PLEASE NOTE: The following specification contains areas, highlighted in yellow and with the [ ] symbol. In these areas, the engineer should make a selection, add specific, project related information and should delete what is not applicable for the specific project.

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. Provide all labor, materials, and services required to furnish, install and place in operation one (1) open channel flow monitoring device as shown on the drawings and specified herein.

1.2 SUBMITTALS

A. Descriptive literature, catalog cuts, dimension prints, installation directions, etc. shall be submitted on all items specified herein.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store products indoors or in weather protected area until installation. Protect from construction traffic and damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

Flow monitoring equipment supplied by Hach Company, Model FL1500.

2.2 FUNCTIONAL DESIGN

A. The open channel flow monitoring system shall be suitable for installations for enforcement, compliance, and in-plant process control.

B. The flow meter shall be able to utilize multiple flow and parameter sensing technologies simultaneously.
   1. Device options for flow measurement technology will include downward looking or in-pipe ultrasonic level measurement, non-contact advanced Doppler Radar, submerged area velocity, or bubble level.
   2. Device options for parameter sensing will include a digital pH sensor.
   3. The flow meter shall be capable of running up to 6 connected devices simultaneously.

C. The flow meter shall be capable of variable-rate data storage with the data storage interval changing based upon a selected logged parameter such as level, velocity, flow rate or water quality parameter.

D. The flow meter shall be capable of interfacing with an optional wastewater sampler by means of an optional interface cable.
   1. Via the interface cable, the flow meter shall be capable of enabling and pacing the sampler based on multiple programmed conditions, as well as receiving sampling data from the sampler.

E. The flow meter shall accept data from a rain gauge.

F. The flow meter shall have standard one (1) 4-20mA inputs

G. The flow meter shall have standard
   [ ] two (2) 4-20mA outputs or
   [ ] three (2) 4-20mA outputs

H. The flow meter shall have standard two (2) high voltage relays

I. The flow meter shall have
   [ ] 2 digital inputs and 2 digital outputs

J. The flow meter shall have

[ ] integral resettable and non resettable flow totalizers and
[ ] external mechanical non resettable totalizer

K. The flow meter shall have Modbus input and output capability.

2.3 DESCRIPTION

A. Flow Meter Construction

1. The flow meter electronics and connections will be housed in a PC/ABS NEMA 4X, IP66, lockable enclosure.
2. The flow meter shall be suitable for conduit connection and be powered by either AC or DC power with optional AC battery backup.
3. Basic construction will consist of a two-piece electronics enclosure, front panel with color display and keypad, and clear cover.
4. The clear polycarbonate cover will allow viewing of the controller display.
5. Connections will be accessible for addition and removal of optional devices by unlatching the door and then opening the front panel on the enclosure.
6. The flow meter shall include a stainless-steel bracket for wall mounting and shall also be suitable for mounting on a rack or inside a console enclosure with optional hardware to mount to a rail or post.
7. Operating temperature shall be –20 to 60 C (–4 to 140 F).
8. Storage temperature shall be –40 to 70 C (–40 to 158 F).
9. The flow meter's primary user interface shall include a tactile keypad with audible feedback,
10. The LED indicator will signal if any alarm condition is activated.
11. Operating power shall be nominal 12VDC.
    a. The flow meter's internal main power supply will operate on 100VAC or 240VAC line power.

B. Flow Meter Functionality

1. Communication and user interface.
    a. Primary programming will be directly through the tactile keypad and programming menus on the front panel of the flow meter.
    b. Direct serial connection to a computer is made using manufacturer provided USB A to B cable or with customer provided USB flash drive.
    c. Software shall also be used to provide data download as well as program upload and download
    d. Alarm status/events shall be indicated by the LED on the controller front panel. Detailed information about the alarm/event(s) indicated will be accessed by pressing a key on the keypad.
    e. The software shall be FSDATA desktop data management software
    f. The software shall be able to retrieve stored data from the flow meter and generate graphs and reports from stored data.
2. Flow Measurement Option
    a. Ultrasonic, non-contact level sensor
    b. Bubble level sensor
    c. Submerged area velocity with Doppler and depth pressure
    d. Area velocity non-contact radar sensor
    e. Electromagnetic

3. Instrument Accessories
   ****
   Select as many as required
   ****

[ ] Flow sensor(s)
[ ] Mounting Hardware
[ ] Auto Sampler
[ ] Rain Gauge

C. Warranty
   1. All equipment is covered by a one-year factory warranty from the date of shipment.

PART 3 EXECUTION

3.1 Preparation

1. Mounting
   a. As shown on the drawings
   b. Mount on rail, panel, pipe or wall as required.

2. Inlet and outlet connection sizes
   a. As shown on the drawings

3.2 Installation

A. Contractor will install the flow meter in strict accordance with the manufacturer's instructions and recommendation.
B. Manufacturer's representative will include a half-day of start-up service by a factory-trained technician.
   1. Contractor will schedule a date and time for start-up.
   2. Contractor will include the manufacturer's services to perform start up on instrument to include basic operational training and certification of performance of the instrument.
   3. Use of manufacturer's service parts is required. Third party parts are not approved for use.

PART 4 MAINTENANCE

4.1 Preventative Maintenance

A. Examine the internal desiccant and replace beads when expired (beads change color from gold to green).
B. Examine the cable connectors on an annual basis for any damage or corrosion and tighten all connections.
C. Replace the hydrophobic filter as needed.

END OF SECTION