

PART 1 - GENERAL

1.1 REFERENCES

- .1 CAN/CSA C22.1-2015, Canadian Electrical Code.
- .2 IEEE 260.1-04, Standard Letter Symbols for Units of Measurement.
- .3 NFPA 90A-2015, Standard for the Installation of Air-Conditioning and Ventilation Systems.

1.2 ACCEPTABLE PRODUCT

- .1 Existing system is Siemens Apogee Series. All DDC Controls work is to be completed by Siemens Building Technologies.

1.3 SCOPE OF WORK

- .1 Supply all necessary hardware (ModBus to BacNet converters), software and wiring required to tie new equipment into the existing Siemens building automation system.
- .2 Provide necessary hardware to tie in the follow to the existing BACNET system:
 - .1 Generator control panel. Refer to Section 26 32 14 – Power Generation - Diesel.
 - .2 Electric system metering located in the main switchboard.
 - .1 Refer to Section 26 24 03 – Service Entrance Distribution Switchboard.
 - .3 Provide necessary converter boxes to convert equipment communication protocol to BacNet required for existing DDC system.
 - .4 Provide all necessary interconnecting cables and Ethernet switches. Tie in to nearest BacNet loop, install necessary conduit and cable.
- .3 Provide graphic interfaces to display both generator data as well as electric metering data. Graphical displays are to be custom to represent physical layout of equipment. Standard templates will not be accepted. Graphics are to be submitted as shop drawings for review and approval by the department representative.
- .4 Review the program logic for the entire building and make necessary modifications to stagger the starts of all equipment when the generator is running. This is necessary so as to not bring the backup generator load on in one large block.

- .5 Remove redundant DDC software logic for items that are being removed under the contract. Remove all obsolete items from alarm list and DDC graphical interface.
- .6 Provide hardware and software to provide fan stop/start and feedback indication for new extraction arms.
- .7 Provide hardware and software to provide indication of transfer switch position (in emergency power condition).

1.4 CONDUIT IDENTIFICATION

- .1 Colour code all EMCS conduits.
- .2 Locate coding on all conduits and cables exposed after completion of construction in all locations including suspended removable ceilings, tunnels and shafts.
- .3 Coding to be plastic tape or paint at all points where conduit or cable enters wall, ceiling, or floor, and at 15m intervals.
- .4 Coding to be 50mm wide, and fluorescent orange. Confirm colour with Departmental Representative at commencement of the project.
- .5 Install 25mm x 305mm stickers every 10 meters conduits. Stickers to indicated "DDC".

1.5 COORDINATED WORK

- .1 Manufacturers' nameplates and CSA labels must be visible and legible after equipment is installed.
- .2 The Controls contractor must cooperate with other contractors performing work on this project necessary to achieve a complete and neat installation. To that end, each contractor must consult the drawings and specifications for all trades to determine the nature and extent of other work and ensure the Controls contractor tender is complete.
- .3 It will be the duty of the Contractor to work in cooperation with the Departmental Representative and with such other contractors and employees rendering such assistance and so arrange his work such that the entire project will be delivered complete in the best possible condition within the project schedule/allotted time.

1.6 SUBMITTALS

- .1 Shop drawings must include a riser diagram depicting locations of all new equipment, with associated network wiring including converter boxes and connection to existing system.

1.7 SYSTEM START-UP

- .1 After all field connections have been made and control power is available to each control panel, notify the Departmental Representative and enable the control system by the EMCS contractor. Do any software loading at this time and the start-up of the systems shall commence.
- .2 The new graphical interface for the generator is to be completed and ready for commissioning prior to the generator commissioning. Verify all graphical elements during generator commissioning.

1.8 TESTING

- .1 Test each point in the system for both hardware and software functionality. Successful completion of the system test constitutes the beginning of the warranty period. Submit a written report to the Departmental Representative indicating that the installed system functions in accordance with the plans and specifications.

1.9 TRAINING

- .1 The EMCS DDC Control contractor will provide both on-site and classroom training to the Departmental Representative and maintenance personnel for the newly installed elements on the system.

1.10 RECORD DRAWINGS

- .1 Following project completion and testing, submit record drawings reflecting the exact installation of the system. The as-built documentation shall also include a copy of all application software both in written form and on USB thumb drive.

1.11 CODE COMPLIANCE

- .1 All electrical components must be approved, listed or certified for its intended use by an agency accredited by the Standards Council of Canada and the Nova Scotia Provincial Inspection Authority.
- .2 All equipment, piping, or conduit used in conditioned air streams, spaces or

return air plenums must comply with most recent edition of NFPA 90A Flame/Smoke/Fuel contribution rating, and all applicable building codes or requirements.

- .3 All wiring must conform to the Canadian Electrical Code.

PART 2 - PRODUCTS

2.1 DIRECT DIGITAL CONTROL

- .1 The existing building contains a Siemens Apogee DCC system which will remain. The project will see the addition of two (2) new devices on the existing BACNET communication system.
- .2 Provide necessary communication converter devices as well as necessary software and firm ware updates required to integrate the new systems.
- .3 Provide necessary hardware to connect new digital I/O to the boiler room I/O panel.

PART 3 - EXECUTION

3.1 IDENTIFICATION

- .1 All I/O field devices (except space sensors) identified with name plates.
- .2 Identification to match all documentation and identify the function.
- .3 Identify all control wires with labelling tape or sleeves using either words, letters, or numbers that can be exactly cross-referenced with as-built drawings.

3.2 CONTROLS CONTRACTOR RESPONSIBILITIES

- .1 Installation of the building automation system will be performed by the Contractor or a subcontractor. However, all installation must be under the personal supervision of the Controls contractor. The Controls contractor will certify all work as proper and complete and shall reflect actual installation on the project record documentation. Under no circumstances shall the design, scheduling, coordination, programming, training, and warranty requirements for the project be delegated to a subcontractor.

3.3 SOFTWARE INSTALLATION

- .1 Provide all labour necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software or other third party software necessary for successful operation of the system.

3.4 COLOR GRAPHIC SLIDES

- .1 Unless otherwise directed by the Departmental Representative, provide color graphic displays as required for each new system. Graphics shall provide an accurate representation of the installation with graphic display for all control points being controlled and/or monitored. Use custom graphic displays as required. Standard templates will not be accepted.
- .2 Graphics shall be reviewed and approved for acceptance by Departmental Representative.

3.5 CLEANUP

- .1 At the completion of the work, check all equipment and thoroughly clean, clean around equipment. Clean the exposed surfaces of tubing, hangers, and other exposed metal of grease, plaster, or other foreign materials.
- .2 Upon final completion of work in an area, vacuum and/or damp wipe all finished room surfaces and furnishings.
- .3 At the completion of Work at the end of each day, remove from the building, premises, and surrounding streets, etc. all rubbish and debris resulting from the operations and leave all equipment spaces clean and ready for use.

END OF SECTION