

**Part 1            General**

**1.1                DESCRIPTION**

- .1        This section specifies the General Provisions for the supply, delivery, installation, calibration and commissioning of the process control and instrumentation system, including all control and graphic panels, as specified herein and /or detailed on the drawings.
- .2        It is the intention of these specifications and drawings, to provide for a complete and fully operating control and instrumentation system, with facilities and services to meet the requirements described herein, and in complete accord with applicable codes and ordinances. The specifications do not purport to cover details entering into the design of the system which shall be the responsibility of the Contractor.
- .3        The work to be done shall include the provision of all labour, materials, tools and equipment as well as the application of a competent knowledge of construction, whether or not directly specified or shown on the plans, required for the installation testing and placing into service the complete control and instrumentation system, except when it is specifically mentioned that certain materials and/or labour are not part of the contract.
- .4        These specifications shall apply to and govern all trades doing control and instrumentation work and shall be read in conjunction with and form a part of the general specifications of the project.
- .5        The Control and Instrumentation work includes but is not limited to the following:
  - .1        Control panels
  - .2        Primary Elements for flow, level, pressure, temperature, etc.
  - .3        Indicators and annunciators
  - .4        Control Wiring and conduit
  - .5        Existing DCS system tie-in.

**1.2                RELATED WORK**

- .1        Section 01 – General Requirements
- .2        Section 44 – Process Mechanical
- .3        The following Sections are included in Process Control and Instrumentation:
  - .1        Section 40 14 00 – Control Panels
  - .2        Section 40 31 01 - Instrumentation

**1.3                EQUIPMENT MANUFACTURERS**

- .1        All equipment shall be manufactured by experienced manufacturers who can demonstrate in-use records for all equipment offered.

- .2 Requests for approval of alternative suppliers shall be submitted to the Contract Administrator. Refer to Section 26 05 01 - Common Work Results - Electrical.
- .3 The majority of equipment shall be supplied by a single manufacturer, particularly where aesthetics are of concern, such as in panels.

#### **1.4 CODES, PERMITS & FEES**

- .1 The work shall comply with the requirements of the current edition of the Canadian Electrical Code, Part 1, and the regulations of the Manitoba Government, Department of Labour, Electrical Protection Branch.
- .2 Obtain the required construction permits, arrange for inspections and supply the Contract Administrator with approval certificates pertaining thereto including a certificate of final inspection

#### **1.5 REFERENCE STANDARDS**

- .1 Unless otherwise specified, equipment shall conform to appropriate standards and recommendations of:
  - .1 The American Society of Mechanical Engineers, hereinafter referred to as ASME Standards.
  - .2 The Instrument Society of America, hereinafter referred to as ISA.
  - .3 The Canadian Standards Association, hereinafter referred to as CSA.
- .2 All equipment shall be metric - SI Standard.

#### **1.6 OPERATION MANUALS**

- .1 Submit operation manuals in accordance with Section 26 05 01 - Common Work Results - Electrical.

#### **1.7 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with E4.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 All materials shall be new and the best of their respective kind.
- .2 All materials shall bear the approval of the Canadian Standards Association (CSA).
- .3 All materials shall be suitable for full operation within specified environments.
- .4 See subsequent clauses for specific equipment and instrument specifications.

## **2.2 POWER SUPPLIES**

- .1 Provide all necessary power supplies for controls and instruments.
- .2 Power wiring to field devices shall be #12 AWG.

## **2.3 CONTROL WIRING**

- .1 Unless specified otherwise, all conductors for control wiring shall be copper with RW90, X-link insulation, 300 volts.
- .2 Neutral conductors shall be white, grounding conductors shall be green, DC conductors shall be blue and AC conductors shall be red.
- .3 Instrumentation wiring for analog signals shall be individually shielded - multipair cable #16 AWG (7x16) tinned copper.
- .4 Control wiring for level and pressure switches shall be #14 THHN Black.
- .5 Where dimensional details are required work with the applicable structural and architectural drawings.
- .6 The Contractor is responsible for correcting any work completed contrary to the intent of the drawings and specification and shall bear all costs for correcting same..

## **2.4 CONDUIT, WIRING AND CABLE**

- .1 Supply and install all conduit, wiring, control and instrumentation cables for the control, instrumentation and low line voltage control for building services.
- .2 Conduit and wiring for power, lighting, miscellaneous electrical systems and power supplies to control instrumentation and building service panels including other components requiring line voltage power supply shall be supplied and installed as specified in Section 26.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install and interconnect all process control system equipment.
- .2 Install all equipment in accordance with the manufacturer's recommendations and in a manner that will ensure satisfactory operation upon completion.
- .3 Provide all labour and all necessary equipment including timbers, scaffolding, tools and rigging materials for installation of the equipment.
- .4 Contractor shall be responsible for coordinating all mechanical, electrical and other works for the equipment being installed.

- .5 Installation shall meet the minimum standards set forth by Standards and Practices for Instrumentation, Tenth Edition - 1989.
- .6 Use trained personnel to install systems and controls as per approved shop drawings and in accordance with manufacturer's recommendations.
- .7 Follow building lines with all piping and electrical wiring runs. Utilize proper separation and wiring techniques.
- .8 The in-line mechanical installation of certain items specified to be supplied in this section are specified to be installed in Section 40 - Process Mechanical.

### **3.2 TESTING**

- .1 Thoroughly test all control equipment, components, and systems for proper operation and report in writing to the satisfaction of the Contract Administrator.
- .2 Tests shall include:
  - .1 Complete operational test including interlocks, functions, features, options, etc., for all instrumentation, PLC, and computer system control operations.
  - .2 Operation of alarm initiating devices.
  - .3 Calibration of all instruments.
- .3 Supply all necessary test equipment and personnel to completely test the entire instrumentation and process control system.

### **3.3 START-UP AND COMMISSIONING**

- .1 Perform all panel start-up and commissioning in accordance with Section 26 05 01.
- .2 Upon completion of the installation, the Contractor shall be responsible for testing to determine correct system operation and sequences as intended in the Contract Documents. Process Instruments such as flow, level, pressure transmitters, etc., shall be checked for operation prior to process start-up, by manipulating operating controls like set points, auto-manual selectors, etc. Status and alarm contacts to be checked by manipulation or jumpering at the sensing element.
- .3 Results of tests are to be logged by the Contractor and submitted to the Contract Administrator. Any apparent defects shall be reported and corrected.
- .4 When preliminary checks have been completed and process equipment is operating or ready to operate, individual systems shall be calibrated in accordance with the latest ISA recommendation. After calibrations the system shall be placed in operation in conjunction with the Contract Administrator and designated operating personnel.

**END OF SECTION**

**Part 1            General**

**1.1                QUALITY ASSURANCE**

- .1            Control equipment to CSA C22.2 No. 14-M1987

**1.2                SUBMITTALS**

- .1            Submit shop drawings in accordance with E4. Include:
  - .1            Panel layout and mounting information.
  - .2            Schematic wiring diagrams.
  - .3            Component shop drawings.
- .2            Include control panel literature in electrical O&M manuals in accordance with Section 26 05 01 – Common Work Results – Electrical.

**Part 2            Products**

**2.1                OPERATOR CONTROL STATIONS**

- .1            All enclosures and devices shall be rated EEMAC 12 in ordinary environments or EEMAC 3R outdoor environments, EEMAC 4X in corrosive environments, unless otherwise noted.

**2.2                PUSHBUTTONS**

- .1            Heavy-duty oiltight, operator flush, black, with 1-NO and 1-NC contacts rated at 10 A, 120 VAC, labels as indicated. Stop pushbuttons coloured red, provision for padlocking in depressed position.
- .2            Acceptable manufacturer shall be Telmecanique, Allen-Bradley.

**2.3                INDICATING LIGHTS**

- .1            Heavy duty, push to test LED type
- .2            Lens colours: Red for running, Green for off, Amber for alarm
- .3            Supply voltage: 120 V (ac)
- .4            Labels as specified in Section 26 05 01 – Common Work Results – Electrical
- .5            Acceptable manufacturer shall be Telmecanique, Allen-Bradley.

**2.4                SELECTOR SWITCHES**

- .1            2 or 3 position as required, labelled as indicated heavy duty oiltight, operators as indicated, contact arrangement as indicated, rated 120 V (ac), 10 A.

- .2 Acceptable manufacturer shall be Telemecanique, Allen-Bradley

## **2.5 GENERAL**

- .1 Supply the control panels in accordance with the general arrangement and dimensions indicated on the appropriate drawings. Panels must be complete with all instruments, meters, switches, indication lights, relays, etc., as specified herein or as indicated.
- .2 Provide removable lamacoid nameplates having letters not smaller than 6 mm to identify equipment.

## **2.6 CONSTRUCTION**

- .1 Minimum EEMAC 12 construction for all panels unless otherwise specified.
- .2 Unless otherwise specified fabricate floor mounted panels, indicated, of high grade, cold rolled smooth sheet metal steel no thinner than 3 mm thick with all doors and edges neatly turned and finished smoothly. Visible welding seams will not be accepted.
- .3 Construct rigid panels and racks with an angle iron or channel supporting frame, suitably braced and stiffened to prevent any deformation during shipping or installation, and provide a surface free from dents, warping or other deformation. Provide a four-sided channel iron mounting base with front recess.
- .4 Provide flush fitting, gasketed doors hung on piano type hinges with three point latches and locking-type handles (CSA Type 12 construction).
- .5 Provide pans and rails for mounting terminal blocks, relays, wiring and other necessary devices.
- .6 Use rear connected fittings to hold equipment and instrument cases on the panel, but where not possible; any front fixing required shall be only by means of chrome-plated, brass or stainless steel machine screws.
- .7 Panel surfaces shall be thoroughly cleaned and degreased before painting. One primer coat shall be covered by two finished paint coats.
- .8 The surface finish shall be free of runs, drops, ridges, waves and laps. The paints shall be applied in such manner as to provide an even film covering corners and crevices. The interior finish shall be white and the exterior finished will be selected after award of the contract.
- .9 Panel Accessories: a metal pocket, 250 mm wide x 150 mm high x 25 mm deep, to hold pertinent drawings and manuals on the lower half of the inside door.

## **2.7 INTERNAL WORKS**

- .1 Provide an individual switch for disconnection and a fuse for isolation of all panel mounted instruments requiring a 120-volt supply.

- .2 Make all wiring connections in the shop from the equipment mounted on the panel to numbered terminal blocks conveniently located in the panel, including the power supply for all instruments. Conductors shall be extra flexible stranded copper of gauges sufficient to carry the required currents, and shall in no case be smaller than #16 AWG extra flexible.
- .3 Wire connections to all relays and instruments shall be made using easily removable good quality mechanical clips.
- .4 Identify all wiring by means of plastic slip-on type markers. Install all wiring neatly and laced or bunched into cable form using plastic wire clips, and where practical, contained in plastic wiring channels with covers.
- .5 Provide Weidmuller terminal blocks #SAK 2.5, T7 Carrier & EK 2.5N Grounding, tubular clamp, 300 V, complete with track. Each terminal shall be clearly indelibly marked with the wire number connection to it. Each field connecting conductor shall be served by one terminal. Provide 20% spare unit terminals, with a minimum of two spare terminals. Provide all necessary terminal block accessories such as manufactured jumpers and marking tape.
- .6 Mount all internally mounted equipment on a hinged sub-chassis or mount on a rack and arrange for ease of access and removal when necessary.
- .7 Arrange all terminal blocks in the panel in groups such that all low level signals such as 4-20 mA DC are located in one area, followed by contact closure type signals (limit switches, etc.), that do not subsequently energize starters, etc. but are for status indication, and the remainder that contain powered circuits, 120 volt, 50 Hz, are to be arranged in such a manner and location so as to prevent interference into the low level signal.
- .8 Submit proposed terminal block layout and identification scheme for review prior to manufacture.
- .9 Provide suitable spaces around the terminal blocks for incoming and outgoing conductors or cable assemblies.
- .10 Provide plastic cable troughs equal to Panduit complete with snap-on covers for containing the cables. Cables are not to be bunched and tied, but laid in.

## **2.8 PANEL MANUFACTURER**

- .1 Panel assembly, subcomponents and all internal components shall be CSA approved. Cabinet construction shall be performed by an established panel manufacturer who shall comply with all building codes, factory, and Department of Labour regulations and has CSA approval as manufacturer for all components of the work including control panels, MCCs, service entrance, etc. Local approvals for panel construction including CSA will not be accepted.
- .2 Panel manufacturer shall have successfully completed a minimum of five (5) water and / or sewage treatment plant projects of a similar scope and complexity in the past 24 months.

- .3 Panel manufacturer shall have full CSA approval as manufacturer for all components of the work (e.g. panels, MCC, service entrance, etc.).
- .4 Acceptable panel manufacturer shall be Celco Controls, Manco Control Systems Inc.

## **2.9 HAULED WASTEWATER CONTROL PANEL (NEWPCC AND SEWPCC)**

- .1 Hauled Wastewater Building Control Panel shall be as indicated on the drawings, complete with the following:
  - .1 EEMAC 12 rated wall mounted enclosure, 12 gauge, hinged lockable doors
  - .2 20A, 1P, 120V main disconnect switch
  - .3 Lamacoid identification nameplates on all components
  - .4 Terminal strips (identified) for all wiring
  - .5 Control relays, OMRON MK3 PN-5S c/w PF-113A-E bases
  - .6 Panel finish shall be white epoxy paint for interior and ASA 61 light grey enamel for exterior
  - .7 Acceptable panel manufacturer shall be as specified in Section 2.8.

## **2.10 LEACHATE BUILDING CONTROL PANEL (NEWPCC)**

1. Leachate Building Control Panel shall be installed as indicated complete with the following features:
  - .1 EEMAC 12 rated wall mounted enclosure, 12 gauge, hinged lockable doors
  - .2 20A, 1P, 120V main disconnect switch
  - .3 Lamacoid identification nameplates on all components
  - .4 Terminal strips (identified) for all wiring
  - .5 Control relays, OMRON MK3 PN-5S c/w PF-113A-E bases
  - .6 Push-to-test L.E.D. type pilot lights, selector switches, push buttons
  - .7 Panel finish shall be white epoxy paint for interior and ASA 61 light grey enamel for exterior
  - .8 Acceptable panel manufacturer shall be as specified in Section 2.8.

## **2.11 DIGESTER BUILDING CONTROL PANEL (NEWPCC)**

1. Digester Building Control Panel shall be installed as indicated complete with the following features:
  - .1 EEMAC 12 rated wall mounted enclosure, 12 gauge, hinged lockable doors
  - .2 20A, 1P, 120V main disconnect switch
  - .3 Lamacoid identification nameplates on all components
  - .4 Terminal strips (identified) for all wiring
  - .5 Control relays, OMRON MK3 PN-5S c/w PF-113A-E bases
  - .6 Push-to-test L.E.D. type pilot lights, selector switches, push buttons
  - .7 Panel finish shall be white epoxy paint for interior and ASA 61 light grey enamel for exterior



- .8 Acceptable panel manufacturer shall be as specified in Section 2.8.

## **2.12 HYDRONIC SYSTEM MOTOR PANELS**

- .1 Hydronic System Motor Panels in NEWPCC Hauled Wastewater Building, NEWPCC Leachate Building and SEWPCC Hauled Wastewater Building shall be installed as indicated complete with the following features:
- .1 EEMAC 12 rated wall mounted enclosure, 12 gauge, hinged lockable doors
  - .2 15, 3P, 600V main disconnect switch
  - .3 Lamacoid identification nameplates on all components
  - .4 Terminal strips (identified) for all wiring
  - .5 FVNR starters for the following motors:
    - .1 Boiler Pump P-1a,  $\frac{3}{4}$  HP
    - .2 Boiler Pump P-1b,  $\frac{3}{4}$  HP
    - .3 Pad Loop Pump P-2,  $\frac{3}{4}$  HP
  - .6 Control relays, OMRON MK3 PN-5S c/w PF-113A-E bases
  - .7 Push-to-test L.E.D. type pilot lights, selector switches, push buttons
  - .8 Circuit breakers, as required
  - .9 600V:120V control transformer
  - .10 120V:24V control transformer
  - .11 Panel finish shall be white epoxy paint for interior and ASA 61 light grey enamel for exterior
- .2 Acceptable panel manufacturer shall be as specified in Section 2.8.

## **2.13 MOTOR CONTROL CENTRE**

- .1 As specified in Section 26 24 19.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install pushbutton stations, control and relay panels, control devices as indicated and interconnect as indicated.

### **3.2 TESTS**

- .1 Depending upon magnitude and complexity, divide control system into convenient sections, energize one section at a time and check out operation of section.
- .2 Upon completion of sectional test, undertake group testing.
- .3 Check out complete system for operational sequencing.
- .4 Submit one copy of test results to the Contract Administrator.

**3.3 COMMISSIONING**

- .1 Perform all panel start-up and commissioning in accordance with Section 26 05 01.

**END OF SECTION**

**Part 1            General**

**1.1                SCOPE**

- .1        This section specifies the supply installation, field testing, and placing into operation of flow, pressure, temperature, level turbidity, and other instruments of control and instrumentation.

**1.2                RELATED WORK**

- .1        Section 26 05 01 – Common Work Results – Electrical
- .2        Section 40 14 00 – Control Panels
- .3        Section 44 - Process

**1.3                SUBMITTALS**

- .1        Submit shop drawings in accordance with E4. Product data sheets to include:
  - .1        Component electrical characteristics.
  - .2        Performance criteria.
  - .3        Physical size and limitations.
- .2        Include instruments literature in electrical O&M manuals in accordance with Section 26 05 01 – Common Work Results – Electrical. Manufacturer's Instructions to indicate special handling criteria, installation sequence, cleaning and maintenance procedures.

**Part 2            Products**

**2.1                INSTRUMENTS**

- .1        Provide each instrument with mechanisms that are corrosion resistant.
- .2        Provide each instrument with mechanisms enclosed in a dustproof and a moistureproof case.
- .3        Provide all indicator and gauge dials finished in permanent white with black graduations and figures.
- .4        Potentiometric signals shall have a "live" zero or positive minimum value in the signal range.
- .5        Each component shall be carefully selected and designed for a long lifetime with ample margin to withstand transient and other surge voltages, which may occur in the circuits from any source in the power supply.

- .6 Each component and composite instrument shall be suitable for the location and installation position at the attitude designated on the drawings, e.g., horizontal, vertical or sloped position.
- .7 The Contractor shall provide all power supplies. Provide each instrument having a 120 volt supply with a receptacle and plug assembly. Receptacles and plug to be of "twist-lok," type.
- .8 Provide each instrument with a circuit breaker.
- .9 All control panel mounted instruments shall be suitable for flush mounting and shall be furnished with bezel.
- .10 Unless otherwise indicated or specified, all signals shall be of the 4-20 mA DC type. This applies to both transmitting and receiving instruments.
- .11 All materials shall conform to the standards of the Canadian Standards Association (CSA).
- .12 Instrumentation Data Sheets are included in this Section.

## **2.2 ULTRASONIC LEVEL SENSOR/TRANSMITTERS**

- .1 Provide one (1) ultrasonic level sensing system suitable for wastewater applications to monitor levels in the following chambers:
  - .1 Hauled Wastewater Building Storage Tanks (2 heads) (NEWPCC and SEWPCC)
  - .2 Leachate Building Storage Tanks (2 heads)
  - .3 Digester Building Storage Tank (1 heads)
- .2 Surface mounted continuous level monitoring device to provide two (2) 4-20 mA signal proportional to storage tank levels.
- .3 Power input: 120 VAC
- .4 Power output: 4-20 mADC and digital communication. Signal to be input to DCS.
- .5 Range: confirm with Contract Administrator prior to shipment.
- .6 Chemical resistant polyester/polycarbonate alloy surface mounted EEMAC 4X rated enclosure complete with LCD and bar graph display.
- .7 Remote level sensing transducer heads complete with built-in temperature compensation and submersible transducer shield. Supply necessary length of transducer cable between transducer and panel mounted transmitter.
- .8 Acceptable manufacturer shall be Siemens MultiRanger 100.

## **2.3 MAGNETIC FLOW METERS**

- .1 Provide eight (8) magnetic flow meters suitable for wastewater applications as follows:

- .1 NEWPCC Hauled Wastewater Building flow lines 1 and 2.
  - .2 NEWPCC Leachate Building flow lines 1 and 2.
  - .3 NEWPCC Digester Building flow line to Headworks and flow line to drain
  - .4 SEWPCC Hauled Wastewater Building flow lines 1 and 2
- .2 Magmeters to have following characteristics:
- .1 CSA Class 1 Div II Groups A, B, C & D certified and F.M. approved
  - .2 Flanges: Carbon steel, flanged each end
  - .3 Liner: Polyurethane
  - .4 Electrodes: 316 stainless steel
  - .5 Enclosure: EEMAC 4X
  - .6 Product temperature: -10 to 50°C
  - .7 Ambient temperature: 10 to 50°C
  - .8 Power supply: 120 volt AC
  - .9 Power output: 4-20 mADC signal input to the plant PLC
  - .10 Operating Range: Confirm all operating ranges with Contract Administrator
  - .11 Accuracy: 0.2%
  - .12 Local display: instantaneous flow in litres per minute and totalizer in cubic metres
  - .13 Programming: via contactless contacts or HART protocol
  - .14 Capacitance back up for retention of settings and current values
  - .15 Operating pressure: 0-700 kPa
  - .16 Test pressure: 1400 kPa
  - .17 Grounding rings: Mandatory for PVC pipe.
- .3 Acceptable Manufacturers:
- .1 Acceptable flowmeter manufacturer shall be Krohne Tidalflux 4110 c/w IFS 4000 PF at the Hauled Wastewater and Leachate Buildings at both the NEWPCC and SEWPCC Plants.
  - .2 Acceptable flowmeter manufacturer shall be Krohne Optiflux 4000 c/w IFC 100, Rosemount 8705 for NEWPCC Digester Building.

## **2.4 PRESSURE TRANSMITTERS**

- .1 Surface mounted continuous pressure monitoring device to provide 4-20 mA signal proportional to wastewater pressure in pipe.
- .2 Power input: 24 VDC.
- .3 Power output: 4-20 mADC signal and digital communication input to PLC.
- .4 Range: 0 to 700 kPa.
- .5 22-316 stainless steel flanges, vent and drain valve and isolating diaphragm.
- .6 B1-2 inch pipe/wall-mounting bracket.

- .7 C6-CSA NEMA 4X enclosure.
- .8 Acceptable manufacturer shall be Rosemount Smart Gauge Pressure Transmitter Model No.3051C.

## **2.5 HYDROCARBON DETECTORS**

- .1 Provide six (6) hydrocarbon detectors suitable for water applications as follows:
  - .1 Hauled Wastewater Building line 1, line 2, flow (NEWPCC)
  - .2 Leachate Building line 1, line 2, flow (NEWPCC)
  - .3 Hauled Wastewater Building line 1, line 2, flow (SEWPCC)
- .2 Acceptable manufacturer shall be Draeger, model Polytron IR334.

## **2.6 BUILDING FLOOD ALARM**

- .1 Building flood alarm and Dry Pit flood alarm switch shall be ultrasonic gap type.
- .2 Acceptable manufacturer shall be Rosemount model 2100.

## **2.7 TEMPERATURE SWITCHES**

- .1 Provide building low temperature switches as indicated. Acceptable manufacturer shall be Siemens Building technologies.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Coordinate the work of this Section with the installation of the equipment specified in the relevant Sections of Sections 23 and 44 and shown on the Mechanical and Electrical drawings.
- .2 Perform all work in compliance with the relevant sections of this Section.
- .3 Ensure that exit light circuit breaker is locked in on position.

### **3.2 FIELD INSTRUMENT MOUNTING**

- .1 "Mounting" shall mean the positioning and fastening with proper brackets in the position required.
- .2 All equipment shall be mounted in accordance with manufacturer's recommendations.
- .3 Locations of all field instruments are subject to modification by the Contract Administrator who reserves the right to move any item up to 3 meters from the position shown, without change to the contract price, provided notice is given before the related work has commenced.

- .4 Exact locations of all field instruments shall be site determined by the Contractor to the satisfaction of the Contract Administrator to ensure proper operation of the device.
- .5 Employ any and all means of trade, skill, and workmanship to install all field instruments to the satisfaction of the Contract Administrator.

### **3.3 COMMISSIONING**

- .1 Instrument manufacturer's qualified field service representative shall be onsite as required to perform instrument calibration, testing and commissioning and to instruct City Staff in all aspects of instrument operation and maintenance.

**END OF SECTION**