1.00 WATER SYSTEM CONTROL PANEL (3B2W)

a) GENERAL

1) SCOPE

The scope of this section of the specifications includes the furnishing and installation of a Control Panel, as called for on the plans, complete as described herein, as manufactured by TEI Controls, Cedar Park, Texas (512) 259-2977. All Control Panels shall have the options listed below. The Control Panel is to provide the control functions of a water supply system consisting of 1 or 2 well pumps or a fill control valve, 1, 2 or 3 booster pumps, 1 compressor, 1 pressure switch, a ground storage tank with level sensing electrodes, and an elevated tank with level sensing electrodes or a hydro tank with electrodes and pressure switch

2) ENCLOSURE

The Control Panel electrical devices, components and wiring shall be housed in a Nema 4X enclosure. The enclosure shall have a hasp or other attachment to enable the Owner to lock the enclosure with a padlock. No devices or components are to be mounted on the enclosure door or the side, bottom, top or back enclosure walls.

3) INTERIOR DEADFRONT

The Control Panel shall have an interior deadfront in the enclosure to limit direct access to the electrical devices, components, and wiring on a separate backplate. The Control Panel will have an Operator Interface Controller "OIC" with a graphic representation of a typical system process mounted on the deadfront. The maximum voltage attached to the wiring on the backside of the deadfront shall not exceed 120 Vac nominal

4) BACKPLATE

The Control Panel shall have an aluminum backplate inside the enclosure behind the deadfront. The backplate shall be raised off the back wall of the enclosure. The backplate shall hold the bulk of the electrical devices, components, and wiring. The backplate shall have terminals for all connections external to the Control Panel.

5) DOCUMENTATION

Documentation shall be provided on the Control Panel for:

i) Installation, configuration, and operating instructions
ii) Wiring schematic showing all devices and components
iii) Description of Control Panel functions

6) INSTALLATION

The installation of the Control Panel and its external connection to the source of power, pressure switches, electrodes, alarm light and horn, autodialer, and communications modem shall comply with the National Electrical Code, local supplemental codes, and the recommendations of the Control Panel manufacturer.

7) ACCEPTABLE MANUFACTURERS

i) TEI Controls, 212 Industrial Blvd., Cedar Park, TX 78613 (512) 259-2977
ii) Or pre-approved equal

b) MAJOR ELECTRICAL DEVICES AND COMPONENTS

1) PROGRAMMABLE LOGIC CONTROLLER

The PLC shall contain the programmed logic to control the pumps in the functional manner listed in a following paragraph in this section. The PLC shall contain the programmed logic to detect abnormal conditions and report those conditions through an autodialer. The PLC shall have programmed logic to receive the following inputs and generate the following outputs:

i) Inputs

a) Well Pump Lead
b) Well Pump Lag
c) Booster Pump Lead
d) Booster Pump Lag
e) Booster Pump Lag Lag
f) Booster Pump Low Level Lockout
g) Low Air
h) Flow Pulse

ii) Outputs

a) Well 1 Start Signal
b) Well 2 Start Signal
c) Booster 1 Start Signal
d) Booster 2 Start Signal
e) Booster 3 Start Signal
f) Add Air Signal
g) Autodialer
h) Alarm Light

2) OPERATOR INTERFACE CONSOLE

The Control Panel shall have an Operator Interface Console. The "OIC" shall display the water level in both tanks, the status of the booster pumps and well pumps, operator input for the number of booster and well pumps, and have alarm messages.

3) PROBE RELAYS

The backplate shall contain a probe relay for each level in the Ground Storage Tank and the Elevated Storage Tank or Hydro Tank.

c) FUNCTIONAL SPECIFICATIONS

1) The Control Panel will provide output signals for 2 well pumps (or a fill valve) to operate in a Lead/Lag manner with alternation after each pumping cycle. Control of the well pumps is based on inputs from 3 electrodes in the ground storage tank for Off, Lead On, and Lag On. The Control Panel will be configurable for use with either 1 or 2 well pumps or a fill valve by inputting the proper value through the "OIC" touch screen.
2) The Control Panel will provide output signals for 3 booster pumps to operate in a Lead/Lag/Lag Lag manner with alternation after each pumping cycle. Control of the booster pumps is based on inputs from 4 electrodes in the elevated storage tank [or hydro tank] for Off, Lead On, Lag On, and Lag Lag On. Low water

cutout protection is provided for the booster pumps in hand and automatic based on inputs from 2 electrodes in the ground storage tank for Off and Reset. The Control Panel will be configurable for use with 1, 2, or 3 booster pumps by installing proper value through the "OIC" touch screen.

3) The Control Panel will provide a startup time delay on each pump as follows: Lead Booster - 3 seconds, Lag Booster - 5 seconds, Lag Lag Booster - 7 seconds, Lead Well - 9 seconds, and Lag Well - 11 seconds. The time delays are to provide staging on of pumps following a loss of electrical power.
4) The Control Panel will provide control function to operate an air compressor on hydro tank systems. A set of dry contacts is provided to operate a 120-volt compressor of up to 1 horsepower. The Control Panel will provide inputs for a system pressure switch. The compressor is to run when the system pressure switch indicates low pressure and the booster pumps are not being called for.
5) The Control Panel will provide a set of input contacts for an "optional installed" pulse flow meter to guard against Booster Pump Failure.
6) The Controller will provide output contacts for an Autodialer and Alarm Light.
7) The electrode sensing voltage will be 24 Vac.
8) The Control Panel is to be powered by 115 Vac, 60 Hz.
9) The Control Panel will detect probe failure with logic in the PLC.

END OF SECTION