Meter must be supplied including:
  - ✓ One set of Klinger seal gaskets, the gaskets for joints shall be of rubber, with a minimum thickness of one and a half (1.5) mm.
  - ✓ Rubber ring gaskets shall be of vulcanised natural or synthetic rubber material. Reclaimed rubber must not be used.
  - ✓ One set of water meter connectors (brass couplings), with holes for sealing wire.
  - ✓ Any specific tools, equipment, software or materials needed for the programming, calibration and installation shall be delivered within the package in sufficient quantities and included in the price of the meter.

2.11. FACTORY WARRANTY

- Defect liability period and amount: refer to Warranty Section 1.10
- The battery life time shall be guaranteed by the manufacturer from the date of delivery, if the battery life expires before the provisioned life time the battery shall be replaced at no cost to the purchaser:
- Separate warranty documents should be submitted upon delivery.
- Warranty shall cover the total cost Delivered at Place (DAP) and the cost of proper replacement and commissioning.
- The accuracy of the meter shall be guaranteed by the manufacturer from the date of delivery for the whole provisioned life time, if the meter's accuracy degraded the meter shall be replaced at no cost to the purchaser, separate warranty documents shall be submitted upon delivery.

In addition to the above mentioned

For Ultrasonic Meters all reflectors (mirrors) shall be guaranteed from the supplier and manufacturers that it will not be affected by the water passes through it and will not affect the durability and stability of the meter; the water meters shall be guaranteed against the water quality (solid particles, dirt's and sedimentation) that no layer will be formed on the reflectors and it will not affect the accuracy or stability of the water meter during the period of meters warranty.

For Electromagnetic Meters the Electrode material must be 316LSS, Hastelloy B.

وزارة المياه والري
سلطة المياه
مديرية المعلومات والمشتريات

3. UNIONS

3.1. DESCRIPTION

Two threaded tail pieces unions shall be used to couple the water meter inlet and outlet to water lines supply and delivery. Each Union shall consist of: Coupling nut with holes for sealing wire, gasket and 2 tail pieces.

The union size shall be suitable to fit the customer meter and house connection threaded size.

The union shall be a rotating nut for connecting the meter sides. The tail pieces shall have male thread in accordance with BSP-21 thread for connecting the meter with the supply and delivery pipelines.

3.2. MATERIAL

Brass or Bronze

3.3. WORKING PRESSURE

The working pressure shall be not less than 12Bars.

1. Contents

وزارة المياه والري
سلطة المياه
مدير إدارة العطاءات والمشتريات

1.1. SCOPE OF APPLICATION

The meter will be used for measurement of cold, chlorinated potable water.
The meter mechanism should be velocity, dry, magnetic drive, multi jet type domestic water meters of ½" nominal size, the meter should be class B or C.

1.2. APPLICABLE STANDARDS

In general, the relevant ANSI/AWWA, ISO or OIML or EN standards or equivalent (latest version) shall be applied.
The following general standards shall apply in addition to those specially indicated in the other chapters of the Technical Specifications.

Standard	Description
ISO 4064-1 /OIML R49-1	Water meters for cold potable water and hot water Part 1: Metrological and technical requirements
ISO 4064-2 / OIML R49-2	Water meters for cold potable water and hot water Part 2: Test methods
ISO 4064-3 / OIML R49-3	Water meters for cold potable water and hot water Part 3: Test report format

The water meters shall comply with respectively latest revision of ANSI/AWWA standard C715 and C750 or shall comply with the latest revision of respectively ISO 4064, OIML R 49.

2.1. MATERIAL

- The water meter and accessories shall be manufactured from materials of adequate strength and durability.
- The meter lower & upper cases, and threaded end connections shall be made of brass or bronze alloy.
- All materials which come in contact with water shall withstand 2PPM (parts per million) of chlorine residual in the water, and shall be resistant to corrosion
- The materials, which come in contact with water, shall not create a toxic hazard, shall not support microbial growth and shall not give rise to unpleasant taste or discoloration in the water supply.
- The spindle and bearings shall be made of stainless steel and sapphire.

2.2. THE TOTALIZER AND TOTALIZER SHIELD

The totalizer shall be designed in such a way that if the totalizer protective glass is broken for a reason or another the totalizer can't be removed from its place.

وزارة المياه والري
سلطنة المملكة
مديرية العطاءات والمشتريات

If the totalizer is an open type, then the totalizer protective cover shall be made of made of sturdy glass and shall have a thickness not less than 5 mm, while if its closed type the glass or the plastic should be scratch resistant .

2.3. TOTALIZER

1. It shall be straight type.
2. The totalizer shall register in cubic meter units.
3. The totalizer shall reset to 0 (zero) at 100,000m3
4. The totalizer shall consist of a row of at least five on-line consecutive digits to read 99,999m3 (Ninety-nine thousand, nine hundred and ninety-nine m3).
5. Other register(s) or dial(s) shall register flows in liters and fractions, the liters register(s) shall be of a different color.
6. Dry so that potable water shall not reach the internal parts of the totalizer gears or dials.
7. The pivot of impeller chamber should be guaranteed against any corrosion or damage at least three years after first installation.
8. The totalizer can be closed or open:
   - Open type: should be capable to be repaired and the chamber is preferred to be made of bronze or brass.
   - Closed type: It should be properly protected.
9. The totalizer shall be capable of being tested using an electronic test bench.

2.4. WORKING PRESSURE AND TEMPERATURE

1) Working pressure shall not be less than 16 bars.
2) Pressure loss through the water meter shall not be greater than 0.63 bar.
3) The meter form water temperature class is T50, and ambient temperature up to 50°C.

2.5. FLOW RATES AND ACCURACY

CLASS B

- Metrological class" R (80 – 100), Q3 2.5", all meters must have MID approval (R 80 - 100) and declaration of conformity.
- The water meter shall be capable of registering flow conditions according to table.
- Max. Permissible error at Q1: < ±5 %
- Max. Permissible error at Q2: < ±2 %
- Max. Permissible error at Q3: < ±2 %

- Max. Permissible error at Q4: < ±2 %

OR Metrological Class B as following requirements:

Nominal flow rate (Qn)	1.5 m^3/hr	Max. Permissible error < ±2 %
Maximum flow rate (Qmax)	3 m^3/hr	Max. Permissible error < ±2 %
Minimum flow rate (Qmin)	30 L/hr	Max. Permissible error < ±5 %
Transitional flow rate (Qt)	120 L/hr	Max. Permissible error < ±2 %

CLASS C

Metrological class" R (160), Q3 2.5", all meters must have MID approval (R 160) and declaration of conformity.

The water meter shall be capable of registering flow conditions according to table.

Max. Permissible error at Q1: < ±5 %

Max. Permissible error at Q2: < ±2 %

Max. Permissible error at Q3: < ±2 %

Max. Permissible error at Q4: < ±2 %

OR Metrological Class C as following requirements:

Nominal flow rate (Qn)	1.5 m^3/hr	Max. Permissible error < ±2 %
Maximum flow rate (Qmax)	3 m^3/hr	Max. Permissible error < ±2 %
Minimum flow rate (Qmin)	15 L/hr	Max. Permissible error < ±5 %
Transitional flow rate (Qt)	25 L/hr	Max. Permissible error < ±2 %

2.6. METER MARKING

The water meter shall be marked with the following identifications:

1) An arrow indicating the direction of the flow permanently affixed to the meter lower casing.
2) Trade mark, name of manufacturer, and model.
3) The meteorological class and permanent rate in m^3 per hour.
4) Manufacturer's serial number of the meter permanently affixed to the meter upper case.

وزارة المياه والري
مديرية المياه والمشتريات

5) Working pressure.
6) Approval marking and No. of approval certificate.
7) Year of manufacturing on counter or in the head ring.
8) Tender No. and the initials of ( ).

2.7 METER LENGTH

The meter length shall be 165 mm.
The meter total length (meter body + tailpieces) shall be 265 mm.

2.8 METER INTERNAL STRAINER

The meter shall be equipped with Internal strainer of at least 12 holes/cm^2 and not more than 18 holes/cm^2 at the flow inlet to the meter.

2.9 METER SEALING

- The meter shall be sealed by the manufacturer upon the delivery and shall be provided with a hole for sealing the meter with the service valve on the inlet side of the meter.
- The sealing material shall be stainless steel wire, 1.1 mm thick and aluminum seal.

2.10 WATER HAMMER

The meter should be resistant for the water hammer, so its accuracy not to be affected as the following test.

- Test Conditions
  - 5 meters are tested separately after all other tests are finished.
  - The test shall be performed at 4 bar pressure.
  - The test shall be performed under two flows by passing 100 litres for each flow:
    - 1500 l/hr
    - 95 % of Q4 (Qmax)
  - Two valves shall be mounted one before the meter and the other after it.

- Test procedures.
  - After passing 20 litres the meter shall be subjected to a sudden closing and opening of a valve mounted before or after it. If the meter shows no visible stalling due to the surge, a maximum of 4 additional interruptions by sudden opening and closing the valve are attempted.
- Test result.
  - If the meter accuracy maintain within ±3% error of indication then the meter is pass, otherwise the meter will fail.
  - This criterion of ±3% applies to each of the 5 meters tested and at both flow rates. Any failure in this criterion affects the entire offer.

2.11 CERTIFICATES, DOCUMENTS AND SAMPLES

DOCUMENTS AND SAMPLES TO BE SUBMITTED IN THE TENDERING PROCESS:

- Type approval certificate issued by a certified third party institution, certificate(s) must be in English, for other languages a certified translated copy should be sent with the original.
  If the meters comply with ANSI/AWWA standard:
  - Affidavit from the manufacturer that the meters provided comply with the latest revision ANSI/AWWA
  - Third party conformity test report to prove compliance with all the required specifications in this document, Upon delivery

  Approvals from JSMO/TRC are the supplier sole responsibility
- Durability or wear test certificate (back dated not exceeding (5) years).
- Quality assurance certificate (ISO 9001).
- Letter of authorization from the manufacture.
- Certificate of conformity to potable water uses.
- Product catalogue and data sheet.
- Compliance sheet.
- Certificates and test results (back dated not exceeding (3) Three months) for number of samples to be assigned by the chosen accredited International certified laboratory according ISO 17025 or American association for laboratory Accreditation (A2LA).
- 5 samples of water meters with approval letter from JSMO.
- The manufacturer shall provide a price list of spare parts that will be needed within five years of delivery of meter.

وزارة المياه والري
مديرية العطاءات والمشتريات

- All above mentioned certificates shall be verified by JSMO (Jordan Standard and Metrology Organization) (all expenses must be borne by the contractor/Supplier).
- All certificates (ISO 17025, approval certificates, manufacturer experience certificate,...etc) must be submitted for the same place/factory where the meters to be manufactured, for all sizes required and for all flow ranges.

DOCUMENTS TO BE SUBMITTED UPON DELIVERY OF SHIPMENT:

- CIF Insurance for the material to be shipped.
- Manufacture's or supplier's warranty certificates.
- Inspection Certificate, Issued by the third party, and supplier's factory inspection report.
- Certificate of Origin.
- Packing List

2.12 ACCESSORIES

The following accessories must be supplied with water meters upon delivery:

1) An internal strainer of at least 12 holes/cm2 and not more than 18 holes/cm2 at the flow inlet to the meter.
2) Internal non-return valve.
3) Special tools, if any, for dismantling and maintenance of quantity calculated at the ratio of 1/1,000 from the ordered meters.
4) Two threaded tailpieces which shall conform to BS 21 or ISO 228-1 standards.
5) The sealing material shall be stainless steel wire, and aluminum seal.

2.13 PACKING TRANSPORT & STORAGE

1) Each meter and its accessories should be supplied in separate individual box and packed in a captive form.
2) Screwed threads of meter ends shall be protected by plastic cap and other suitable materials covering the entire length of threads.
3) Each meter shall be packed in a box containing 10 meters max.
4) All meters shall be adequately protected for the whole period of transport and storage against corrosion and accidental damage. The vendor/manufacturer shall be held responsible for the meters so packed and not protected, and to ensure that it reaches the store intact and undamaged. Meters shall be packed to withstand rough handling during transportation and all packages shall be suitable for storage.

وزارة المياه والري
سلطة المياه
دائرة العطاءات والمشتريات

5) All packages shall have an indelible identification mark corresponding to the packing list.
6) Meters shall be protected from exposure to sun light and against the effect of windblown sand and humidity from place of manufacture until delivery to (تحدد من قبل الجهة الطالبة)

2.14. EVALUATION

The Purchaser will carry out a detailed evaluation of the technical bids, previously determined to be substantially responsive in order to determine whether the technical aspects are in accordance with the requirements set forth in the bidding documents.
The Purchaser will examine and compare the technical aspects of the bids on the basis of the submittals supplied by the bidders (documents, catalogues, leaflet , website, media, samples...etc) taking into account that number of samples to be assigned by the chosen accredited International certified laboratory. Certificates and test results (back-dated not exceeding (3) Three months) to be submitted with the offers, and shall include the following tests:

- Static pressure test according to ISO 4064
- Error of indication according to ISO 4064
- Water hammer test according to section 2.10 of this document.

The Bidder shall submit the samples with the technical offer for visual inspection, samples shall be retained by the purchaser.

2.15. THIRD PARTY INSPECTION

The supplier is requested to provide in his technical offer three options for accredited international or local third party entities to perform the tests; the purchaser will choose one of them to perform the needed inspections. If the supplier includes local entities as options, preference will be given to the local entities.

Tests in table below must be performed in an accredited laboratory according to ISO/IEC 17025 or American association for laboratory Accreditation (A2LA).
The supplier is requested to call the chosen company to attend and witness the tests to be done at the manufacturer's testing premises or any place the manufacturer chooses.
The call for Third Party Company must include the main task of this company to ensure 100% complete matching between the product and what is required in tender/contract documents in terms of standards, specifications and conditions in addition to **contractual specifications for third-party involvement in manufacturing process**

1. Presence during Manufacturing:

The third-party entity shall be present during the entire manufacturing process to ensure compliance with the required standards and Specifications Factory. And provide necessary approvals and at each phase of production.

وزارة المياه والري
مديرية العطاءات والمشتريات

2. Submission of Approval List – check list for Manufacturing Process:

The third-party shall provide a detailed approval list for the manufacturing process, which includes Certificates, material selection, production techniques, and quality control measures .....ect. This list must be reviewed and accepted by third party.

3. Review of Third-Party Qualifications and submitted CV in advance:

The third-party entity must submit detailed qualifications and resumes of their personnel to demonstrate their competence in supervising the manufacturing process. The purchaser reserves the right to review and approve the submitted qualifications prior to assigning responsibilities.

4. Approval before Inspection:

Prior to conducting inspections, the third-party must ensure that all required documentation and processes comply with agreed-upon standards and specifications Factory. Inspection cannot proceed without obtaining formal approval from the third-party.

The third party is obligated to provide all the required and send it to the purchaser.

This clause shall apply specifically to the manufacturing of water meters and must be adhered to strictly to ensure product quality and compliance with regulatory and contractual requirements.

The course of inspection must include the following tests:

1) Static pressure test according to ISO 4064
2) Error of indication according to ISO 4064
3) Water hammer test according to section 2.10 of this document.
4) Visual inspection:
   Randomly chosen samples will be physically inspected to ensure that the internal and external parts comply with the required specifications. The inspection shall cover materials, surface finishing, required markings, any damages, and packing.
5) Dimensions check
   The meter total length (meter body + tailpieces) shall be 265 mm.

A sample (size specified in the table below) is to be randomly chosen by the third party representative for the above mentioned tests; those tests must be witnessed by the third part representative and attended by four representatives of the purchaser for each batch.

وزارة المياه والري
سلطنة عمان

Acceptance/rejection criteria for those tests

Each batch shall be tested randomly as per the table below. The relative errors (of indication) observed for each of the flow rates shall not exceed the maximum permissible errors specified in section 3.7.

Test	Test sample size	Acceptance criteria
Static pressure	1% of each production batch	97% minimum of tested meters should pass the test
Error of indication	1% of each production batch	97% minimum of tested meters should pass the test

- If more than 3% of tested meters did not pass the test at the 1st Stage, then will be a 2nd Stage, an additional 1% of ordered quantity should be tested, if 97% minimum of the 2nd stage passes then the whole quantity will be accepted plus to an additional penalty that equal to the following equation :

*(Number of failed meters (1st stage + 2nd stage)/Sample size (1st stage + 2nd stage))*Batch size.*

Note: This penalty can be accepted as an additional water meters or money reduction.

- If more than 3% of tested meters did not pass the test at the 2nd Stage, then the whole batch will be rejected.
- Visual inspection and Dimensions check shall completely comply.

Failure to achieve these criteria will result in rejecting the whole batch with the same sequence of serial numbers will be rejected and the supplier to manufacture a new batch and all the above procedure will be repeated.

Purchaser's representatives have the right and authority to object or reject at any stage of testing and inspection. A written letter of objection shall be sent to the 3rd party entity and evidence to the contrary of any issues shall be provided, and if needed, the tests shall be repeated.

The supplier is requested to inform the purchaser in written of the production time schedule and of testing time, duration and location in advance allowing enough time (not less than 5 weeks) for travel arrangements.

The supplier shall bear all costs of inspection including (fees of third party, all travelling and accommodation.

The Supplier shall provide the Purchaser with full reports and results of all tests performed during this inspection, for the performance tests specified above the report format should be according to Test Report Format OIML R 49-3.

The Purchaser may require the Supplier to carry out any test and/or inspection not required by this Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications and standards under this Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to this Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Supplier's performance of its other obligations under this Contract, due allowance will

وزارة المياه والري
مديرية التعاقدات والمشتريات

be made in respect of the delivery dates and completion dates and the other obligations so affected.

The goods should be inspected before each shipment; the supplier is requested to call the chosen Third Party Company to attend and witness the inspection to verify quality, quantity, packing, marking and loading and delivery to ( ) warehouses in ( ) -Jordan.

The Purchaser may require the Supplier to carry out any test and/or inspection not required by this Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications and standards under this Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to this Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Supplier's performance of its other obligations under this Contract, due allowance will be made in respect of the delivery dates and completion dates and the other obligations so affected.

Electrical and SCADA

CONTENTS

I. Electrical and SCADA

1.1 Water Pump Station

1.1.1 Standards and Regulations

All electrical work should be done to the requirements of national technical specifications, in addition to the international codes. These standards are:

- General Technical Specifications for Buildings, Electrical Installations, Part 3 Ministry of Public Works and Housing, Jordan.
- Jordanian Electrical Codes.
- Requirements for Electrical Installations for Buildings (IEE Wiring Regulations), published by the Institute of Electrical Engineers – London (UK).
- International Electro-technical Commission (IEC) Standards.
- British Standards Institute (BSEN)
- IES/CIBSE Illumination codes.
- National Fire Protection Association (NFPA)
- Civil Defense Fire Department.
- The Client Requirements.
- The electricity company regulations and requirements

1.1.2 Pump Station Facilities

1.1.2.1 Power Transformer

1. Design of power transformer to provide power for the electrical installations of pump station.
2. The capacity of the transforms shall be determined after estimation of the demand load of the project.
3. A letter shall be issued by the Client /Consultant to the related electricity company describing the electrical load of the project and requesting the power supply to energise the project.
4. The Contractor shall coordinate with the related Electricity Company to supply and install the power transformer in its location within the pump station site.
5. A provisional sum will be allocated in the BOQ for the transformer item to be paid through it.
6. The price of this item is equal to the total costs required by the electricity company, in addition to that 10% shall be paid to the Contractor as overhead and profit.
7. All Civil works needed for installation the transformer will be paid for the Contractor as lump sum price.

1.1.2.2 Main Distribution Board

1. Design of main distribution board (MDB) to be installed in the electric room of the pump station building.
2. The main distribution board shall include the following compartments:
    - Compartment for energy meter which is supplied and erected by the electricity company.
    - Compartment for main moulded case circuit breaker incomer.
    - Compartment for outgoing moulded case circuit breakers
    - Compartment for the UPS and 24VDC batteries and charger.
    - Compartment for the capacitor bank.
    - All power, control and monitoring devices, indication lamps etc.

1.1.2.3 Control Panels

- Design control panels (CP), one for each pump. The purpose of these control panels is to provide power and control the operation of the pumps' motors and these control panels shall be installed inside the electric room of the pump station building.
- Each control panel includes busbar, main moulded case circuit breaker, starter, power, control and monitoring devices, four-way selector switch (Local, Off, Site, SCADA), On/Off push buttons, indication lamps etc.
- The control panels enclosures shall be part of the main distribution board.

1.1.2.4 Local Control Panels

- Design local control panels (LCP) to be installed near the pumps and their motors and control the operation of the pumps' motors.
- Local control panel comprises isolator rated as per the machine load, emergency stop, On/Off push buttons, indication lamps.

1.1.2.5 Earthing System

- Design of an earthing system for the pumping station to achieve an earth resistance not more than 2 ohms.
- Earthing system includes earthing rods, earthing conductor connects the main earthing rod with the earthing busbar inside the main distribution board, earthing pits, round conductor connecting the earthing rods.
- Designer shall prepare earthing calculations using adequate calculation method to achieve the number of earthing rods and earthing pits around the pump station building in addition to the size of earthing round conductor.

1.1.2.6 Lightning System

- Design of lightning system for the pumping station and other buildings to achieve an earth resistance not more than 10 ohms.
- The lightning system includes air terminals and a lattice of tape conductors, down conductors, earthing rods, earthing conductors, earthing pits.
- Designer shall prepare the risk analysis to determine if the structure(s) need lightning system or not.
- Lightning protection system shall comply with the requirements and recommendations of BS EN/IEC 62305-1:2011 & IEC 62305-2:2011 standard with the relevant parts and sections.

1.1.2.7 Distribution Board

- Design of 3 phase distribution board for the pump station building to provide power for lighting, power, and AC circuits.
- Distribution board includes main isolator rated 100Amp,10A MCBs for lighting,16Amp MCBs for sockets and 20Amp/25Amp MCBs for AC and Water heaters. Each AC and water heater shall have separate circuits.
- Also, any other separate building such as the Guard house shall have its own distribution board.

1.1.2.8 Main and Branch Low Voltage Power Cables

- Design and calculate the size of power cables between the transformer and the main distribution board (MDB) in addition to the branch power cables between the control panels and the related motors.
- Design and calculate the size of all branch power cables between the main distribution board (MDB) and the electrical panels.
- Cables inside electric and pumps rooms shall be installed in concrete trenches. When cables leave the trench and are connected to the terminal box of the motor, they should be installed on galvanized cable ladder or galvanized covered cable tray.

- Main power cables from the transformer and diesel generator to the automatic transfer switch (ATS)shall be single core, copper conductor, XLPE insulated, aluminium wire armoured, and PVC sheathed.
- Main power cable from the automatic transfer switch (ATS) to the main distribution board shall be single core, copper conductor, XLPE insulated, aluminium wire armoured, and PVC sheathed.
- Indoor power cables shall be multicore, copper conductor, XLPE insulated, and PVC sheathed non armoured.
- Outdoor power cables shall be multicore, copper conductor, XLPE insulated, and PVC sheathed non armoured.
- All outdoor power cables shall be installed inside UPVC pipes.
- If for limited cases where cables will be installed directly buried, they shall be armoured.
- All indoor and outdoor cable supporting systems such cable ladders, cable trays and PVC and galvanized conduits shall be included in the price of the cables.
- Designer shall use suitable software and submit voltage drop, short circuit and cables sizing calculations for all electrical loads taking into consideration that the voltage drop shall not exceed 4%.

1.1.2.9 Control, Signal and Instrumentation Cables

All control, signal and instrumentation cables which shall be installed between the motors, pumps, instruments and measuring devices and the related electrical and PLC panels shall be mentioned as an item in the BOQ. The contractor shall prepare a shop drawing for the types, sizes and routes of these cables.

1.1.2.10 Trenches for Power Cables

- Indoor concert trenches shall be located underneath the electrical panels and between the control panels and motors with size (Depth X Width) (60X60) cm. These indoor concrete trenches are covered by galvanized chequer plates.
- Outdoor cables trenches shall have 80cm depth, laying of cables inside100mm UPVC conduits, soft sand below and above the UPVC conduit, solid concrete blocks, warning tape, and finally compacted backfilling.

1.1.2.11 Electrical Manholes

- Electrical concrete manholes (80 x 80 x 80) dimensions for outdoor installation cables with medium-duty steel covers.
- Spacing between manholes shall not be more than 50 meters.

1.1.2.12 Indoor Lighting

- Pump station building and the related buildings shall be furnished with lighting points which include PVC conduits, wiring, lighting switches, and lighting fixtures.
- Lighting points shall be 3 wire systems with 2.5mm2 wire size.
- The following table presents the types of lighting fixtures and the required illumination for the relative spaces:

Table 0-1 types of lighting fixtures and the required illumination for the relative spaces

Space	Lighting Level (LUX)	Luminaire
Pumps Hall	300	High bay LED lighting fixture with efficacy min. 120 lumen/watt, heavy die- cast aluminium, 4000K, IP-54.
Electrical Room	400	.LED lighting fixture, min 120 lumen/w, 4000K, IP-20

Operator Room	500	.LED lighting fixture, min 120 lumen/w, 4000K, IP-20

1.1.2.13 Emergency Lighting

- Emergency lighting fixtures shall be provided for the buildings and shall comprise exit and escape route luminaries to facilitate the safe evacuation of personnel from any building or major "dry" structure in the event of power failure.
- Emergency lighting shall be provided in any area where work may be required during such a power failure.
- Emergency luminaries shall be LED types with self-contained battery/charger/inverter modules.
- Emergency luminaries shall be capable of not less than 3 hours operation.

1.1.2.14 External Lighting

- Design of external lighting poles along the roads and the boundary of the pump station.
- Lighting poles shall be 7 meters height with 150watt LED luminaire.
- The spacing between lighting poles shall be 25 meters.
- Design of external lighting control panel (ELCP) including main MCCB incomer, number of outgoing MCCBs with rating not less 25 Amp., contactor, photocell and timer with 3-way selector switch (Manual, Off, Automatic).
- Each circuit shall serve 10 lighting poles as maximum.
- The ELCP shall be supplied by power from the main distribution board.
- Design of power cables with size not less than 4x16 mm2 CU/XLPE/SWA/PVC between the lighting poles.

1.1.2.15 Lighting Calculations

Appropriate lighting calculation software shall be used for indoor and external lighting to determine the adequate number of lighting fixtures and verify the LUX level.

1.1.2.16 Sockets

- Pump station building, and related buildings shall be furnished with sockets outlets and their points which include PVC conduits and wiring.
- The sockets points shall be 3 wire systems with 2.5mm2 size. For AC and water heaters, 3x4 mm2 wiring shall be used. For external installations, galvanized conduits shall be used.

1.1.2.17 Isolators

- Any mechanical machine inside or outside the pump station building such as AC units, fans, crane, service pump…etc shall be equipped with isolator (disconnect switch) for maintenance and isolation purpose.
- The rating of the isolator shall be suitable to the related machine.

1.1.2.18 Fire Alarm System

Conventional fire alarm & detection system for the pump station building and the related buildings shall be designed as per the requirements of Civil Defense department. Fire alarm system main components:

- Fire Alarm Control Panel
- Smoke detectors
- Heat detectors
- Manual call stations
- Visual / Sounder alarms
- Wiring and conduits

1.1.2.19 Satellite System

Guard house building shall be furnished with satellite dish of 80cm installed on the building roof, RJ6 wiring inside PVC conduit from the roof to appropriate point inside building.

1.1.2.20 Programmable Logic Controller (PLC)

- Design of programmable logic controller (PLC) to be installed in the electric room. The function of this PLC is to monitor and control the operation and status of the electromechanical equipment such as motors, pumps, and instruments, level meters, flow meters, actuated valves. Etc.
- Programmable logic controller (PLC) comprise enclosure with power supply, central processing unit (CPU), Digital input/output modules. Analogue input /output modules, communication module.
- Consultant shall prepare full detailed design for the PLC and prepare a list of the digital and analogue inputs/outputs which are related to the pumps and related devices and instruments with additional spare I/Os not less than 25% of the used I/Os.
- The PLC shall be supplied by power from the UPS of the main distribution board.
- The PLC shall be linked with the SCADA system via one of the following media:
- Long Term Evolution (LTE)4TH Generation technology with modem.
- Fiber Optic Cables with fiber optic/ethernet switch

1.1.2.21 Instruments and Measuring Devices

Design all needed measuring devices such as flow meters, level meters, pressure transmitters, flow switches etc. All power and control wiring between these devices and their related panels and PLC shall be provided and executed by the Contractor. All instruments shall be supplied by power from the UPS of the main distribution board. The following instruments shall be installed:

- Pressure transmitter (4-20 mA) on the main suction pipe.
- Pressure transmitter (4-20 mA) on the main discharge pipe.
- Pressure transmitter (4-20 mA) on the suction pipe of each pump.
- Pressure transmitter (4-20 mA) on the discharge pipe of each pump.
- Flow switch on the suction pipe of each pump.
- Ultrasonic level meter on the top of the treated water reservoir.
- Electromagnetic flow meter on the main discharge pipe.
- Electromagnetic flow meter on the main suction pipe which is coming from the treated water reservoir.
- Platinum Resistance Thermometer (PT100)
- PT 100 sensors shall be installed in the front and rear bearings of each pump in addition to the three windings of each motor to measure the temperatures and send them to the related PLC as analogue signals.

1.1.2.22 Valves with electrical actuators

Some valves are electrically operated and equipped with electrical actuators as per the mechanical drawings and details. The following valves are usually equipped with electrical actuators:

- Valve on the suction pipe of each pump.
- Valve on the discharge pipe of each pump.
- Valve on the main suction pipe of the pumps.
- Valve on the main discharge pipe of the pumps.
- Any other valves shown in the mechanical drawings.

Each valve actuator must incorporate local controls for Open, Close and Stop operation and a Local/Stop/Remote mode selector switch and working as follows:

- Local mode: The valve can be opened/closed from the site only via local controls.
- Stop mode: The valve is stopped, and no action can be done either locally or remotely.
- Remote mode: The valve can be opened/closed via SCADA selector soft key (Auto, Manual) and shall have two options:
    - Option 1: In the Remote mode, and the SCADA selector soft key in Auto mode, the valve shall be opened/closed automatically according to the operation of the pump.
    - Option 2: In the Remote mode, and the SCADA selector soft key in Manual mode, the valve shall be opened/closed manually by the SCADA operator.

1.1.2.23 Fiber Optic Cable

Design of single mode fiber optic cable (8 fibers) to be connected between the PLCs inside the pump station and the main SCADA system. The fiber optic cable shall be installed inside 75 mm UPVC pipe in the same trench of the pipelines. Work shall include the needed fiber optic splices (joints) and manholes.

1.1.2.24 On-Grid Photovoltaic Solar System

- Engineer shall prepare and submit for the Client feasibility study for installation On-Grid Photovoltaic Solar system for the pump station site with adequate kWp taking into consideration the payback for the system shall not be more than 7 years.
- If the result of the study is feasible, then the Consultant shall design an On-Grid Photovoltaic solar system for the pump station site.

Consultant shall submit the following:

    - Product Datasheet: For each type of product indicated. Include dimensions; shipping, installed, and weights of elements; and data on features, ratings, and performance.
    - Design drawings and calculations.
    - Detail equipment assemblies and indicate dimensions, weights, method of field assembly, components, and location and size of each field connection. Show access and workspace requirements and required clearances.
    - Wiring Diagrams for Power, signal, and control wiring. Details of internal & interconnecting wiring and differentiate between manufacturer-installed and field-installed wiring.
    - Qualification Data for qualified testing agency.
    - The system shall include PV panels, steel structure for rooftop mounting, all required supports and civil works according to wind and snow design calculations, DC cables, AC cables, control cables, cable trays, conduits, DC/AC Inverters, circuit breakers, electrical distribution boards, connecting the system with the power system in the buildings, and all accessories required to complete the work.
    - The PV system shall be considered as an optional item in BOQ.

1.1.3 Pumps and Motors

Pumps are characterized by the flow(Q) in m3/hr and head (H) in (m). The electrical power in Kilowatt (KW) absorbed by the pump depends on the pump's flow, head and efficiency.

The following formula is used to calculate the absorbed power by the pump:

Pump absorbed power (KW) Ppump = (Q x H x 9.81) / (3600 x pump efficiency)

Motor rated power (KW) Pmotor = (P/motor efficiency) x1.2

1.1.4 Operation of Pumps

Each pump should be operated manually or automatically from either of three locations.

- Local control panel (LCP)
- Control panel (CP)
- SCADA

Table 0-2 Methods of Operation for the Pumps

CP Selector Switch				CP P.B	LCP P.B	SCADA Selector Soft Key		Emergency Stop	Description
Local	Off	Site	SCADA			Auto	Manual		
Active	NA	NA	NA	Active	N. A	NA	NA	Active	Manual Operation P.B AT CP
NA	NA	Active	NA	NA	Active	NA	NA	Active	Manual Operation P.B AT LCP
NA	NA	NA	Active	NA	NA	NA	Active	Active	Manual Operation via SACDA
NA	NA	NA	Active	NA	NA	Active	NA	Active	Fully Automation

Notes:

- NA: Not Active
- P.B: Push Button
- SCADA: Supervisory, Control and Data Acquisition
- CP: Control Panel
- LCP: Local Control Panel

1.2 Reservoir

1.2.1 Standards and Regulations

All electrical work should be done to the requirements of national technical specifications, in addition to the international codes. These standards are:

- General Technical Specifications for Buildings, Electrical Installations, Part 3 Ministry of Public Works and Housing, Jordan.
- Jordanian Electrical Codes.
- Requirements for Electrical Installations for Buildings (IEE Wiring Regulations), published by the Institute of Electrical Engineers – London (UK).
- International Electro-technical Commission (IEC) Standards.
- British Standards Institute (BSEN)
- IES/CIBSE Illumination codes.
- The Client Requirements.
- The Electricity Company and the public guidelines and regulations must be observed.

1.2.2 Reservoir Facilities

1.2.2.1 Power Supply

- Supply and install power supply to provide power for the electrical installations of the reservoir.
- Coordination with Irbid District Electricity Company shall be conducted for this purpose.
- A provisional sum will be allocated in the BOQ for the power supply item to pay through it.
- The price of this item is equal to the total costs required by the electricity company, in addition to 10% shall be paid to the Contractor as overhead and profit.

1.2.2.2 Main Distribution Board

- Main distribution board (MDB)is designed to be installed in the electrical room of the reservoir site.
- Main distribution board comprises compartment for main moulded case circuit breaker incomer, compartment for the UPS and compartment for outgoing moulded case circuit breakers.

1.2.2.3 Earthing System

- Design of an earthing system for the reservoir building to achieve an earth resistance not more than 2 ohms.
- Earthing system includes earthing rods, earthing conductor connects the main earthing rod with the earthing busbar inside the main distribution board, earthing pits, round conductor connecting the earthing rods.
- Designer shall prepare earthing calculations using adequate calculation method to achieve the number of earthing rods and earthing pits around the pump station building in addition to the size of earthing round conductor.

1.2.2.4 Distribution Board

- Design of 3 phase distribution board for the Guard and electrical building to provide power for lighting, power, and AC circuits.
- Distribution board includes main isolator rated 100Amp,10A MCBs for lighting,16Amp MCBs for sockets and 20Amp/25Amp MCBs for AC and Water heaters. Each AC and water heater shall have separate circuits.

1.2.2.5 Main and Branch Low Voltage Power Cables

- Design and calculate the size of power cable between the power supply and the main distribution board (MDB).
- Design and calculate the size of all branch power cables between the main distribution board (MDB) and the distribution boards.
- Main power cable from the power supply to the main distribution board shall be multicore, copper conductor, XLPE insulated, and PVC sheathed, armoured.
- Indoor power cables shall be multicore, copper conductor, XLPE insulated, and PVC sheathed non armoured.
- Outdoor power cables shall be multicore, copper conductor, XLPE insulated, and PVC sheathed non armoured.
- All outdoor power cables shall be installed inside UPVC pipes.
- If for limited cases where cables will be installed directly buried, they shall be armoured.
- All indoor and outdoor cable supporting systems such cable ladders, cable trays and PVC and galvanized conduits shall be included in price of the cables.
- Contractor shall use suitable software and submit voltage drop, short circuit and cables sizing calculations for all electrical loads taking into consideration that the voltage drop shall not exceed 4%.

1.2.2.6 Control, Signal and Instrumentation Cables

All control, signal and instrumentation cables which shall be installed between the instruments and measuring devices and the related electrical and PLC panels shall be mentioned as an item in the BOQ. The contractor shall prepare a shop drawing for the types, sizes and routes of these cables.

1.2.2.7 Trenches for Power Cables

Outdoor cables trenches shall have 80cm depth, laying of cables inside100mm UPVC conduits, soft sand below and above the UPVC conduit, solid concrete blocks, warning tape, and finally compacted backfilling.

1.2.2.8 Electrical Manholes

- Electrical concrete manholes (80x80x80) dimensions for outdoor installation cables with medium duty steel covers.
- Spacing between manholes shall not be more than 50 meters.

1.2.2.9 Indoor Lighting

- Guard houses and electrical buildings shall be furnished with lighting points which include PVC conduits, wiring, lighting switches, and lighting fixtures.
- The lighting points shall be 3 wire system with 2.5mm^2 wire size.

The following table presents the type of lighting fixtures and the required illumination for the relative spaces:

Table 0-3 Type of Lighting Fixtures and the Required Illumination for the Relative Spaces

Space	Lighting Level (LUX)	Luminaire
Guard Room	400	LED lighting fixture, min 120 lumen/w, cri>80, .4000K, IP-20
Electrical Room	400	LED lighting fixture, 40-watt, min 120 lumen/w, .cri>80, 4000K, IP-20

1.2.2.10 Emergency Lighting

- Emergency lighting should be designed and provided for the building and shall comprise exit and escape route luminaries to facilitate the safe evacuation of personnel from any building or major "dry" structure in the event of power failure.
- Emergency lighting shall be provided in any area where work may be required during such a power failure.
- The emergency luminaries shall be LED units with self-contained battery/charger/inverter modules. The emergency luminaries shall be capable of not less than 3 hours operation.

1.2.2.11 External Lighting

- Design of external lighting poles along the roads and the boundary of the reservoir site.
- Lighting poles shall be 7 meters height with 150-watt LED luminaire.
- The spacing between lighting poles shall be 25 meters.
- Design of external lighting control panel (ELCP) including main MCCB incomer, number of outgoing MCCBs with rating not less 25 Amp., contactor, photocell and timer with 3-way selector switch (Manual, Off, Automatic).
- Each circuit shall serve 10 lighting poles as maximum.
- The ELCP shall be supplied by power from the main distribution board.
- Design of power cables with size not less than 4x16 mm2 CU/XLPE/SWA/PVC between the lighting poles.

1.2.2.12 Lighting Calculations

Appropriate lighting calculation software shall be used for indoor and external lighting to determine the adequate number of lighting fixtures and verify the LUX level.

1.2.2.13 Sockets

Guard houses and electrical buildings shall be furnished with sockets outlets and their points which include PVC conduits and wiring. The sockets points shall be 3 wire system with 2.5mm2 size. For AC and water heaters, 3x4 mm2 wiring shall be used. For external installations, galvanized conduits shall be used.

1.2.2.14 Isolators

- Any mechanical machine inside or outside Guard house and electrical building such as AC units, fan, service pump…etc shall be equipped with isolator (disconnect switch) for maintenance and isolation purposes.
- The rating of the isolator shall be suitable to the related machine.

1.2.2.15 Satellite System

Guard house building shall be furnished with satellite dish of 80cm installed on the building roof, RJ6 wiring inside PVC conduit from the roof to appropriate point inside building.

1.2.2.16 Programmable Logic Controller (PLC)

- Design of programmable logic controller (PLC) to be installed in the electric room. The function of this PLC is to monitor and control the operation and status of the electromechanical equipment and instruments such as level meters, flow meters, actuated valves. Etc.
- Programmable logic controller (PLC) comprise enclosure with power supply, central processing unit (CPU), Digital input/output modules. Analogue input /output modules, communication module.
- Consultant shall prepare full detailed design for the PLC and prepare a list of the digital and analogue inputs/outputs which are related to the devices and instruments with additional spare I/Os not less than 25% of the used I/Os.
- The PLC shall be supplied by power from the UPS of the main distribution board.
- The PLC shall be linked with the SCADA system via one of the following media:
  - Long Term Evolution (LTE)4TH Generation technology with modem.
  - Fiber Optic Cables with fiber optic/ethernet switch

1.2.2.17 Instruments and Measuring Devices

Design of all needed measuring devices such as flow meters, level meters, pressure transmitters etc. All instruments shall be supplied by power from the UPS of the main distribution board.

The following instruments shall be installed:

- Ultrasonic level meter on the top of compartment 1 of the reservoir.
- Ultrasonic level meter on the top of compartment 2 of the reservoir.
- Electromagnetic flow meter on the main outlet pipe of the reservoir.

1.2.2.18 Valves with electrical actuators

Some valves are electrically operated and equipped with electrical actuators as per the mechanical drawings and details. The following valves are usually equipped with electrical actuators:

- Valve on the main inlet pipe to the reservoir
- Valve on the main inlet pipe to compartment 1 of the reservoir
- Valve on the main inlet pipe to compartment 2 of the reservoir
- Valve on the main outlet pipe from compartment 1 of the reservoir
- Valve on the main outlet pipe from compartment 2 of the reservoir
- Valve on the main outlet pipe from the reservoir

Each valve actuator must incorporate local controls for Open, Close and Stop operation and Local/Stop/Remote mode selector switch and working as follows:

- Local mode: The valve can be opened/closed from the site only via local controls.
- Stop mode: The valve is stopped, and no action can be done either locally or remotely.
- Remote mode: The valve can be opened/closed via SCADA selector soft key (Auto, Manual) and shall have two options:

- Option 1: In the Remote mode, and the SCADA selector soft key in Auto mode, the valve shall be opened/closed automatically according to the operation of the pump.
- Option 2: In the Remote mode, and the SCADA selector soft key in Manual mode, the valve shall be opened/closed manually by the SCADA operator.

1.2.2.19 Fiber Optic Cable

Design of single mode fiber optic cable (8 fibers) to be connected between the PLCs inside the pump station and the main SCADA system. The fiber optic cable shall be installed inside 75 mm UPVC pipe in the same trench of the pipelines. Work shall include the needed fiber optic splices (joints) and manholes.

1.2.2.20 On-Grid Photovoltaic Solar System

- Engineer shall prepare and submit for the Client feasibility study for installation On-Grid Photovoltaic Solar system for the pump station site with adequate kWp taking into consideration the payback for the system shall not be more than 7 years.
- If the result of the study is feasible, then the Consultant shall design an On-Grid Photovoltaic solar system for the pump station site.
- Consultant shall submit the following:
  - Product Datasheet: For each type of product indicated. Include dimensions; shipping, installed, and weights of elements; and data on features, ratings, and performance.
  - Design drawings and calculations.
  - Detail equipment assemblies and indicate dimensions, weights, method of field assembly, components, and location and size of each field connection. Show access and workspace requirements and required clearances.
  - Wiring Diagrams for Power, signal, and control wiring. Details of internal & interconnecting wiring and differentiate between manufacturer-installed and field-installed wiring.
  - Qualification Data for qualified testing agency.
- The system shall include PV panels, steel structure for rooftop mounting, all required supports and civil works according to wind and snow design calculations, DC cables, AC cables, control cables, cable trays, conduits, DC/AC Inverters, circuit breakers, electrical distribution boards, connecting the system with the power system in the buildings, and all accessories required to complete the work.
- The PV system shall be considered as an optional item in BOQ.

1.3 Chambers along the Pipeline

1.3.1 Chamber Facilities

Usually, chambers along the pipeline comprises at least one of the following devices:

- Butterfly Valve (BFV)
- Electromagnetic flow meter (EMFM) measures the rate flow in m3/hr and the accumulative flow in m3
- Flow Control Valve (FCV)
- Pressure Reducing Valve (PRV)
- Pressure Transmitter: At the upstream and downstream of each pressure reducing valve there will be installed pressure transmitter which will measure the pressure and transmit this value to the related PLC then to SCADA system as 4-20 mA

1.3.2 Chamber Electrical Panel

Chamber Electrical Panel (CEP) will provide power and control the butterfly valve, flow control valve and electromagnetic flow meter. Chamber Electrical Panel (CEP) will have its own cabinet with two compartments:

- Power compartment which comprises main incoming circuit breaker, outgoing circuit breakers, busbar, three-way selector switch (Local, off, Remote/SCADA) for each valve, open/close push buttons, instruments, UPS … etc.
- PLC compartment which comprises the DC power supply, central processing unit (CPU), Input/Output modules, LTE (4G) communication module with antenna.
- The PLC will be communicated with the SCADA system via LTE(4G) network which is installed by the service provider.
- Chamber Electrical Panel (CEP) will be installed inside small electric room, dimensions (LxWxH) 2x2 2.5 meters or installed outdoor near the chamber.
- If the chamber electric panel is outdoor type, the enclosure shall be stainless steel 304 grad and the ingress protection shall be IP66.

1.3.3 Concrete Base

For outdoor installation, the chamber electrical panel should be installed on fair face reinforced concrete base with the following characteristics:

- The concrete base shall be reinforced by 12mm diameter steel bars,150mm spacing.
- The steel strength shall be grade 60.
- The concrete strength shall be grade 25 MPa.
- Concrete blinding,10cm thickness and 15 MPa strength.
- The concrete base shall be cured with water for three days twice per day (morning and evening).
- The shuttering shall not be removed before 48 hours.
- The base shall be equipped with UPVC pipes for interring and outgoing of power cables.

1.3.4 Chamber PLC Input/ Output

The following tables present the inputs/outputs of the PLC inside chamber electrical panel.

Table 0-4 Inputs/Outputs of the PLC Inside Chamber Electrical Panel

DIGITAL INPUT MODULE	D/I NO.	DESCRIPTION
D/I CARD 1 16 DIGITAL INPUTS	DI1	BUTTERFLY VALVE 1 OPENED
	DI2	BUTTERFLY VALVE 1 CLOSED
	DI3	BUTTERFLY VALVE 1 FAULT
	DI4	FLOW CONTROL VALVE OPENED
	DI5	FLOW CONTROL VALVE CLOSED
	DI6	FLOW CONTROL VALVE FAULT
	DI7	FLOWMETER (EMFM) PULSE/COUNTER
	DI8	MAIN SUPPLY FAULT
	DI9	DC/UPS FAULT
	DI10	BUTTERFLY VALVE 2 OPENED
	DI11	BUTTERFLY VALVE 2 CLOSED
	DI12	BUTTERFLY VALVE 2 FAULT
	DI13	PRESSURE TRANSMETER 1 (INDICATION)
	DI14	PRESSURE TRANSMETER 2 (INDICATION)
	DI15	SPARE INPUT
	DI16	SPARE INPUT
DIGITAL OUTPUT MODULE	D/O NO.	DESCRIPTION
D/O CARD 1 8 DIGITAL OUTPUTS	DO1	OPEN COMMAND BUTTERFLY VALVE 1
	DO2	CLOSE COMMAND BUTTERFLY VALVE 1
	DO3	OPEN COMMAND BUTTERFLY VALVE 2
	DO4	CLOSE COMMAND BUTTERFLY VALVE 2
	DO5	SPARE OUTPUT
	DO6	SPARE OUTPUT
	DO7	SPARE OUTPUT
	DO8	SPARE OUTPUT
ANALOG INPUT MODULE	A/I NO.	DESCRIPTION
A/I CARD 1 8 ANALOG INPUTS	AI1	FLOW CONTROL VALVE POSITION (0–100%)
	AI2	EMFM FLOW SIGNAL
	AI3	EMFM ACCUMULATIVE FLOW
	AI4	PRESSURE TRANSMETER 1 (READING)
	AI5	PRESSURE TRANSMETER 2 (READING)
	AI6	SPARE INPUT
	AI7	SPARE INPUT
	AI8	SPARE INPUT
ANALOG OUTPUT MODULE	A/O NO.	DESCRIPTION
A/O CARD 1 4 ANALOG OUTPUTS	AO1	OPEN COMMAND FLOW CONTROL VALVE
	AO2	CLOSE COMMAND FLOW CONTROL VALVE
	AO3	SPARE INPUT
	AO4	SPARE INPUT

1.3.5 Modulating Flow Control Valves

The modulating flow control valves inside the various chambers can be opened to flow water to the desired consumers. These valves will comprise modulating actuators to control the opening of the valve. Controlling the opening of this valve will control the water flow to the targeted zone depending on the desired flow rate.

These flow control valves will have three positions:

- Position 1: Fully opened to pass the water to the desired consumers and this will be achieved by activation the open push button manually.
- Position 2: Fully closed to prevent water flow to the desired consumers and this will be achieved by activating the close push button manually.
- Position 3: Partially opened to control the water quantity based on flow rate and this will be achieved by activating the modulating actuator via the feedback reading from the electromagnetic flowmeter which is installed beside the flow control valve.

The priorities for activation of the modulating gates are shown in the following table.

Table 0-5 Priorities for Activation of The Modulating Gates

Priority	Status	Case	Device	Operation
1	Fully Opened	Flow water to the desired consumers	Open Push Button	Manually
2	Partially Opened	Flow water to the consumers at desired flow	EMFM	Automatic based on the feedback flow rate signal
3	Fully Closed	Prevent water flow to the desired consumers	Close Push Button	Manually

1.3.6 Control and Operation of Modulating Flow Control Valves

Each actuated flow control valve actuator must incorporate in its electrical panel Local/OFF/Remote mode selector switch with Open, Close push buttons and works as follows:

- Local mode: The valve can be opened/closed locally from the chamber electrical panel only via the push buttons.
- OFF mode: The valve is stopped, and no action can be done either locally or remotely.
- Remote mode: The valve can be opened/closed via SCADA selector soft key (Auto, Manual) and shall have two options:
    - Option 1: In the Remote mode and the SCADA selector soft key in Auto mode, the valve shall be partially opened/closed according to the flow quantities.
    - Option 2: In the Remote mode and the SCADA selector soft key in Manual mode, the valve shall be opened/closed manually by the SCADA operator.

Each flow control valve will be operated manually or automatically from either of two locations.

- Chamber Electrical Panel (CEP)
- SCADA

The following table presents the methods of operation for the modulating flow control valve.

Table 0-6 Methods of the Operation for the Modulating Flow Control Valves

Cep Selector Switch			Cep (P.B)	Scada Selector Soft Key		Description
Local	**Off**	**Remote**		**Auto**	**Manual**	
NA	Active	NA	NA	NA	NA	Valve Is Stopped
NA	NA	Active	NA	Active	NA	Fully Automation Partially Open Via (Emfm).
NA	NA	Active	NA	NA	Active	Manual Operation Via Scada
Active	NA	NA	Active	NA	NA	Manual Operation P.B At Cep

Notes:

NA: Not Active

P.B: Push Button

SCADA: Supervisory Control and Data Acquisition

CEP: Chamber Electrical Panel

1.4 Pressure Transmitter

At the upstream and downstream of each pressure-reducing valve there will be installed pressure transmitter, which will measure the pressure and transmit this value to the related PLC then to SCADA system as 4-20mA.

1.5 Butterfly Valves

The Butterfly valves inside the various chambers are usually considered open to flow water to the desired consumers. In case of emergency cases for maintenance purposes or to isolate the targeted consumers, the butterfly valves shall be closed.

1.6 PLC I/O List for Pump Station

See Annex 1.

1.7 PLC I/O List for Reservoir

See Annex 2.

Annex 1: PLC I/O List for Pump Station

EQUIPMENT / MACHINE	DIGITAL INPUT MODULE		D/I NO.	DESCRIPTION	DIGITAL OUTPUT MODULE		D/O NO.	DESCRIPTION	ANALOG INPUT MODULE		A/I NO.	DESCRIPTION
PUMP and MOTOR	D/I CARD (FOR EACH PUMP)	16 Digital Inputs	DI 1	PUMP OFF/READY	D/O CARD	16 Digital Outputs	DO 1	START PUMP	A/I CARD 1 (FOR EACH PUMP)	8 Analog Inputs	AI 1	MOTOR WINDING 1 TEMPERATURE
			DI 2	PUMP RUN			DO 2	STOP PUMP			AI 2	MOTOR WINDING 2 TEMPERATURE
			DI 3	PUMP FAULT			DO 3	SPARE OUTPUT			AI 3	MOTOR WINDING 3 TEMPERATURE
			DI 4	PUMP OPERATION (LOCAL, SITE, SCADA)			DO 4	SPARE OUTPUT			AI 4	PUMP FRONT BEARINGS TEMPERATURE
			DI 5	MOTOR WINDINGS HIGH TEMPERATURE ALARM/TRIP			DO 5	SPARE OUTPUT			AI 5	PUMP REAR BEARINGS TEMPERATURE
			DI 6	PUMP FRONT BEARINGS HIGH TEMPERATURE ALARM/TRIP			DO 6	SPARE OUTPUT			AI 6	SPARE INPUT
			DI 7	PUMP REAR BEARINGS HIGH TEMPERATURE ALARM/TRIP			DO 7	SPARE OUTPUT			AI 7	SPARE INPUT
			DI 8	LOW SUCTION PRESSURE/ALARM/TRIP			DO 8	SPARE OUTPUT			AI 8	SPARE INPUT
			DI 9	HIGH DISCHARGE PRESSURE/ALARM/TRIP			DO 9	SPARE OUTPUT	A/I CARD 2 (FOR EACH PUMP)	8 Analog Inputs	AI 9	PUMP SUCTION PRESSURE
			DI 10	PUMP FLOW/NO FLOW/ALARM/TRIP			DO 10	SPARE OUTPUT			AI 10	PUMP DISCHARGE PRESSURE
			DI 11	SOFT STARTER/VFD MEASUREMENTS			DO 11	SPARE OUTPUT			AI 11	MOTOR CURRENT
			DI 12	SPARE INPUT			DO 12	SPARE OUTPUT			AI 12	PUMP SPEED
			DI 13	SPARE INPUT			DO 13	SPARE OUTPUT			AI 13	SPARE INPUT
			DI 14	SPARE INPUT			DO 14	SPARE OUTPUT			AI 14	SPARE INPUT
			DI 15	SPARE INPUT			DO 15	SPARE OUTPUT			AI 15	SPARE INPUT
			DI 16	SPARE INPUT			DO 16	SPARE OUTPUT			AI 16	SPARE INPUT
MEASURING DEVICES	D/I CARD	16 Digital	DI 1	MAINS SUPPLY FAULT					A/I CARD	8 Analog Inputs	AI 1	ELECTROMAGNETIC FLOWMETER FLOW /AT MAIN DISCHARGE

													PIPE OF THE PUMPS
			DI 2	LOW BUTTERY VOLTAGE							AI 2	ELECTROMAGNETIC FLOWMETER FLOW/AT MAIN SUCTION PIPE OF THE PUMPS (IF ANY)
			DI 3	INVERTER FAULT							AI 3	RESERVOIR COMPARTMENT 1 LEVEL
			DI 4	UPS FAULT							AI 4	RESERVOIR COMPARTMENT 2 LEVEL
			DI 5	BATTERY CHARGER FAULT							AI 5	MAIN SUCTION PIPE PRESSURE
			DI 6	ELECTROMAGNETIC FLOWMETER PULSE/COUNTER/AT MAIN DISCHARGE PIPE							AI 6	MAIN DISCHARGE PIPE PRESSURE
			DI 7	ELECTROMAGNETIC FLOWMETER PULSE/COUNTER/AT MAIN SUCTION PIPE (IF ANY)							AI 7	SPARE INPUT
			DI 8	RESERVOIR LOW LEVEL/ALARM/ STOP SUPPLY PUMPS							AI 8	SPARE INPUT
			DI 9	RESERVOIR HIGH LEVEL/ALARM/ STOP FEED PUMPS								
			DI 10	SPARE INPUT								
			DI 11	SPARE INPUT								
			DI 12	SPARE INPUT								
			DI 13	SPARE INPUT								
			DI 14	SPARE INPUT								
			DI 15	SPARE INPUT								
			DI 16	SPARE INPUT								
MOTORIZED VALVES	**D/I CARD**	**16 Digital Inputs**	DI 1	MOTORIZED VALVE AT SUCTION PIPE OF THE PUMP IS OPENED	**D/O CARD**	**16 Digital Outputs**	D O 1	OPEN MOTORIZED VALVE AT SUCTION PIPE OF THE PUMP	**A/I CARD**	**8 Analog Inputs**	AI 1	MOTORIZED VALVE PARTIALLY (%) OPEN AT SUCTION PIPE OF THE PUMP
			DI 2	MOTORIZED VALVE AT SUCTION PIPE			D O 2	CLOSE MOTORIZED			AI 2	MOTORIZED VALVE PARTIALLY

				OF THE PUMP IS CLOSED				VALVE AT SUCTION PIPE OF THE PUMP						(%) OPEN AT DISCHARGE PIPE OF THE PUMP
			DI 3	MOTORIZED VALVE AT DISCHARGE PIPE OF THE PUMP IS OPENED			D O 3	OPEN MOTORIZED VALVE AT DISCHARGE PIPE OF THE PUMP				AI 3	MOTORIZED VALVE PARTIALLY (%) OPEN/AT MAIN SUCTION PIPE OF THE PUMPS
			DI 4	MOTORIZED VALVE AT DISCHARGE PIPE OF THE PUMP IS CLOSED			D O 4	CLOSE MOTORIZED VALVE AT DISCHARGE PIPE OF THE PUMP				AI 4	MOTORIZED VALVE PARTIALLY (%) OPEN/AT MAIN DISCHARGE PIPE OF THE PUMPS
			DI 5	MOTORIZED VALVE AT MAIN SUCTION PIPE OF THE PUMPS IS OPENED			D O 5	OPEN MOTORIZED VALVE AT MAIN SUCTION PIPE OF THE PUMPS				AI 5	SPARE INPUT
			DI 6	MOTORIZED VALVE AT MAIN SUCTION PIPE OF THE PUMPS IS CLOSED			D O 6	CLOSE MOTORIZED VALVE AT MAIN SUCTION PIPE OF THE PUMPS				AI 6	SPARE INPUT
			DI 7	MOTORIZED VALVE AT MAIN DISCHARGE PIPE OF THE PUMPS IS OPENED			D O 7	OPEN MOTORIZED VALVE AT MAIN DISCHARGE PIPE OF THE PUMPS				AI 7	SPARE INPUT
			DI 8	MOTORIZED VALVE AT MAIN DISCHARGE PIPE OF THE PUMPS IS CLOSED			D O 8	CLOSE MOTORIZED VALVE AT MAIN DISCHARGE PIPE OF THE PUMPS				AI 8	SPARE INPUT
			DI 9	SPARE INPUT			D O 9		A/O CARD	8 Analog Outputs		A O1	PRTIALLY (%) OPEN /CLOSE MOTORIZED VALVE AT SUCTION PIPE OF THE PUMP
			DI 10	SPARE INPUT			D O 10					A O2	PRTIALLY (%) OPEN /CLOSE MOTORIZED VALVE AT DISCHARGE SI OF THE PUMP

			DI 11	SPARE INPUT		DO 11				AO3	PRTIALLY (%) OPEN /CLOSE MOTORIZED VALVE AT MAIN SUCTION PIPE OF THE PUMPS
			DI 12	SPARE INPUT		DO 12				AO4	PRTIALLY (%) OPEN /CLOSE MOTORIZED VALVE AT MAIN DISCHARGE PIPE OF THE PUMPS
			DI 13	SPARE INPUT		DO 13				AO5	SPARE OUTPUT
			DI 14	SPARE INPUT		DO 14				AO6	SPARE OUTPUT
			DI 15	SPARE INPUT		DO 15				AO7	SPARE OUTPUT
			DI 16	SPARE INPUT		DO 16				AO8	SPARE OUTPUT

Annex 2: PLC I/O List for Reservoir

EQUIPMENT / MACHINE	DIGITAL INPUT MODULE	D/I NO.	DESCRIPTION	DIGITAL OUTPUT MODULE	D/O NO.	DESCRIPTION	ANALOG INPUT MODULE	A/I NO.	DESCRIPTION
MEASURING DEVICES	D/I CARD	DI 1	MAINS SUPPLY FAULT	D/O CARD	DO 1	OPEN MOTORIZED VALVE AT MAIN INLET OF THE RESERVOIR	A/I CARD	AI 1	ELECTROMAGNETIC FLOWMETER FLOW /AT MAIN INLET PIPE OF THE RESERVOIR
	16 Digital Inputs	DI 2	LOW BUTTERY VOLTAGE	16 Digital Outputs	DO 2	CLOSE MOTORIZED VALVE AT MAIN INLET OF THE RESERVOIR	8 Analog Inputs	AI 2	ELECTROMAGNETIC FLOWMETER ACCUMULATIVE FLOW AT MAIN INLET PIPE OF THE RESERVOIR
		DI 3	INVERTER FAULT		DO 3	OPEN MOTORIZED VALVE AT MAIN INLET OF COMPARTMENT 1 OF THE RESERVOIR		AI 3	ELECTROMAGNETIC FLOWMETER FLOW /AT MAIN OUTLET PIPE OF THE RESERVOIR
		DI 4	UPS FAULT		DO 4	CLOSE MOTORIZED VALVE AT MAIN INLET OF COMPARTMENT 2 OF THE RESERVOIR		AI 4	ELECTROMAGNETIC FLOWMETER ACCUMULATIVE FLOW AT MAIN OUTLET PIPE OF THE RESERVOIR
		DI 5	BATTERY CHARGER FAULT		DO 5	OPEN MOTORIZED VALVE AT MAIN OUTLET OF THE RESERVOIR		AI 5	RESERVOIR COPARETMENT 1 LEVEL
		DI 6	ELECTROMAGNETIC FLOWMETER PULSE/COUNTER /AT MAIN OUTLET PIPE		DO 6	CLOSE MOTORIZED VALVE AT MAIN OUTLET OF THE RESERVOIR		AI 6	RESERVOIR COPARETMENT 2 LEVEL
		DI 7	RESERVOIR COMPARTMENT 1 LOW LEVEL/ALARM/ACTIVATE FEED PUMPS		DO 7	OPEN MOTORIZED VALVE AT MAIN OUTLET OF COMPARTMENT 1 OF THE RESERVOIR		AI 7	SPARE INPUT

			DI 8	RESERVOIR COMPARTMENT 2 LOW LEVEL/ALARM/ACTIVATE FEED PUMPS			DO 8	CLOSE MOTORIZED VALVE AT MAIN OUTLET OF COMPARTMENT 2 OF THE RESERVOIR			AI 8	SPARE INPUT
			DI 9	RESERVOIR COPARTMENT 1 HIGH LEVEL/ALARM/STOP FEED PUMPS			DO 9					
			DI 10	RESERVOIR COPARTMENT 2 HIGH LEVEL/ALARM/STOP FEED PUMPS			DO 10					
			DI 11	SPARE INPUT			DO 11					
			DI 12	SPARE INPUT			DO 12					
			DI 13	SPARE INPUT			DO 13					
			DI 14	SPARE INPUT			DO 14					
			DI 15	SPARE INPUT			DO 15					
			DI 16	SPARE INPUT			DO 16					

ب.المواصفات الفنية العامة

1. المواصفات الفنيه العامه لأعمال تمديد خطوط المياه وملحقاتها الصادره عن سلطة المياه سنة 1992 وما طرأ عليها من تعديلات.

2. المواصفات العامة للاعمال الانشائية والمعمارية الصادرة عن وزارة الاشغال العامة والاسكان لسنة 1996 .

3. المواصفات الفنيه العامه لاعمال انشاء الطرق والجسور الصادره عن وزارة الاشغال العامه والاسكان سنة 1991 وما طرأ عليها من تعديلات (لا ترفق مع العطاء).

4. أسس و معايير تطهير شبكات مياه الشرب و الصادرة عن اللجنة العليا لنوعية المياه سنة 2004.

5.كودات البناء الأردنية للأعمال الكهربائية والميكانيكية.

6.أية مواصفات أخرى مشار اليها في وثائق العقد.

المتطلبات البيئية والاجتماعية (لا تنطبق)

على الجهة المستفيدة/ المشترية الاستعانة بخدمات أخصائي/ أخصائيين بيئيين واجتماعيين وصحيين وسلامة مؤهلين تأهيلا مناسبا لإعداد المواصفات البيئية والاجتماعية والصحية والمتعلقة بالسلامة، للعمل مع أخصائي المشتريات.

يجب على الجهة المستفيدة/ المشترية إرفاق سياسات وتشريعات المملكة البيئية والاجتماعية والصحية والمتعلقة بالسلامة والتي سيتم تطبيقها على المشروع، او الاشارة اليها، وإذا لم تكن هذه السياسات متوفرة، يتم استخدام الإرشادات التالية في صياغة سياسة مناسبة لتطبيقها على الأشغال موضوع المناقصة.

المحتوى المقترح للسياسة البيئية والاجتماعية

يجب أن تتضمن الغاية من هذه السياسات دمج حماية البيئة، والصحة والسلامة المهنية والمجتمعية،ودعم المرأة والشباب والاشخاص ذوي الاعاقة ، والمساواة، وحماية الطفل، والأشخاص ، والتحرش الجنسي، والعنف القائم على المرأة والشباب والاشخاص ذوي الاعاقة، ومشاركة أصحاب المصلحة (Stakeholders) على نطاق واسع في عمليات التخطيط، والبرامج، والنشاطات المتعلقة بتنفيذ المشروع، ويجب أن تضع السياسة إطارًا للمتابعة والمراقبة، والتطوير المستمر للعمليات والأنشطة وقياس مدى الامتثال لهذه السياسات.

ويجب أن تكون هذه السياسات، مختصرة قدر الإمكان، ولكن محددة وواضحة وقابلة للقياس لتمكين قياس مدى الامتثال لها وفقًا لشروط العقد.

وكحد أدنى، يجب ان تتضمن هذه السياسات الالتزامات التالية:

1. *تطبيق الممارسات الصناعية الدولية الجيدة لحماية البيئة الطبيعية والحفاظ عليها وتخفيف الآثار التي لا يمكن تجنبها؛*
2. *توفير بيئة عمل صحية وآمنة وأنظمة عمل آمنة والحفاظ عليها.*
3. *حماية صحة وسلامة المجتمعات المحلية والمستخدمين، مع الاهتمام بشكل خاص بالمعاقين أو المسنين أو غير ذلك من المستضعفين؛*
4. *التأكد من أن شروط التوظيف وظروف العمل لجميع العمال المشاركين في الأشغال تفي بمتطلبات القوانين والانظمة ذات الصلة والاتفاقيات التي وقعت المملكة عليها؛*
5. *عدم التسامح مع الأنشطة غير القانونية وفرض الإجراءات التأديبية عليها، وعدم التسامح مع العنف القائم على المرأة والشباب والاشخاص ذوي الاعاقة والمعاملة اللاإنسانية وإنفاذ الإجراءات التأديبية؛*
6. *دمج منظور دعم المرأة والشباب والاشخاص ذوي الاعاقة وتوفير بيئة مواتية تتمتع فيها النساء والرجال بفرص متكافئة للمشاركة والاستفادة من تخطيط وتطوير الاشغال؛*
7. *العمل بشكل تعاوني، بما في ذلك مع المستخدمين النهائيين للاشغال والسلطات ذات الصلة والمقاولين والمجتمعات المحلية.*
8. *ضمان مشاركة الأشخاص والمنظمات المتاثرة والاستماع إليهم والاستجابة لاهتماماتهم، مع إيلاء اعتبار خاص للضعفاء والمعوقين وكبار السن؛*
9. *توفير بيئة تشجع على تبادل المعلومات والآراء والأفكار خالية من الخوف من الانتقام وتحمي المبلغين عن المخالفات.*

الحد الأدنى من محتوى المتطلبات البيئية والاجتماعية والصحية

- *عند إعداد المواصفات التفصيلية للمتطلبات البيئية والاجتماعية والصحة والسلامة، على الأخصائي الذي يقوم بتحضيرها الاشارة الى الامور التالية ويأخذها بعين الاعتبار:*
  - *التقارير المتعلقة بالمشروع، وعلى سبيل المثال تقييم الأثر البيئي والاجتماعي للمشروع، وخطة ادارة الجوانب البيئية والاجتماعية للمشروع.*
  - *شروط الموافقات/ التصاريح المتعلقة بالمشروع.*
  - *المعايير المطلوبة.*
  - *الاتفاقيات أو المعاهدات الدولية ذات الصلة وما إلى ذلك، والمتطلبات والمعايير القانونية و/ أو التنظيمية الوطنية.*
  - *المعايير الدولية ذات الصلة (على سبيل المثال إرشادات منظمة الصحة العالمية للاستخدام الآمن للمبيدات الحشرية).*
  - *معايير القطاع ذات الصلة (على سبيل المثال ارشادات الاتحاد الأوروبي بشأن معالجة مياه الصرف الصحي).*
  - *آلية معالجة الشكاوى وأنواع الشكاوى التي يجب تسجيلها، وكيفية حماية السرية المتعلقة بالمبلغين عن الانتهاكات.*
- *يجب أن تصف المواصفات البيئية والاجتماعية والصحية والمتعلقة بالسلامة، إلى أقصى حد ممكن، النتائج المتوخاة بدلاً من طريقة العمل.*
- *يجب إعداد المتطلبات البيئية والصحية والمتعلقة بالسلامة (بطريقة لا تتعارض مع الشروط العامة والخاصة للعقد.*
- *بالإضافة إلى ذلك يجب على الجهة المستفيدة تحديد ما يلي كيفما ينطبق:*
  - ***إدارة وسلامة المواد الخطرة***

يتعين على الجهة المستفيدة تحديد متطلبات إدارة وسلامة المواد الخطرة كيفما ينطبق.

  - ***كفاءة الموارد ومنع التلوث وإدارته***

يتعين على الجهة المستفيدة تحديد كفاءة الموارد وتدابير منع التلوث وإدارته كيفما ينطبق.

  - ***كفاءة استخدام الموارد***

يتعين على الجهة المستفيدة أن تحدد وكيفما ينطبق التدابير اللازمة لتحسين كفاءة استهلاك الطاقة والمياه والمواد الخام، وكذلك الموارد الأخرى.

- ***الطاقة:*** *حدد التدابير القابلة للتطبيق لتحسين استخدام الطاقة إذا تم تقييم الأشغال على انها تنطوي على استخدام كبير للطاقة.*
- ***المياه:*** *حدد التدابير القابلة للتطبيق لتجنب أو تقليل استخدام المياه بحيث لا يكون لاستخدام المياه في الأشغال آثار سلبية كبيرة على المجتمعات والمستخدمين الآخرين والبيئة، إذا تم تقييم الأشغال على أنها تنطوي على استخدام كبير محتمل للمياه أو سيكون لها تأثيرات كبيرة محتملة على جودة المياه.*
- ***المواد الخام:*** *حدد التدابير القابلة للتطبيق لدعم الاستخدام الفعال للمواد الخام إذا تم تقييم الأشغال على انها تنطوي على استخدام هام للمواد الخام.*

  - ***منع التلوث وإدارته***

- ***إدارة تلوث الهواء:*** *حدد التدابير المطلوبة لتجنب أو تقليل تلوث الهواء المتعلق بالأشغال.*
- ***إدارة النفايات الخطرة وغير الخطرة:*** *حدد التدابير القابلة للتطبيق لتقليل توليد النفايات، وإعادة استخدام وإعادة تدوير واستعادة النفايات بطريقة آمنة لصحة الإنسان والبيئة بما في ذلك التخزين والنقل والتخلص من النفايات الخطرة.*
- ***إدارة المواد الكيميائية والخطرة:*** *حدد التدابير القابلة للتطبيق لتقليل والتحكم في إطلاق واستخدام المواد الخطرة لأنشطة الأشغال بما في ذلك إنتاج المواد ونقلها ومناولتها وتخزينها.*

▪ ***السلامة على الطرق***

اذكر أي متطلبات محددة للسلامة المرورية والطرق، كيفما ينطبق.

الدفع مقابل المتطلبات البيئية والاجتماعية

يجب على الاخصائي البيئي والاجتماعي واخصائي المشتريات لدى الجهة المستفيدة النظر في الكيفية التي سيتم بها الدفع للمقاول مقابل الوفاء بالمتطلبات البيئية والاجتماعية (ES)، وفي معظم الحالات، يتم الدفع للمقاول مقابل ذلك من خلال تحميل تكلفتها على الأسعار المذكورة في جدول الكميات للبنود الأخرى، وعلى سبيل المثال، عادةً ما يتم تغطية تكلفة تنفيذ أنظمة العمل الآمنة في مكان العمل، بما في ذلك التدابير اللازمة لضمان سلامة المرور والطرق، من خلال اسعار الوحدة للمناقص للبنود ذات الصلة، ويمكن بدلاً من ذلك تخصيص مبالغ احتياطية للأنشطة المنفردة وعلى سبيل المثال لخدمة الاستشارة الخاصة ببعض القضايا البيئية والاجتماعية، أو لتشجيع المقاول على تقديم نتائج بيئية واجتماعية إضافية تتجاوز متطلبات العقد.

جداول الكميات
Bills of quantities

مقدمه:

1 – تعتبر جداول الكميات مع المقدمه جزء لا يتجزء من وثائق العطاء وتقرأ وتفسر على هذا الاعتبار

2 – على المناقص وضع اسعارهم باليورو.

تسعير البنود في جدول الكميات

1 – ان مواصفات ووصف الاعمال للبنود المبينه في جداول الكميات غير مفصله في الجداول وعلى المناقص مقدم العطاء الرجوع الى المواصفات والشروط للتاكد منها قبل وضع اسعاره.

2 – على المناقصين وضع اسعارهم الفرديه للبنود على اساس السعر لكل وحده كيل لجميع الاعمال المبينه في جداول الكميات وتعتبر هذه الاسعار ملزمه للمقاول وصالحه لجميع الاعمال المطلوبة في أي موقع ضمن مناطق العطاء.

3– على المناقصين وضع اسعارهم الافرديه لوحدة الكيل بالرقم والكتابه .

4– على المقاول تقديم مع عرضه الفني والمالي تحليل اسعار مفصل لكافة بنود جداول الكميات واي بنود مرتفعة عن الاسعار الدارجة يحق لصاحب العمل مفاوضة المقاول عليها.

5– تكون هذه الاسعار شامله لجميع التكاليف من ايدي عامله واجور واليات والارباح وأي مصاريف اخرى تترتب على المقاول بموجب شروط العقد ان كان منصوصا عليها صراحه او ضمنا، ولا يحق للمقاول المطالبه باي زياده في الاسعار لاي سبب كان الا في الحالات التي تجيزها شروط العقد .

6– يكون السعر للوحدة في جدول الكميات لاعمال تمديد انابيب المياه شاملا على سبيل المثال وليس الحصر توريد جميع انواع الانابيب على اختلاف اقطارها وجميع القطع من اكواع وتيهات ونقاصات وسدادات ومرابط والفلنجات والقطع الخاصة...الخ وحفر الخنادق وتمديد الانابيب وعمل وتنفيذ التوصيلات اللازمة وتوريد المعاجين والمواد اللازمة وتنفيذ وصلات الأنابيب الدكتايل وتركيب القطع حيثما يلزم وتوريد وصب الدعامات الخرسانية (Thrust Blocks) لأنابيب الدكتايل وكافة الفحوصات المخبرية وتوريد ووضع (الأدلة الكترونية والشريط التحذيري البلاستيكي) أو (الشريط التحذيري المعدني) ويشمل أيضاً تقديم جميع المواد والتجهيزات اللازمة واجراء فحص التسرب (الضغط الهيدروليكي) والغسيل والتعقيم وتغليف الوصلات والطمم (من مواد مختارة) والطمم الى السطح العلوي واعادة الاوضاع ونقل الانقاض ... الخ وجميع متطلبات العقد بموجب المخططات والمواصفات وحسب تعليمات المهندس المشرف .

7 – على المقاول ان يضمن اسعاره لتكلفة جميع الاعمال اللازمه للتحكم بالمياه حيثما تكون الحفريات في ارض مغموره بالمياه وحيثما يحدث تقاطع بين خطوط المياه والصرف الصحي والعبارات والمصارف السطحيه او خطوط مياه اخرى بما في ذلك الاحتياطات الضروريه لتوفير المياه لمنطقة العمل .

8– تشمل الاسعار الافراديه ايضا على سبيل التوضيح وليس الحصر الاعمال المؤقته والمعدات الانشائيه والحراسه والاناره وتوفير الممرات الآمنه للمواطنين والارباح واية نفقات اخرى شاملا جميع الاخطار والالتزمات الوارده أو التي ينص عليها العقد .

9- اضافه الى ذلك فان الاسعار الافراديه والاجور تعتبر شامله لحمايه وتثبيت جميع اعمال المواسير والعبارات والكوابل وجميع الخدمات والمرافق المبينه وغير المبينه على المخططات التي يمكن ان تتعرض للخطر اثناء تنفيذ عمليات المقاول وتشمل الاسعار كذلك تكاليف الفحوص التي يطلبها المهندس وكذلك تشمل عمل وتحضير وتقديم المخططات التنفيذيه وكذلك المخططات المرجعيه .

10- تعتبر الاسعار الوارده في جدول الكميات التي يضعها المقاول انها القيمه الحقيقيه والشامله للاشغال الوارده والمطلوبه في جدول الكميات بموجب المواصفات والمخططات وتعليمات المهندس وانها تشمل ايضا ارباح المقاول وتعويضه عن أي التزامات اخرى قد يتحملها وفقا لشروط ومواصفات العطاء

11- تكون الاسعار التي يضعها المقاول شامله حماية الانشاءات القائمه والخدمات وازالة واعادة تركيب الاطاريف واعادة وضع السطوح كما كانت عليه والادراج وحديد الحمايه على جوانب الطرق والجسور واشارات المرور والاسيجه وكل الخدمات والمنشئات التي قد تتاثر بشكل مباشر وغير مباشر وكذلك ازاحة او تغيير خطوط المواسير القائمه تحت الارض واية خدمات اخرى وكذلك اعادة زراعة الشجيرات والتربه الزراعيه وكل ما يلزم وحسب تعليمات وموافقة المهندس .

12- على المقاول استعمال الاسمنت المقاوم للاملاح في جميع انواع الخرسانه الملامسة للتربة (خرسانة النظافة؟،قواعد الاعمدة، الجسور الارضية،جدران التعليات،الجدران الاستنادية واساساتها،تغليف الانابيب....الخ) وبدون أي علاوات او فروقات في الاسعار.

الكيل والدفع:

1 - ان كميات الاعمال الوارده في جدول الكميات هي كميات تقديريه ومذكوره لتثبيت الاسعار الافراديه لنوع وقطر المواسير (وطبيعة مواد السطوح) التي يتوقع تنفيذها خلال مده العقد وهي قابله للزياده والنقصان بنسب غير محدده ويدفع للمقاول عن الكميات من الاعمال المنجزه فعليا والتي يوافق عليها المهندس .

2- على المقاول اخذ موافقة صاحب العمل على الكميات التي سيتم توريدها للمشروع بعد عمل المخططات التنفيذية واية كميات زائدة لم يتم الموافقة علبها من قبل صاحب العمل يتحملها المقاول.

3- أي عمل يقوم به المقاول ويكون غير مطلوب في العقد وليس بامر خطي من المهندس لن يكون مشمولا في عملية الكيل.

4- تكال اعمال خطوط المياه المختلفه بالمتر الطولي الفعلي الذي ينفذه المقاول حسب نوع وقطر المواسير وحسب طبيعة مواد السطوح المختلفه وتقاس خطوط المياه المنفذة من النهايات المبينة على المخططات على محاور خطوط المواسير بدون حسم القطع من أكواع وتيهات ونقاصات ... الخ وتشمل عملية الكيل المواسير داخل غرف المفاتيح ما لم يذكر خلاف ذلك.

5- يدفع عن المفاتيح والهوايات .... الخ بانواعها واقطارها المختلفة بالعدد ويكون السعر للوحدة شاملا جميع ما يلزم بموجب وثائق العطاء ومتطلباته وشروطه.

6-تعتبر الأسعار الواردة في جدول الكميات شاملة للضرائب والرسوم حيث انا العطاء غير معفي.

جدول كميات رقم(1)/اعمال محطة المعالجه

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
1	اعمال فك و إزالة وحدتي الفلترة الـ (Microfiltration) القائمة حاليا في المحطة بجميع قطعها وخطوطها وتوصيلاتها الميكانيكية والكهربائية شاملا جميع المضخات وضاغطات الهواء واللوحات الكهربائية والانظمة التابعة لها وحصر جميع مكونات المحطة في جداول خاصة من قبل مندوب المقاول المحال عليه العطاء ومندوب شركة مياه اليرموك وتصنيفها (صالح وغير صالح) ونقلها من موقع المحطة وكما جاء المواصفات الفنية المرفقة	مقطوع	1				
2	تصميم وتوريد وتركيب وتشغيل وحدات ضخ أفقية لتغذية انظمة المعالجة بقدرة (75م3/س لكل مضخة (2عاملة و2 احتياطية) أو حسب ما يتطلبه تصميم وحدات المعالجة لانتاج وبنسبة استرجاع لا تقل عن 95٪ شاملا جميع ما يلزم من متطلبات التوصيل للتشغيل من (محابس عزل وفلنجات ورادات وساعات وأجهزة قياس ضغط والحمايات الكهربائية والميكانيكية والحرارية وأجهزة تحكم VFD000 الخ) . وان يكون السعر شاملا جميع ما يلزم من مواد وأعمال كهربائية من (لوحة التحكم والكوابل والقطع الكهربائية اللازمة لايصال لوحة التحكم الخاصة بها بلوحة التحكم الرئيسية ولوحة ال HMI) شاملا جميع ما يلزم للتنفيذ وبالمواصفات الواردة في وثائق العطاء.	عدد	4				
3	تصميم وتوريد وتركيب وتشغيل Automatic Self Cleaning عدد 2 بطاقة لكل وحدة 75 م3/ساعة شاملا جميع ما يلزم من لوحات تحكم ومحابس اوتوماتيكية ومحابس عزل واجهزة قياس ضغط وأجهزة نقل الضغط على ان تكون مصنوعة من الستانلس ستيل 316 وان يكون pore size بالاعتماد على projection UF وحسب متطلبات التصميم وتوصيات الشركة المصنعة	عدد	2				
	المجموع ينقل لما بعده						

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
4	تصميم وتوريد وتركيب وتشغيل أنظمة فلترة بأغشية الـ Ultrafiltration وتوابعها شاملا جميع ما يلزم من توصيلات وقطع ومحابس ومواد وأعمال كهربائية وميكانيكية وانشائية لضمان عمل النظام حسب تعليمات الشركة الصانعة وحسب المواصفات الواردة في وثائق العطاء يجب على المقاول تقديم تصميم كامل لأنظمة الفلترة مع جميع المواصفات المطلوبة، ورسومات تفصيلية، وحجم المعدات والحسابات وفقًا للمواصفات ومتطلبات وثائق العطاء. إن الأعمال والرسومات المحددة في وثائق العطاء هي لأغراض إرشادية، ويجب على المقاول إعداد التصميم وفقًا للشروط الواردة في الجدول (1) في وثائق العطاء وفقًا للمعايير الدولية، ومواصفات المالك وتوصيات الشركة المصنعة العناصر أدناه هي متطلبات عامة، ويُطلب من المقاول تقديم نظام متكامل، وأي عناصر أو أجهزة مطلوبة ولكنها غير مذكورة في وثائق العطاء تعتبر ضمن بنود جدول الكميات ويجب توفيرها كنظام كامل واحد. يتضمن النظام على سبيل المثال لا الحصر						
4.1	على المناقص تصميم وتوريد وتركيب وتشغيل وحدتي فلترة أغشية ال (Ultrafiltration), PVDF ,Flux 60-65 بدلا من الوحدات القائمة على ان يؤخذ بالاعتبار امكانية تشغيل المحطة بنصف طاقتها. بمعنى أخر ان تتكون من وحدتين منفصلتين بشكل كامل (من مضخات التغذية ولغاية مدخل وحدات المعالجة بالاشعة فوق البنفسجية)، وبالمواصفات الواردة في المرفق رقم (2) **بطاقة تصميمية للمياه الخام المراد معالجتها 75م3/س لكل وحدة اي بطاقة اجمالية (150م3/س) وكما جاء في المواصفات الفنية (وحدتي الفلترة للمحطة كاملة وليس لكل نظام)**	نظام	2				
4.2	جميع أجهزة المراقبة والتحكم (ساعات واجهزة قياس الضغوط وأجهزة قياس تدفق كهرومغناطيسية لكل نظام وأجهزة قياس ساعات العمل وأجهزة قياس منسوب المياه في الخزانات،،، الخ)، ونظام التحكم بالمحابس الهوائية وكما جاء بالمواصفات الفنية المرفقة						
4.3	التوصيلات ومحابس عزل الوحدات والمحابس الهوائية والعادية الخاصة بالتشغيل، وكذلك المحابس الهوائية الخاصة بالغسيل العكسي والغسيل الكيماوي إضافة الى ضاغطات الهواء وكما جاء بالمواصفات الفنية شاملا التوصيلات الشفافة بحيث يتم عمل فحوصات ال Bubble test and pressure decay test بدون فك الاغشية وكما جاء بالمواصفات الفنية المرفقة						
	المجموع ينقل لما بعده						

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
4.4	نظام الغسيل العكسي وتوابعه (BW/CEB) (من مضخات وأجهزة تحكم (VFD) وحمايات ومضخات حقن وخزانات ونافخات هواء أو ضاغطات هواء .....) وكما جاء بالمواصفات الفنية المرفقة وتوصيات الشركة الصانعة لانظمة الفلترة بالخصوص	نظام	1				
4.5	نظام الغسيل الكيماوي وتوابعه (CIP)(من مضخات وأجهزة تحكم (VFD) وحمايات وخزانات وخلاطات وأجهزة.....) بحيث تكون مضخة احتياطية لكل مضخة عاملة)وكما جاء بالمواصفات الفنية وتوصيات الشركة الصانعة لوحدات الفلترة بالخصوص	نظام	1				
4.6	نظام معادلة الحموضة وإزالة الكلورين في المياه المرفوضة وتوابعه (مضخات حقن وأجهزة وخزانات .....) بحيث تكون مضخة احتياطية لكل مضخة عاملة)وكما جاء بالمواصفات الفنية	نظام	1				
4.7	نظام ال diagnostic and repair skid(kit) وتوابعه	نظام	1				
5	توريد وتركيب وتنفيذ جميع الاعمال والمواد اللازمة وذلك لتعديل تسلسل وحدات المعالجة ، بحيث يتم ربط نظام الاشعة فوق بنفسجية بمخرج أنظمة الفلترة الذي سيتم توريده من خلال هذا العطاء من جهة وبخزان تجميع المياه المنتجة القائم من جهة أخرى، شاملا جميع ما يلزم من تعديلات على التوصيلات القائمة وتوريد وتركيب جميع ما يلزم من مواسير وقطع ومحابس..... الخ، اضافة الى توريد وتركيب وتشغيل جهاز UBS وكما جاء بالمواصفات الفنية.	مقطوع	1				
6	تصميم وتوريد وتركيب وتشغيل نظام مراقبة وتحكم لعكارة المياه الخام على خط سحب مضخات تغذية وحدات الفلترة داخل مبنى التشغيل شاملا جميع ما يلزم من مواد واعمال كهربائية وميكانيكية لتشغيل النظام حسب الاصول وبالمواصفات الواردة في وثائق العطاء وتعليمات الشركة الصانعة	نظام	1				
7	تصميم وتوريد وتركيب وتشغيل نظام مراقبة وتحكم وتسجيل لقراءات عكارة المياه المنتجة المفلترة وتوابعه شاملا جميع ما يلزم من توصيلات وقطع ومواد وأعمال كهربائية وميكانيكية لتشغيل النظام حسب توصيات الشركة الصانعة وحسب المواصفات الفنية المرفقة	نظام	2				
	المجموع ينقل لما بعده						

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
8	تصميم وتوريد وتركيب وتشغيل نظام التحكم والمراقبة PLC & HMI لجميع وحدات وانظمة المعالجة المذكورة أعلاه شاملا جميع ما يلزم مثل المواد والقطع الكهربائية واجهزة تحكم ومراقبة وكيبلات وحساسات واي أعمال لضمان عمل النظام حسب المواصفات الفنية المرفقة .	نظام	1				
9	أعمال الخطوط: تنفيذ جميع اعمال الخطوط وملحقاتها وتوصيلاتها وحسب الموصى به من الشركة المصنعة شاملا جميع ما يلزم من قطع واللحام والعزل شاملا كذلك شبك الخطوط القائمة والمقترحة مع جميع ما يلزم لاتمام اعمال الشبك والتمديد :						
9.1	**خط سحب رئيسي** توريد وتركيب خط سحب و(Header) حديد بقطر 200 ملم من خزان المياه الخام لغاية مضخات تغذية انظمة الفلترة والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من مواد و اعمال لاتمام الاعمال حسب الاصول	م.ط	10				
9.2	**خطوط سحب فرعية:** توريد وتركيب خطوط سحب حديدية قطر 200 ملم من الـ(Header) اعلاه لمضخات تغذية انظمة الفلترة والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من مواد واعمال لاتمام الاعمال حسب الاصول	عدد	4				
9.3	**خطوط دفع فرعية:** توريد وتركيب خطوط دفع حديدية قطر 150 ملم (خط لكل مضخة تغذية) والسعر شامل لمحابس العزل والردادات والتوصيلات والفلنجات وجميع ما يلزم من مواد واعمال لاتمام الاعمال حسب الاصول	عدد	4				
	المجموع ينقل لما بعده						

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
9.4	**خطوط دفع رئيسية (1)** توريد وتركيب خطوط دفع حديدية قطر 150 ملم من مضخات تغذية انظمة الفلترة (خط دفع لكل مضختين) ولغاية مدخل الـAutomatic Self Cleaning والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من مواد واعمال لاتمام الاعمال حسب الاصول	م.ط	20				
9.5	**خطوط دفع رئيسية (2)** توريد وتركيب خطوط دفع UPVC قطر 125 ملم من مخرج الـ Auto Self Cleaning ولغاية انظمة الفلترة والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من اعمال لاتمام الاعمال حسب الاصول	م.ط	10				
9.6	**خطوط دفع رئيسية (3)** توريد وتركيب خطوط دفع حديدية قطر 100 ملم من مخرج انظمة الفلترة ولغاية مدخل نظام الـUV والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من مواد واعمال لاتمام الاعمال حسب الاصول	م.ط	10				
9.7	**خطوط دفع رئيسية (4)** توريد وتركيب خطوط دفع حديدية قطر 200 ملم من مخرج نظام الـUV ولغاية خزان المياه المنتجة والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من اعمال لاتمام الاعمال حسب الاصول	م.ط	10				
	المجموع ينقل لما بعده						

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
9.8	**خطوط سحب مضخات الغسيل العكسي** توريد وتركيب خطوط دفع حديدية مع (Header) قطر 200 ملم من مخرج خزان المياه المنتجة ولغاية مضخات الغسيل العكسي والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من مواد و اعمال لاتمام الاعمال حسب الاصول	م.ط	15				
9.9	**خطوط سحب فرعية لمضخات الغسيل العكسي:** توريد وتركيب خطوط سحب حديدية قطر 150 ملم من الـ(Header) اعلاه لمضخات تغذية انظمة الفلترة والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من مواد و اعمال لاتمام الاعمال حسب الاصول	عدد	2				
9.10	**خطوط دفع فرعية لمضخات الغسيل العكسي:** توريد وتركيب خطوط دفع حديدية قطر 150 ملم (خط لكل مضخة غسيل) والسعر شامل لمحابس العزل والردادات والتوصيلات والفلنجات وجميع ما يلزم من مواد و اعمال لاتمام الاعمال حسب الاصول	عدد	2				
9.11	**خطوط دفع مضخات الغسيل العكسي** توريد وتركيب خطوط دفع حديدية قطر 150 ملم من مخرج مضخات الغسيل العكسي الى مدخل الغسيل التابع لأنظمة الفلترة والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من مواد و اعمال لاتمام الاعمال حسب الاصول	م.ط	20				
9.12	**خط المياه المرفوضة (Reject Water)** توريد وتركيب خطوط دفع حديدية قطر 200 ملم من مخرج انظمة الفلترة (مياه الغسيل العكسي) منهل التصريف والسعر شامل لمحابس العزل والتوصيلات والفلنجات وجميع ما يلزم من مواد و اعمال لاتمام الاعمال حسب الاصول	م. ط	15				
10	التشغيل التجريبي والتدريب	شهر	3				
	المجموع الاجمالي لجدول الكميات 1 (غير شامل للضرائب والرسوم)						

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

جدول كميات رقم (2)/ اعمال استبدال خطوط السحب والدفع والمحابس

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
1	توريد وتركيب خطوط حديد Black steel لاستبدال خطوط السحب والدفع القائمة والسعر يشمل قص وازالة الخطوط القائمة والمحابس والقطع القائمه وتسليمها لمستودعات مياه جرش وتوريد وتركيب خطوط مياه حديد قطر 6 انش شاملا توريد وتركيب جميع القطع اللزمه من اكواع وتيات واي قطع اخرى ضرورية لاتمام العمل شاملا الربط على المضخات القائمة والخطوط القائمة او المقترحه شاملا اللحام والعزل وجميع ما يلزم لاتمام العمل حسب الاصول	م.ط	33				
2	توريد وتركيب خطوط حديد Black steel لاستبدال خطوط السحب والدفع القائمة والسعر يشمل قص وازالة الخطوط القائمة والمحابس والقطع القائمه وتسليمها لمستودعات مياه جرش وتوريد وتركيب خطوط مياه حديد قطر 8 انش شاملا توريد وتركيب جميع القطع اللزمه من اكواع وتيات واي قطع اخرى ضرورية لاتمام العمل شاملا الربط على المضخات القائمة والخطوط القائمة او المقترحه شاملا اللحام والعزل وجميع ما يلزم لاتمام العمل حسب الاصول	م.ط	66				
3	توريد وحفر وتمديد خطوط مياه دكتايل C40 (حسب المواصفة EN 545:2010) قطر 200 ملم ، حسب المطلوب طبقاً للمواصفات وفي الأماكن التي يحددها جهاز الإشراف والسعر يشمل الحفر والكشف وقص الخط القائم المراد استبداله من الجهتين وحفر الخنادق في جميع أنواع التربة من صخر وخرسانة وإسفلت الخ ... طبقاً للمواصفات الفنية المعتمدة وإعادة الأوضاع مع التسوية والطمم والدك جيداً وعلى طبقات والتأمين اسفل واعلى الماسوره مع وضع الشريط التحذيري الممغنط ويكون الطمم حسب مواصفات سلطة المياه ونقل ناتج الحفر خارج الموقع . والسعر يشمل توريد وتركيب جميع القطع اللازمة (مثل التيات والمفف والادابتر والاكواع والكولرات واللحام والعزل ..الخ) لربط الخط المقترح مع القائم من الجهتين . وتكون كلفة اعادة الاوضاع حسب المطلوب من الجهة المعنية والعمل يكون حسب تعليمات المهندس	م.ط	12				
	المجموع ينقل لما بعده						

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
4	توريد وتركيب محابس بشكل مكشوف على خطوط السحب والدفع الجديده شاملا الشبك من الجهتين شاملا توريد وتركيب جميع القطع اللازمه لتركيب المحابس وجميع ما يلزم لاتمام العمل وكمايلي:						
4-أ	محابس قطر 6" ضغط 16 بار على خطوط السحب	عدد	2				
4-ب	محابس قطر 6" ضغط 40 بار على خطوط الدفع	عدد	2				
4-ج	محابس قطر 8" ضغط 16 بار على خطوط السحب	عدد	4				
4-د	محابس قطر 8" ضغط 40 بار على خطوط الدفع	عدد	4				
5	توريد وتركيب ردادات بشكل مكشوف على خطوط الدفع الجديده شاملا الشبك من الجهتين شاملا توريد وتركيب جميع القطع اللازمه لتركيب المحابس وجميع ما يلزم لاتمام العمل وكمايلي:						
5-أ	رداد قطر 6" ضغط 40 بار	عدد	2				
5-ب	رداد قطر 8" ضغط 40 بار	عدد	4				
6	تصميم وتنفيذ وتركيب surge tank system على خطوط الدفع الجديدة حسب المطلوب شاملا" جميع المواد اللازمه لتركيب النظام من قاعدة خرسانيه وقطع و محابس و مواسير وتمديدات كهربائية وجميع ما يلزم لاتمام العمل حسب الاصول شاملا" تجربة النظام لمدة (30 يوم) Q=200m3/hr H= 350 m.	عدد	1				
7	تصميم وتنفيذ وتركيب surge tank system على خطوط الدفع الجديدة حسب المطلوب شاملا" جميع المواد اللازمه لتركيب النظام من قاعدة خرسانيه وقطع و محابس و مواسير وتمديدات كهربائية وجميع ما يلزم لاتمام العمل حسب الاصول شاملا" تجربة النظام لمدة (30 يوم) Q=120m3/hr H= 300 m.	عدد	1				
	المجموع ينقل لما بعده						

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				سنت	يورو	سنت	يورو
8	تصميم وتوريد وتركيب نظام الكلورة الخاصة بخزان المياه المنتجة بما يضمن عمله اصوليا شاملا توريد وتركيب جمع ادوات ومعدات السلامة العامة (كاشف تسرب كلور، اجهزة انذار،مراوح شفط للغرفة ،مضخة كلور،معدات السلامة العامة لاستخدام نظام الكلورة....الخ) وحسب تعليمات المهندس المشرف.	بالمقطوع	1				
9	حوض تغطيس اسطوانات الكلور:تقديم وصب خرسانة مسلحة (Ready mix) بقوة كسر صغرى لا تقل عن 300كم/سم2 بعد 28 يوم حسب المخططات والمواصفات والسعر يشمل الحفريات والطمم واعادة الاوضاع وخرسانة النظافة والطوبار من خشب نوع (Fear face) جديد من الداخل والخارج كاملا بجميع تشكيلاته شاملا حديد التسليح G60 شاملا عزل الاجزاء المدفونة بالخيش والاسفلت100/80 ثلاث طبقات وذلك لعمل حوض مائي لاستعمالات اسطوانات غاز الكلورين ويكون أبعاد الحوض (2×2)م وبارتفاع 1.70م شاملا توريد وتركيب Rubber water stopوالسعر يشمل أيضا" توصيل الحوض بخزان الماء المراد تركيبة بمواسيرقطر2" بولي اثيلين وبطول تقريبي 10–15 م للخارج و مواسير مجلفنة class B 6–8م للداخل والسعر يشمل أيضا" توريد وتركيب غطاء متحرك يتكون من صاج حديد مبزر سماكة (3 ملم) شاملا" الأيادي والفواصل والدهان الحراري والتثبيت والقفل عدد (3) والاطار المعدني بأبعاد تقريبية 1.6×1.6 م / ثلاث قطع والسعر يشمل أيضا" تركيب درج معدني مجلفن 25ملم وعمل Washout للماء مع Headwall شاملا" توريد وتركيب محبس قطر 2" حسب المخططات والمواصفات مع جميع مايلزم والسعر يشمل أيضا" عمل منهل قطر (60 سم) رنجات مع غطاء معدني MDمع التمديد للخارج شاملا عمل Water test فحص تسرب للحوض المقترح قبل عملية العزل والطمم وجميع مايلزم.	بالمقطوع	1				
10	توريد وتركيب خط للغسيل (WASHOUT) على الخط الداخل للخزان القائم شاملا" توريد وتركيب محبس قطر 4" بضغط اسمي 16 بار بشكل مكشوف مع جميع ما يلزم وربط خط الغسيل (من البوليثلين قطر 125 ملم) على منهل تصريف مياه الغسيل العكسي لوحدات المعالجة وتقدر المسافة ب 10 متر وحسب تعليمات المهندس المشرف	عدد	1				
11	توريد وتركيب وتشغيل عداد كهرومغناطيسي قطر 200 ملم (داخل المحطة) و الضغط 16 بار بشكل مكشوف حسب المواصفات على الخطوط المقترحة الداخلة الى خزان المحطة والعمل حسب تعليمات المهندس المشرف.	عدد	2				
	المجموع ينقل لما بعده						

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				يورو	سنت	يورو	سنت
12	تصميم وتوريد وتنفيذ وتشغيل غرفة للوحات كهربائيه بمساحة تقريبية لا تقل عن 20 متر مربع(ويحدد موقع الغرفة بالتنسيق مع المهندس المشرف) شاملا جميع الاعمال من حفريات وطمم وخرسانة بقوة كسر لا تقل عن (250 كغم /سم2) بعد 28 يوم وحديد التسليح للقواعد والاعمده والزنانير والسقف والنظافه والطوبار واعمال الطوب والربس والتصوينه ومدة الميلان والمزراب قطر 4" وعزل السطح زفته ساخنه وكل مايلزم حسب المخططات والمواصفات وموافقة المهندس المشرف كما يتضمن العمل توريد وعمل قصارة داخلية وخارجية ثلاثة وجوه للغرفه والتصوينه شاملا توريد وتركيب رخام سماكة 3 سم للشبابيك والابواب وحسب المواصفات والمخططات وموافقة المهندس المشرف كما يتضمن العمل توريد وتركيب باب حديد مضغوط (1.5×2.25) م كبس على الوجهين من صاج سماكة (1.5 ملم) شاملا جميع القطع المعدنية اللازمة والغال سيلندر والدهان الزياتي ثلاثة وجوه وجميع ما يلزم بموجب المخططات والمواصفات وتعليمات المهندس كما يشمل العمل توريد و تركيب شباك معدني صنف لوفر (1.5× 0.6) م.مصنوع من الصاج سماكة 1.5 ملم شاملا أعمال الدهان حسب المواصفات وموافقة المهندس المشرف كما يشمل العمل توريد وعمل دهان بلاستيكي أملشن (3) ثلاثة وجوه مع الحف واالمعجونه حسب الألوان المطلوبة وذلك للأسقف والجدران من الداخل والخارج حسب المواصفات وموافقة المهندس المشرف كما يشمل العمل توريد وعمل مدة مصقوله للغرفه والارصفه بعرض 1م حول الغرفه من الخرسانة المسلحه سماكة 12 سم بقوة كسر لا تقل عن (250 كغم /سم2) بعد 28 يوم شاملا الحديد والحفر والطمم وعمل الفواصل الإنشائية وكل ما يلزم حسب المخططات والمواصفات وموافقة المهندس المشرف كما يشمل العمل توريد وتركيب مكيف 2 طن للغرفة وشمل العمل كذلك توريد وتركيب وتشغيل جميع الاعمال الكهربائيه للغرفة بحيث تنفذ التمديدات الكهربائية في السقف وفي الجدران داخل مداميك الطوب وتحت القصارة شاملا الاسلاك والكوابل بالأقطار المناسبة مع المواسير والعلب الخاصة شاملا لوحة قواطع ونيون مزدوج وابريز ووحدات للاناره الخارجيه ذراع قصير زئبقيه بقدرة 120 واط عدد (2) ونظام تاريض بموجب االمواصفات الخاصة وتعليمات المهندس المشرف(وعلى المقول اخذ موافقة المهندس المشرف على تصميم وموقع الغرفة قبل التنفيذ)	بالمقطوع	1				
	المجموع ينقل لما بعده						

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				يورو	سنت	يورو	سنت
13	اعمال اضافية في المحطة وكما يلي :						
13.1	غرفة الفلاتر: توريد وتركيب فورسيلنج من نوعية جيدة شاملا الزوايا المعدنية والشبكة المعدنية والقواطع اللازمة شاملا تزويد السقف بوحدات الانارة الازمة شاملا التمديدات الكهربائية اللازمة مع جميع ما يلزم حسب المطلوب وتعليمات المهندس المشرف	م2	170				
13.2	مباني المحطة : تنظيف الاسطح وتوريد وتنفيذ دهان بلاستيكي املشن 3 وجوه حيثما يلزم للاسقف والجدران من الداخل والخارج حسب المطلوب و حسب تعليمات المهندس المشرف.	م2	500				
13.3	غرفة المشغلين:توريد وتركيب بطاريات للمجلى والحمام والمغسلة بالاضافة الى توريد وتركيب مكيف حامي بارد 1.5 طن بالاضافة الى توريد وتركيب كيزر كهربائي شاملا جميع ما يلزم من التمديدات الصحية و الكهربائية.	بالمقطوع	1				
13.4	تصميم وتوريد وتنفيذ صبة من الخرسانة المسلحة للارضية المحيطة بالخزان وعلى المقاول تصميم وتقديم المقاطع الانشائية التفصيلية وموافقة المهندس المشرف عليها.	م2	200				
13.5	غرفة الكلور : توريد وتركيب باب حديد مضغوط كبس على الوجهين من صاج سماكة (1.5 ملم) (استبدالا للباب القائم) شاملا جميع القطع المعدنية اللازمة والغال سيلندر والدهان الزياتي ثلاثة وجوه وجميع ما يلزم بالاضافة الى صيانة وتركيب الاضاءة اللازمة وحسب المطلوب وحسب تعليمات المهندس المشرف.	مقطوع	1				
13.6	صيانة ترنشات كيبلات الكهرباء في غرفة مضخات التزويد :تمديد كابلات الكهرباءداخل الترنش حسب المطلوب وتغطية الاجزاء المكشوفة بما يضمن حمايتها وعدم وصول المياه اليها.والعمل حسب تعليمات المهندس المشرف.	مقطوع	1				
	المجموع ينقل لما بعده						

الرقم	بيان الأعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				يورو	سنت	يورو	سنت
13.7	صيانة واصلاح الاجزاء المتضررة في قواعد المضخات وحسب تعليمات المهندس المشرف	عدد	6				
13.8	توريد وتركيب وتشغيل رافعة كهربائية (Crane) 6 حركات بقدرة 5 طن استبدالا للرافعة القائمة الموجودة في غرفة المضخات شاملا كذلك استبدال ال I Beams القائمة والعمل حسب تعليمات المهندس المشرف.	مقطوع	1				
13.9	اعمال قصارة (خشنة وناعمة) في المحطة اينما يلزم وحسب تعليمات المهندس المشرف	م2	100				
13.10	توريد وتمديد كيبل رئيسي بقدرة مناسبة من المحول الرئيسي في الساحة الى لوحةMDB (قياس ونوع الكيبل CU/XLPE/AWA/PVC – 1X630m three core:) والسعر يشمل توريد وتركيب Sleeve من مواسير UPVC وحفريات الخنادق (60×40) سم والتأمين برمل الصويلح سماكة 10سم أسفل وفوق الSleeve والشريط التحذيري والطوب الأسمنتي للحماية سماكة 7سم وإعادة الطمم مع الدك وإعادة الأوضاع ونقل الأنقاض والعمل حسب تعليمات المهندس المشرف.	م ط	20				
	المجموع الاجمالي لجدول الكميات 2 (غير شامل للضرائب والرسوم)						

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

جدول كميات رقم (3)/ اعمال الخط الناقل والسياج

الرقم	بيان الاعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				يورو	سنت	يورو	سنت
1	على المقاول عمل الدراسة اللازمة للمناسيب للخطوط المقترحة والتي تضمن وصول المياه من النبعين وصبها في الخزان القائم بشكل انسيابي(by gravity) وتقديم الدراسة للمهندس المشرف والموافقة عليها وتعتبر تكاليف الدراسة محملة على بنود العطاء. والخطوط المقترحة كما يلي:						
1.1	توريد وتمديد خطوط مياه black steel قطر 200 ملم ، حسب المطلوب طبقاً للمواصفات وفي الأماكن التي يحددها جهاز الإشراف بشكل مكشوف . والسعر يشمل :توريد وتركيب جميع القطع اللازمة (مثل التيات والمفف والادابتر والاكواع واللحام والعزل ..الخ) لاعمال التمديد. والسعر يشمل تكلفة فحوصات الضغط والكلورة والغسيل وجميع فحوصات النوعية التي تقوم بها مديرية المختبرات. شاملا تصميم وتوريد وانشاء الركب من الخرسانة المسلحة التي يوضع عليها الخط الناقل والعمل يكون حسب تعليمات المهندس المشرف . والكمية تشمل الخطين المقترحين.	م ط	590				
1.2	توريد وحفر وتمديد خطوط مياه black steel قطر 200 ملم في سطح اسفلتي قطع شارع امام المحطة حسب المطلوب طبقاً للمواصفات والسعر يشمل الحفر وإعادة الأوضاع مع التسوية والطمم والدك جيداً وعلى طبقات والتأمين اسفل واعلى الماسوره مع وضع الشريط التحذيري الممغنط ويكون الطمم حسب مواصفات سلطة المياه ونقل ناتج الحفر خارج الموقع . والسعر يشمل تكلفة فحوصات الضغط والكلورة والغسيل . والسعر يشمل توريد وتركيب جميع القطع اللازمة (مثل التيات والمفف والادابتر والاكواع والكولرات واللحام والعزل ..الخ). وتكون كلفة اعادة الاوضاع حسب المطلوب من الجهة المعنية والعمل يكون حسب تعليمات المهندس. والكمية تشمل قطع خطي النيع المقترحين للشارع.	م ط	20				
	المجموع ينقل لما بعده						

الرقم	بيان الاعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				يورو	سنت	يورو	سنت
1.3	توريد وحفر وتمديد خطوط مياه black steel قطر 200 ملم في الارض الطبيعية وفي حرم المحطة حسب المطلوب طبقاً للمواصفات والسعر يشمل الحفر وإعادة الأوضاع مع التسوية والطمم والدك جيداً وعلى طبقات والتأمين اسفل واعلى الماسوره مع وضع الشريط التحذيري الممغنط ويكون الطمم حسب مواصفات سلطة المياه ونقل ناتج الحفر خارج الموقع . والسعر يشمل تكلفة فحوصات الضغط والكلورة والغسيل والسعر يشمل توريد وتركيب جميع القطع اللازمة (مثل التيات والمفف والادابتر والاكواع والكولرات واللحام والعزل ..الخ). وتكون كلفة اعادة الاوضاع حسب المطلوب من الجهة المعنية والعمل يكون حسب تعليمات المهندس. والكمية تشمل خطي النيع المقترحين .	م ط	40				
2	فصل والغاء الخطوط القائمة امام نبعي عين الديك وعين التيس. ويتم تحديد منطقة العمل بالتنسيق مع ادارة مياه جرش والمهندس المشرف. والسعر يشمل الحفر على الخطوط القائمة امام النبعين وفصلها والغائها شاملا كذلك اعادة الاوضاع .	بالمقطوع	بالمقطوع				
3	توريد وصب خرسانة مسلحة بقوة كسر لا تقل عن 250 كغم/سم2 (حول كل من نبعي عين الديك وعين التيس) سماكة(عرض) 40-50 سم وبعمق لا يقل عن 120 سم. وعلى المقاول تقديم رسومات تنفيذية للمقاطع الانشائية بتسليح الحديد المناسب يوافق عليها المهندس المشرف .ويتم تحديد منطقة العمل بالتنسيق مع ادارة مياه جرش والمهندس المشرف. والسعر يشمل الحفر واعادة الاوضاع والعمل يكون حسب تعليمات المهندس المشرف.	م3	50				
4	توريد وتركيب اغطيه معدنيه لفتحه قياس (1م×1م) مجلفنه بالتغطيس على الساخن والسعر يشمل الحلق والايدي والقفل الخ وحسب تعليمات المهندس المشرف.	عدد	2				
5	توريد وتركيب جميع القطع اللازمة وعمل شبكات شاملا" جميع القطع اللازمة شاملا" اللحام والعزل لخطوط الحديد ..الخ شاملا جميع ما يلزم لتنفيذ الشبكات حسب المواصفات والمخططات وتعليمات المهندس المشرف.						
5.1	شبك الخط المقترح لنبع عين الديك على نبع عين الديك وشبك الخط المقترح لنبع عين التيس على نبع عين التيس وحسب نعليمات المهندس المشرف	بالمقطوع	1				
5.2	شبك الخطين المقترحين لنبعي عين الديك وعين التيس على مدخلي الخزان وحسب تعليمات المهندس المشرف	بالمقطوع	1				
	المجموع ينقل لما بعده						

الرقم	بيان الاعمال	وحدة الكيل	الكمية	سعر الوحدة		المبلغ الإجمالي	
				يورو	سنت	يورو	سنت
6	لاغراض تنفيذ هذا البند(6) والبند الذي يليه(7) على المقاول وعن طريق مساح مرخص تحديد حدود كل من نبع عين التيس وعين الديك وتكون التكلفة محمله على اسعار البنود : توريد وتركيب سياج معدني لكل من حرم نبعي عين الديك وعين التيس مكون من شريط شبكي مزنبق سماكة 2.9ملم وفتحة 5×5 سم بالارتفاع المبين على المخططات ويشمل السعر توريد وتركيب أعمدة من حديد (I Beam) قياس 100×50 ملم مثبتة عموديا" كل ثلاثة أمتار بدبش وخرسانة عادية (نسبة الخرسانة 70% و الدبش30%) وبقوة كسر صغرى لا تقل عن 180 كغم/سم2 بعد 28 يوما"حسب المخططات والمواصفات والسعر للمتر الطولي لكامل ارتفاع السياج يشمل الحفر وجميع المواد والأعمال بما في ذلك توريد وتركيب وشد ثلاثة أسلاك شائكة على الجزء العلوي المائل واثنان قطريان وكذلك تدعيم الزوايا باتجاهين ودهان الأعمدة بدهان مانع للصدأ ثلاثة وجوه بموجب الشروط الخاصة والمخططات والمواصفات وحسب تعليمات المهندس المشرف . والكمية تقريبية تشمل اعمال النبعين.	م ط	300				
7	توريد وتركيب باب للسياج (1م×2م) مكون من ذرفة واحده مصنوعة من مواسير2" جلفنايز وزن خفيف ومثبت عليها شريط شبكي مزنبق مماثل لشريط السياج من شبك قياسي 5×5 سم سماكة 2.9 ملم والسعر يشمل توريد وصب خرسانة مسلحة قوة تحمل 250كغم/سم2 شاملا أعمال الحفريات والطوبار للقواعد والزنانيروالأعمدة الخرسانية المسلحة ويكون طوبار الأعمدة 40×40 سم بارتفاع 2.5 م من الواح فيرفيس أملس والسعر يشمل توريد وتركيب حديد التسليح للقواعد والاعمده والزنانير والسعر يشمل والدهان وجهان تأسيس ووجهين زياتي والسعر يشمل أيضا تركيب الأيادي والغال والمفصلات والدقورة والقفل وحسب تعليمات المهندس المشرف.والكمية تشمل النبعين(باب لكل نبع)	عدد	2				
	المجموع الاجمالي لجدول الكميات 3 (غير شامل للضرائب والرسوم)						

وزارة الميـــاه والـري
سلطـــة المياه
مديرية العطاءات والمشتريات

جدول رقم 4/ استبدال المضخات واللوحات الكهربائية

Item No.	Description	Unit	Quantity	Rate (Euro)	Amount (Euro)
	Mechanical Works				
1	**Mluit stage centrifugal pumps**				
	Supply, install, operate and commission six Multi Stage centrifugal pumps (three of them standby)with driving motor (3 phase 400 volts, 50 Hz, 3000 rpm) in the pumping station room. The price for each pump shall also include control cables from the new (MCC), (CP) and (PLC) to the motors, dry run protection relay with the necessary power, instrumentation and control wiring to the (PLC) and (MDB) and (CP) and accessories. The works include any necessary civil works, cable trenches, foundation for pumps and motors as per Manufacturer's requirements, and the Engineer instructions:				
1.a	Capacity of Q=150 m3/hr, H= 350 m head. مضخة الكتة	No.	2		
1.b	Capacity of Q=100 m3/hr, H= 250 m head. مضخة مخيم غزة	No.	2		
1.c	Capacity of Q=75 m3/hr, H= 400 m head. مضخة دبين	No.	2		
	Electrical Works				
2	Main Distribution Panel including: MCCB 3POLES 630Amp QTY2 MCCB 3POLES 400 Amp QTY4 MCCB 4POLES 100 Amp QTY2	No.	1		
3	Supply,install and comission three new Control Panels(VFDs) as per the required specifications and engineer instructions				
3.a	Variable Speed Drive 250kW لوحة تشغيل الكتة	No.	2		
3.b	Variable Speed Drive 132kW لوحة تشغيل مخيم غزة	No.	2		
3.c	Variable Speed Drive 160kW لوحة تشغيل دبين	No.	2		

4	Automation & SCADA (transfer all signals to the existing RTU/PLC) and the flow shall be controlled through the existing PLC using the VFD.	L.S	L.S		
5	**Electro-magnetic water meter**				
	Supply, install, operate and commission electromagnetic flowmeters on the discharge pipeline. Price shall include power and control cables through heavy duty galvanized conduits between the Pressue transmitters and PLC inside the electrical room, all as per specifications, and Engineer's instructions. as per Manufacturer's requirements, and the Engineer	No.	3		
6	**pressure Transmitters**				
	Supply, install, operate and commission pressure transmitters on the discharge pipeline,The price shall include Isolating Valve, and all necessary fittings. Price shall include power and control cables through heavy duty galvanized conduits between the Pressue transmitters and PLC inside the electrical room, all as per specifications, and Engineer's instructions.as per Manufacturer's requirements, and the Engineer	No.	3		
		المجموع الاجمالي لجدول الكميات4 (غير شامل للضرائب والرسوم)			

جدول الكميات رقم (5)/كادر المقاول المطلوب حسب النظام رقم (100) لعام 2024

بيان الأعمال	الحد الأدنى للبدل الشهري للفرد يورو (أ)	العدد (ب)	المدة بالأشهر (ج)	البدل الشهري للفرد (د) يورو		المبلغ الإجمالي (ب×ج×د) يورو	
يجب على المقاول أن يلحق بكوادره الخبيرة جهاز مساعد استناداً لنظام الزامية تشغيل العمالة الأردنية من أبناء المحافظة – النظام رقم (100) لعام 2024 ، يجب أن يكون كادر المقاول المساعد من الأردنيين من أبناء المحافظة ذاتها الذي ينفذ فيها المشروع طيلة مدة تنفيذ المشروع والتشغيل والصيانة.							
مهندس حديث التخرج حسب التخصصات المطلوبة.	540	3	12				
فنيون	405	3	12				
عمال	390	3	12				
ملاحظات هامة:							
ستم التأكد من التزام المقاولين بدفع البدل الشهري للعاملين بما لايقل عن الحد الادنى المنصوص عليه في البند (أ) من هذا الجدول.							
البند (د) هو الحد الأدنى للبدل الشهري للفرد بالإضافة إلى قيمة مصاريف المكتب وأرباحه عن الفرد.							
في حال عدم التعيين وتشغيل العمالة الأردنية المطلوبة وكما ورد أعلاه يتم حسم ضعف قيمة الحد الأدنى المشار إليه في العمود (أ) من هذا الجدول.							
في حال استدعت طبيعة الأعمال في المشروع تعيين أعداد وخبرات إضافية غير الموجودة في وثائق العطاء تكون جميع تكاليفها محملة على الأسعار الإفرادية للعطاء طيلة مدة تنفيذ المشروع.							
المجموع الاجمالي لجدول الكميات رقم 5							

وزارة الميـــاه والـري
سلطـــة المياه
مديرية العطاءات والمشتريات

جدول الكميات رقم 6/ مبلغ احتياطي للاعمال غير المنظورة

الرقم	بيان الاعمال	وحدة الكيل	الكمية رقما وكتابة	سعر الوحدة يورو	المبلغ الاجمالي يورو
	مبلغ احتياطي للاعمال غير المنظورة	P.S	1	40200	40200

وزارة المياه والري
سلطة المياه
مديرية العطاءات والمشتريات

خلاصة جداول الكميات

الرقم	بيان الاعمال	المجموع رقما		المجموع كتابة
		سنت	يورو	
1	مجموع جدول الكميات (1) اعمال محطة المعالجة			
2	مجموع جدول الكميات (2) اعمال استبدال خطوط السحب والدفع والمحابس			
3	مجموع جدول الكميات (3) اعمال الخط الناقل والسياج			
4	جدول رقم (4) استبدال المضخات واللوحات الكهربائية			
5	جدول الكميات رقم (5)/كادر المقاول المطلوب حسب النظام رقم (100) لعام 2024			
6	تنزيل أو زيادة			
7	المجموع الكلي بعد التنزيل أو الزيادة وغير شامل الضرائب والرسوم			
8	**جدول رقم (6) مبلغ احتياطي للاعمال غير المنظورة**		**40200**	اربعون ألفا ومائتي يورو
9	مجموع الأعمال غير شاملة الضرائب + جدول العمالة+ المبلغ الاحتياطي.			
10	قيمة جميع الضرائب والرسوم (ضريبة المبيعات و الرسوم الجمركية فقط)			
11	مجموع قيم الأعمال في جدول الكميات شاملا الضرائب والرسوم +جدول العمالة + المبلغ الاحتياطي.			
	المجموع الكلي بعد التنزيل أو الزيادة (يورو)			

فقط .....

دينار لا غير .

اسم وتوقيع المقاول : .....

التاريخ : ..... / ..... / .....

وزارة الميـــاه والـري
سلطـــة المياه
مديرية العطاءات والمشتريات