SECTION 25 14 05 – LOCAL CONTROL STATIONS AND MISCELLANEOUS ELECTRICAL DEVICES

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide complete local control stations, relays, detectors, and switches as indicated on the electrical drawings, control diagram, herein, or in other Sections of the Specifications.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Local control panels shall comply with the requirements of NEC, NEMA, and shall be built to UL-508 standards, or equal as approved by the Municipality of Anchorage Building Department.

1.3 CONTRACTOR SUBMITTALS

A. Furnish Shop Drawings in accordance with MASS Section 10.05 Article 5.6, and 26 05 00 – Electrical Work, General.
   1. Include panel schematics and layout drawings, and catalog cuts of all control equipment including enclosures, relays, pilot devices, terminations, and wire troughs.

PART 2 - PRODUCTS

2.1 GENERAL

A. The CONTRACTOR shall provide the stations to satisfy the functional requirements in the relevant mechanical equipment and Instrumentation & Control specifications and the Electrical Schematics. Each station shall be fabricated with UL-labeled components. Stations not specifically indicated as being WORK of other Sections shall be provided under this Section. All stations shall be wired under this Section.

B. The controls shall be 120-volt maximum, preferably 24 VDC. Where the electrical power supply is 240-volt, single-phase or 480-volt, 3-phase, the station shall be provided with a fused control power transformer. Control conductors shall be provided in accordance with Section 26 05 00 – Electrical Work, General.

C. Each station shall be provided with identified terminal strips for the connection of external conductors. The CONTRACTOR shall provide sufficient terminal blocks to connect 25 percent additional conductors for future use. Termination points shall be identified in accordance with Shop Drawings. The stations shall be the source of power for all 24 VDC/120 VAC solenoid valves interconnected with the stations. All equipment associated with the stations shall be ready for service after connection of conductors to equipment, controls, and stations.

D. Wiring to door-mounted devices shall be extra flexible and anchored to doors using wire anchors cemented in place. Exposed terminals of door-mounted devices shall be guarded to prevent accidental personnel contact with energized terminals.

E. Enclosures
   1. In indoor rooms, enclosures shall be NEMA 12 steel enclosures painted with ANSI 61 exterior and white interior.
   2. In outdoor areas and underground locations, enclosures shall be NEMA 4X stainless steel (prior to modifications) with brushed finish. Where possible, penetrations shall be made in such a manner as to maintain the NEMA 4X rating. If this is not possible, the penetrations shall be made in such a manner as to minimize entry of foreign materials into the enclosure.
   3. Through the door disconnects are not permitted.
   4. Enclosures shall be freestanding, pedestal-mounted, or equipment skid-mounted, as indicated. Internal control components shall be mounted on a removable mounting pan. Mounting pan shall be finished white.
   5. Enclosures shall have non-locking handles.

F. Disconnect Switches
   1. Heavy duty, non-fusible, single throw.
   2. Horsepower rated.
   3. UL listed.
   4. Padlockable in "Off" position and door interlock without having the operator mounted on the door.
   5. Enclosure per area classification in Section 26 05 00 – Electrical Work, General.
   6. 600-volt, 3-phase, 3-pole.
   7. Auxiliary control contact as applicable and as indicated.
   8. As manufactured by **G.E., Cutler-Hammer,** or **Square D**.

G. Identification of panel-mounted devices, conductors, and electrical components shall be in accordance with Section 26 05 00 – Electrical Work, General.

H. Panel-mounted devices shall be mounted a minimum of 3 feet above finished floor elevation.

I. Combination Motor Starters: Provide NEMA combination motor starters not furnished in a new MCC, **Allen-Bradley Bulletin 513**, or equal.
   1. Provide circuit breakers. Fuses are not acceptable.
   2. Provide overload relay. Overload relay shall be electronic, **Allen-Bradley E3 Plus**, or equal, or thermal overload, as noted on the drawings.
   3. Provide terminal strips for field terminations.
   4. Provide green run lights.
   5. “Through the door” type disconnects are not permitted.
   6. Assembly shall be Listed as “Self Protected” under UL 508 Type F
   7. Provide status contact as required by control wiring diagrams.
   8. Provide the following combination starters:

Facility	Drawing

Note: Sump pump combination starters are listed separately in Article 2.6 of this Section.

2.2 STATION COMPONENTS

A. Pushbuttons, selector switches, and pilot lights shall be the heavy-duty, oil-tight type, sized to 30 mm. Miniature style devices are not acceptable. Devices shall be as manufactured by **Square D, G.E., Cutler-Hammer**, or equal. Switches shall be UL listed for use in existing motor starters, MCCs, or LCPs, as required.
   1. Lens colors shall be green for "run," "open," or "on;" red for "stopped," "closed," or "off;" and amber for alarm.
   2. Pilot lights shall be LED type.

B. Relays shall be 1, 2, or 3 PDT, as required, with 10-amp contacts, plug-in type utilizing rectangular blades and provided with sockets for screw-type termination and hold-down clips or DIN rail mounted. Relays shall be as manufactured by **Square D, Potter Brumfield**, or equal.

C. Magnetic starters shall be:
   1. NEMA rated. IEC or dual NEMA/IEC rated type are not acceptable.
   2. FVNR type unless indicated otherwise.
   3. Combination starters with magnetic only instantaneous trip circuit breakers such as **Cutler-Hammer "MCP," G.E., "Mag-Break,"** or equal.
   4. Control transformers shall be provided with primary and secondary fuses, 120-volt maximum control voltage.

D. Terminal strips shall be provided for all panels and shall be the flanged fork or ring lug type suitable for No. 12 AWG stranded wire minimum, or shall be DIN rail-mounted terminals, **Phoenix model KDKS**, or equal. Provide 25 percent spare terminals in each panel.

E. Time delay relays shall be combination on delay and off delay (selectable) with adjustable timing ranges. Provide socket with screw terminal connections and retaining strap. Time delay relays shall be Square D JCK70, or equal.

F. DeviceNet Switches and Enclosures: Enclosures for DeviceNet switches shall be die cast watertight/oil-tight metal boxes, rated NEMA 4/13, with heavy duty industrial-rated 30mm NEMA 4 rated switches. Enclosures shall be 3-hole vertical alignment box with (8) DeviceNet inputs and (4) DeviceNet outputs. Pushbutton switches shall be momentary contact with labels, start switches shall be LED illuminated flush green,

and stop switches shall be non-illuminated guarded red. H-O-R (Hand-Off-Remote) selector switch shall be LED illuminated 3-position maintained selector. CONTRACTOR shall provide EDS file for each switch. Hardware shall be **Allen-Bradley Model 800T**, or equal.

2.3 FACTORY TESTING

A. Each LCS shall be factory-assembled and tested for sequence of operation prior to delivery.

2.4 MISCELLANEOUS DEVICES

A. Intrusion Detection Switches:
   1. Industrial limit switch and lever arm, **Allen-Bradley 802T-HP switch with 802MC-W2B lever arm**, or equal.
   2. Provide the following intrusion detection switches:

Tag No.	Location

B. Smoke Detectors: Smoke detectors are to be **GE Interlogix ESL 500N Series, Model 541NCRXT**, or equal. Provide the following devices:

Tag No.	Location

Tag No.	Location

C. Flood Detectors: Flood detection is to be accomplished utilizing single-level liquid level sensors that employ hermetically sealed magnetic reed switch technology. The detector is to have a float made from Burna-N that rides up and down a brass stem. The 'normally closed' switching contact is to be rated at 24 VDC, 0.5 A. Flood detectors are to be **Madison M Series model M4300**, or equal. Provide the following flood detectors:

Tag No.	Location

D. Valve Limit Switches: Valve off-seat limit switches shall be single-pole double-throw, **Cla-Val X105LCW**, or equal, compatible with the type of valve. Provide a complete assembly, including rising stem, bushing, mounting bracket, adjustable locking collar, and mechanical modifications required for installation. Provide the following devices:

Tag No.	Location

Tag No.	Location

E. High Wet Well Float Switch: The float switch shall be a simple level switch that provides a contact on high level. The float body shall be high-density polypropylene and the cable shall be flexible PVC, rated 120 VAC and use in corrosive environments at a temperature range of -20 degrees F to 100 degrees F. The contact shall be a single Form C-type mercury or mercury-free switch. The float switch shall include a Kevlar Cable grip and 20 meters of cable. The switch shall be **Flygt Model ENM-10**, or equal.

F. Pump Protection Relays: The pump protection relay shall monitor the pump for high temperature and leakage. The relay for Flygt pumps shall plug into an 11-pin socket, operate on 24V AC or DC, and shall provide a single 2-pole contact for high temperature and a single 2-pole contact for leakage. The relay for ABS pumps shall be a UL 508 listed control panel with ABS solid state seal minder relay, motor protection relay, and seal in relay. The relay shall be UL-listed for use with the type of existing pumps shown on the following table:

Pump Station	Pumps

G. DeviceNet Level Indicator: The DeviceNet level indicator shall display the wetwell level using an analog style needle and numeric display, and shall be compatible with DeviceNet specification. The indicator shall have an operating range of -40 degrees C to 85 degrees C, and shall be installed in the enclosure as shown on the detail drawings. The indicator shall be **AMC Technologies Corporation**, or equal.

2.5 SOLENOID VALVE ASSEMBLIES

A. Solenoid valves shall be designed for not less than 0 to 116 psi differential pressure. Enclosures shall be NEMA 4X. All coil ratings shall be 24 VDC, class H insulation, continuous duty. Solenoid valves shall be **ASCO 8320P172**.

B. Actuating valves for potable water service shall have brass or stainless steel body with screwed ends, stainless steel trim and spring, Teflon or other resilient seals with material best suited for the temperature and fluid handled. Valve bodies shall be **Cla-Val 100-01-203H**.

C. Each device shall consist of an assembly of a solenoid valve as specified in Paragraph A above, and valve body as specified in Paragraph B above. Connect the solenoid valve to the valve body with a 1/8" x 1-1/2" brass nipple. Provide the following devices:

Tag No.	Location	Description

D. Spares: Provide two (2) spare solenoid valves, only as specified in Paragraph A above.

2.6 SUMP PUMP CONTROLLER

A. The sump pump controller shall be located in a NEMA combination motor starter panel as shown on the Drawings. Combination motor starter panels shall be in accordance with paragraph 2.1.I above. Electrical and control wiring is shown on the Sump Pump Control sheet for each facility where required. The sump pump controller shall be a complete and functional system, suitable for operating the specified sump pump, and shall be equipped with appropriate circuit breakers,

magnetic starter, DeviceNet electronic overload (A-B E3 Plus or equal), hand/off/auto selector switch, and “green” pump running indicator LED lamp.

B. Sump pump controllers are to be provided for the following locations:

Facility	Drawing

PART 3 - EXECUTION

3.1 INSTALLATION

A. Stations shall be installed in accordance with in Section 26 05 00 – Electrical Work, General, and in accordance with the manufacturer's recommendations.

B. Stations shall be protected at the Site from loss, damage, and the effects of weather. Stations shall be stored in an indoor, dry location. Heating shall be provided in areas subject to corrosion and humidity.

C. Station interiors and exteriors shall be cleaned, and coatings shall be touched up to match original finish upon completion of the WORK.

D. Conduit, conductors, and terminations shall be installed in accordance with Section 26 05 00 – Electrical Work, General.

E. Solenoid valves shall be securely supported and connected to existing copper tubing hydraulic control valve harnesses or pre-lube lines.
   1. Solenoid valves shall be independently supported using stainless steel hardware and shall not rely on copper tubing for support. The CONTRACTOR shall submit support details to the ENGINEER for approval prior to installation.

3.2 FIELD TESTING

A. Each station shall be tested again for functional operation in the field after the connection of external conductors and prior to equipment startup.

B. Deficient stations shall be corrected, to the ENGINEER’S satisfaction, at the CONTRACTOR’S expense.

END OF SECTION 25 14 05