PART 1 - GENERAL

1.1 SCOPE OF WORK

1. The work described in this section include the design, delivery, installation, site services, commissioning, mechanical testing and guarantees for the supply of treated submersible centrifugal water pumps and accessories.

1.2 SYSTEME DESCRIPTION

1. Design for the submerged installation:
   1. Pumps must be submersible model and dedicated to pumping unfilled water;
   2. Must operate over an extended periods when fully submerged.

2. Operating Conditions:
   1 Nature of the water pumped:
   2. Treated wastewater without solid particles;
   3. Water temperature between 5 ° C and 25 ° C.

3. Design parameters:
   1. Each pump / motor should be one-piece design with direct drive.
   2. Each pump with its accessories and cables must be capable of continuous submersion at least 5 meters deep without leakage.

4. Pumps control
   1. A duplex control panel shall be provided with pumps;
   2. The alternation of the pumps must be effective;
   3. A manual operation must be individually or simultaneously possible;
   4. Hours of operation of each displayable pumps;
   5. High level alarms and malfunctions.

1.3 DOCUMENTS TO BE PROVIDED

1. 1. Layout drawings:
      1. Provide shop drawings of pumps.

2. Certification :
   1. The pump / motor unit must bear the CSA certification.
   2. The proof of this certification and the accompanying drawings should be provided on request by the pump manufacturer.
   3. The certification "engine" part only cannot be accepted.

1.4 WARRANTY

1. Pump / motor:
   1. The manufacturer of the pump must ensure the units to the General Contractor in writing against defects in workmanship and materials, covering parts and labor for a period of one (1) year after final acceptance of the work.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

1. The pumps are as manufactured by Goulds or approved equivalent.

2.2 LIST OF EQUIPMENT AND DATA SHEETS

1. Equipment Description:

Identification	Model	Wheel	Capacity (L/s)	Head (m)
Goulds	WE0312 L	5,38''	2,4	6,0
Motor (HP)	**Voltage**	**Phase**	**HERTZ**	**RPM**
0,33	230	1	60	1750

2.3 MAIN COMPONENTS

1. Each pump shall comprise the following components without limitation:

2. Preassembled components :
    1. Motor;
    2. Shaft;
    3. Volute casing;
    4. Impeller;
    5. Oil chamber;
    6. Discharge elbow;
    7. Mechanical joint.

3. Accessories:
    1. The accessories used in the current pumping wells will (valve fleets level control valves) be replaced by equivalent equipment. Present the shop drawings of each equipment for approval by the Project manager

2.4 MATERIALS

1. Manufacturing - General:
    1. The main parts of the pump shall be of gray cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All nuts and bolts shall be made of stainless steel AISI type 304. Every surface of metal other than stainless steel and brass having contact with the pumpage must be protected by an approved coating that is resistant wastewater.

2. The sealing device shall include a metal/metal contact between machined surfaces. The Critical mating surfaces where water tightness is required shall be machined and fitted with O-rings in Viton or Nitrile rubber. The adjustment resulting from the compression of rubber O-rings in two (2) plans and O-ring contact of four (4) sides without the requirement to limit the specific torque

3. The gaskets rectangular section requiring specific torque limits to achieve compression cannot be considered as adequate or equal. Or secondary seal or O-ring elliptical, grease or any other device product cannot be used.

2. Accessories:
    1. Lifting system:
        1. Each pump shall be equipped with a lifting system designed for normal load exceeding the weight of the pumping unit of at least 50%.
        2. The lift system includes:
            1. A short chain attached to the pump handle.
            2. Nylon rope attached to the chain.
            3. An eye claw compatible with the hoist hook to be used to remove the pump.
        3. The toothed grommet that is placed in the hook of the hoist down on the nylon cord and automatically grabs the chain.

3. Protections :
    1. The stator shall incorporate thermal switches in series to stop the engine and generate an alarm when the winding temperature exceeds 125 ° C or 140 ° C for engines class H.
    2. A leak detector must be included to stop the engine and generating an alarm when there is presence of water in the stator chamber.
    3. Protection relay pump (temperature and humidity).

PART 3 – EXECUTION

3.1 INSTALLATION

1. Installer les pompes conformément aux exigences du Manufacturier.

2. The cconnections of the cables to the motor of the pump and the sealing must be made in the factory to ensure sealing.

3.2 ELECTRICAL CONNECTION

1. The Contractor shall connect the pumps and fleet level control panel provided and installed in the technical building;
2. The connection must be made by a qualified electrician;
3. Coordination must be made between the various stakeholders.

PART 4 – FACTORY AND FIELD TESTS

4.1 FACTORY TESTED

1. Hydraulic testing:
    1. All pumps supplied shall be subjected to hydraulic tests demonstrating their ability in terms of flow, pressure and power consumption.
    2. The tests shall be performed using clean water temperature below 30 ° C in accordance with the indications of the latest version of December 2011 "Hydraulic Institute Standards for Centrifugal, Rotary and Reciprocating Pumps" (HIS).
    3. If such tests are impossible to achieve because of the size of the pumps or for any other reasons, they can be performed after the installation of the pumps on the work site. However, this procedure is subject to the approval of the Project Manager or his representative before construction.

4.2 FIELD TESTS

1. Preparation:
    1. Isolate the wet well whenever possible.
    2. Switch off the SYSTEM control water levels (SYSTEM to fleets or other).
    3. Operate pumps in manual mode.

2. Description of tests:
    1. Basic Principle:
        1. For each pump, measures flow, pressure, voltage and amperage levels should be carried out simultaneously.
    2. Methodology:
        1. The pumping rate is equal to the volume between them and "departure" of the pump (or pumps) plus the volume of water that may have entered the wet well during the pumping time "off" levels, divided by pumping time.
        2. For results to be valid, always measure the flow pumps using their normal operating levels.
        3. Retesting three (3) times for each of the pumps so as to obtain results with a maximum deviation of ± 5 %.
    3. Calibration results:
        1. For calibration of each pumps and group of pumps, provide all possible combinations of pumps in the performance test report, the following information:
            1. The calibration of the pumping station used on the sketch area and height calibration.
            2. A plan that includes the size of wet wells and the location of equipment in the calibration area.

3. The calculations of total volumes, useful and useless for each wet well. Explain the peculiarities of each well, if applicable.
4. Static and dynamic pressures at the time of calibration gauge and the distance between the gauge and the level of water.
5. The amperage measured during calibration.
6. The voltage for the benchmarking exercise.
7. Calibration and inspection of the pumping station cards.

4. Additional tests:
   1. When the pump calibration is completed, the pumping system must be operated in automatic mode.
   2. When stopping and starting of pumps for each sequence pumping pressure data must be taken to observe the hydraulic transients.
   3. Simultaneously, the behavior of the air vent (if required) and the valve should be noted.

4.3 RAPPORT

1. Provide the Project Manager test report carried out on site, all data must be transferred to the theoretical curve of the pump.

2. The report of the manufacturer must be provided to Project Manager before shipping pumps on site.

END OF SECTION