

# DIVISION 01 GENERAL REQUIREMENTS

## SPECIFIC TO DALHOUSIE UNIVERSITY

Dalhousie University Design Guidelines provide assistance to consultants during the planning, and design phases of the University's expansion and renovations. The Guidelines do not relieve a consultant from any professional responsibility, duty or due diligence to design elegant, functional, efficient and low maintenance facilities.

Facility owners have preferred materials and requirements that make the task of maintaining facilities less costly. Dalhousie understands this is a balance between capital and operating cost. The Guidelines are not intended to be the only acceptable solution. Dalhousie expects consultants to bring modern and innovative ideas, materials and methods to the University. If these Guidelines do not allow these new ideas then the consultant is to make a request in writing to the Dalhousie Project Manager for an exception to the guidelines. Necessary reasoning and or calculations shall accompany the request. The exception request will be reviewed internally and either rejected or accepted. The consultant will document this rational and/or justification for each exception in the Basis of Design. The University Guidelines may be updated subsequently.

These documents provide design guidelines only, and are not intended for use, in whole or in part, as a specification. Do not copy the guidelines verbatim in specifications or in notes on drawings. Refer questions and comments regarding the content and use of these documents to the Dalhousie University Project Manager. The Guidelines are intended to be read in conjunction with the local codes and regulations, and in no way are to be considered as a code replacement. The codes and regulations represent the minimum acceptable standard. Where the technical design requirements differ from the building codes and other applicable codes and standards, the more stringent of the codes shall be applied.

REVISION HISTORY	
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Division 01 General Requirements	C	NC	NA
01 14 00 WORK RESTRICTIONS			
01 26 00 CONTRACT MODIFICATION PROCEDURES			
01 29 00 PAYMENT PROCEDURES			
01 31 00 PROJECT MANAGEMENT AND COORDINATION			
01 35 23 OWNER SAFETY REQUIREMENTS			
01 35 13.01 SPECIAL PROCEDURES FOR BACNET INTEGRATION			
01 35 13.02 PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (PICS) - IP			
01 35 13.03 PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (PICS) - MSTP			
01 41 00 REGULATORY REQUIREMENTS			
01 51 00 TEMPORARY UTILITIES			
01 52 00 CONSTRUCTION FACILITIES			
01 55 00 VEHICULAR PARKING			
01 56 00 TEMPORARY BARRIERS AND ENCLOSURES			
01 58 00 PROJECT IDENTIFICATION			
01 74 00 CLEANING AND WASTE MANAGEMENT			
01 78 00 CLOSEOUT SUBMITTALS			

Consultant's Signature: \_\_\_\_\_

Consultant's Name (print): \_\_\_\_\_

Date: \_\_\_\_\_

## 01 14 00 WORK RESTRICTIONS

### RELATED REQUIREMENTS

All work to comply with HRM Noise By-Law for excessive noise restrictions and HRM Trucking By-Law for deliveries.

HRM By-Law Number N-200 Respecting Noise (“Noise By-Law”).  
<http://www.halifax.ca/legislation/bylaws/hrm/documents/By-lawN-200.pdf>

HRM By-Law Number T-400 Respecting the Establishment of Truck Routes for Certain Trucking Motor Vehicles Within the Halifax Regional Municipality (“Truck Routes By-Law”).  
<http://www.halifax.ca/legislation/bylaws/hrm/documents/By-lawT-400.pdf>

### USE OF SITE AND FACILITIES

Use Owner’s facilities – washrooms, elevators, stairwells, etc (*[Consultant to request direction from Owner’s PM](#)*)

Use of any University space outside the work site for storage of materials, temporary office space or any other purpose is prohibited.

Use of sanitary or storm drains for disposal of grouts and other cementitious materials or any material that will block a drainage line is prohibited.

If use of washrooms, elevators or stairwells is permitted by the Owner, these facilities will be returned to the Owner in the same condition existing prior to the Work.

### EXISTING SERVICES

Notify University’s Project Manager and utility companies of intended interruption of services and obtain required permission.

Where Work involves breaking into or connecting to existing services, give a minimum of 72 hours notice to the University’s Project Manager. For services such as water main connecting operational buildings, electrical supply to operational buildings, steam/condensate to operational buildings, and communication service to operational buildings, additional notice will be required to coordinate disruption. The University’s Project Manager shall be consulted to assist with coordination.

### UNIVERSITY SMOKING POLICY

Smoking is strictly prohibited on all Dalhousie property, including construction sites, parking lots, sidewalks. Observe and strictly enforce this policy.

### LANGUAGE AND HARASSMENT POLICY

Foul language will not be tolerated

Harassment of any kind (verbal, sexual, physical, etc) to any individual will not be tolerated.

## **TRAVERSING LANDSCAPED AREAS**

Operation of vehicles across landscaped areas is not permitted.

Exception to this rule: Owner's Project Manager and Dalhousie Security Services have provided written permission 48 hours before exception.

To obtain written permission:

- Provide a written site specific safety plan, including pedestrian traffic control plan and protection of Owner's property.
- Provide plan to protect both soft and hard landscaped areas and surfaces. This could include installation of portable construction mats, plates or timber designed to distribute heavy point loads.

Repair any damage that is a result of the Work, including curbs, sidewalks, unit pavers and landscape elements.

Obtain approval by the Owner's Project Manager prior to replacement sod or plant installation.

## **01 26 00 CONTRACT MODIFICATION PROCEDURES**

### **Part 1 General**

#### **1.1 SECTION INCLUDES**

- .1 Contract modifications.

#### **1.2 RELATED SECTIONS**

- .1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

#### **1.3 GENERAL**

- .1 Construct Work under a single CCDC-2 stipulated price contract with Dalhousie Supplemental Conditions.

#### **1.4 VALUATION OF CONSTRUCTION COST FOR CHANGES IN THE WORK**

- .1 Quotations submitted in response to Consultant's potential change orders shall be fully detailed and itemized to facilitate reviewing and processing by the Consultant. Quotations shall:
  - .1 List work proposed to be carried out by the Contractor's own forces showing labour, material, plant and equipment charges together with quantities and unit rates upon which the quotation is based.
  - .2 List work proposed to be carried out by Subcontractors showing the amount quoted by each Subcontractor as verified by the Subcontractor's quotation, the quotation shall show labour, material, plant and equipment charges together with quantities and unit rates upon which the quotation is based.
- .2 Where contract unit rates are not applicable:

- .1 Quote material prices which shall be the net price paid by the Trade Contractor (or Subcontractor) after deduction of all trade and cash discounts and the like other than reasonable discount for prompt payments.
- .2 Quote plant and equipment costs which shall not be more than the rates quoted in the latest edition of "Rental Rates on Contractors Equipment" published by the Canadian Construction Association.
- .3 Quote labour costs which shall be the actual rate paid to the workmen plus a mark-up percent based on union, Merit or corporate agreement to cover Welfare Contribution, Pension Contribution, Vacation Pay, Trade Improvement Fund, Promotional Fund, Training Fund, Supplementary Unemployment Benefits, Check Off, Apprenticeship, Trust Fund and similar labour contract payments; Workers Compensation Insurance, Canada Pension Scheme and other statutory charges on labour where real and applicable.
- .3 The value of change shall be determined in one of the following ways:
  - .1 By estimate and acceptance in lump sum, submitted with subcontractors and supplier's signed quotation and breakdown estimate for materials and labour.
  - .2 By unit prices agreed upon.
  - .3 By cost and percentage or by cost and fixed fee.
- .4 In case of additional work to be paid for under the above methods, the Contractor shall keep and present in such form as the Consultant may direct, a correct amount of the net cost of labour and materials after all trade discounts together with vouchers. In any case, the Consultant shall certify to the amount due to the Contractor.
- .5 In determination of method 1.4.3.1 and 1.4.3.3 above, the labour cost to be calculated by the actual estimated hours at an hourly rate determined as follows:
  - .1 The hourly rate to be the total payroll cost including; base hourly wage rate of worker, statutory contribution to UIC, WCB and CPP and other applicable labour burdens paid directly by the employer such as vacation pay, holiday pay, pension plan etc. (See labour rate calculation form attached).
  - .2 The Consultant reserves the right to verify the payroll costs by an independent audit.
  - .3 To the direct labour rate the following percentage factors will be recognized:
    - .1 Small tools / expenditures: 5% (on direct base labour rate)
    - .2 Site supervision: 5% (on direct base labour rate)
- .6 In determination of method 1.4.3.1 and 1.4.3.3 above, the material cost and labour units to be calculated as follows:
  - .1 Material:
    - .1 Recognized publications or invoices for Civil/Arch.
    - .2 For Mechanical it shall be Allpriser or other approved standard publication of list prices less 30% FOB job site.
    - .3 For electrical it shall be National Price Monitor or other approved standard publication of list prices less 30% FOB job site.
  - .2 Labour:
    - .1 Recognized publications or estimate for Civil/Arch.
    - .2 For Mechanical it shall be Mechanical Contractor Association (MCA) or other recognized trade publication of labour units applied with no productivity factors.

- .3 For Electrical it shall be National Electrical Contractors Association (NECA) or other recognized trade publication of labour units applied with no productivity factors.
- .3 Indirect Labour - @ 3% of the total direct base labour rate representing testing, cleanup, safety and identification.
- .4 Job expense - @ 5% of the total direct base labour rate representing non-working foremen, layouts, as-built drawings and coordination.
- .7 In determination of method 1.4.3.1 and 1.4.3.3 above, equipment cost, equipment rental cost for major pieces of equipment required will be at net invoice cost.
- .8 In determination of method 1.4.3.1 and 1.4.3.3 above, markups shall be calculated as follows:
  - .1 The cost of any authorized change shall be determined by the net total of labour and material or equipment as outlined in 1.4.3.1, 1.4.3.2 and 1.4.3.3 above, on which the following percentage markup shall be added:
    - .1 Work Completed by Contractor's own forces: 10%
    - .2 Contractor's markup on work completed by Subcontractor(s): 5%
    - .3 No percentage markup shall apply to deductions
  - .2 The defined % markups are to include all normal overhead costs such as: head office supervision, insurance, bonds, site office expenses, foreman benefits and profits etc.
- .9 Submit to the Consultant a detailed breakdown list of all materials, labour units and equipment rentals for review and approval.
- .10 It shall be understood and agreed that the mark-ups specified above shall be deemed to provide for payment in full for all items that are considered to be site or head office overhead, profit, supervision, administration and labour as defined in this section.
- .11 The issuance of a change order shall be deemed to be formal acceptance by the Consultant of the quotation. Following the issue of a change order the Consultant will not entertain claims for extra payments due to errors alleged to have been made in the Contractor's quotation.
- .12 The intention is that quotations submitted in response to contemplated change order shall be fair and reasonable and reflect current market prices in line with prices in original tender. The Contractor shall check Subcontractor's quotations for compliance with this requirement before submission to Architect/Consultant.
- .13 Where it is proposed that a change in the scope of work affects the construction schedule, this must be identified at the time of submission of quotation. Claims to access the impact of changes on the schedule at a later date will be rejected. Time extension to the project schedule will be considered only where it can be shown with the overall project schedule that the work area and or trades affected by the change are on the critical path. Time extensions granted for changes to the scope of work will not give rights to claim any additional cost.

**1.5 LABOUR RATE CALCULATION SHEET**

1. Base Rate (per collective agreements or other)	
Journeyman's Rate (apprentice will apply where used)	
Vacation & Holiday Pay	%
<b>Total Base Rate</b>	<b>\$ -</b>

2. Benefits: (per collective agreements or other)		
Health & Welfare		%
Pension Fund		%
Training Fund, apprenticeship & Union		%
P / E Fund (IIF & other)		%
Total Benefits		\$ -
3. Labour Burden: (applied to base rate 1 only)		
(Fed rate tables, base rate 1, 40 hr/wk, 52 pay periods)		
Workman's Compensation		%
Unemployment Insurance		%
Canada Pension		%
Total Burdens		\$ -
4. Job Factor: (applied to base rate 1 only)		
Small Tools (5% base rate)		5.00%
Site Supervision (5% base rate)		5.00%
Indirect labour (testing, cleanup, safety &		3.00%
Job Expense (non working foreman,		5.00%
5. Board / Travel (Union Rates) Per Hour		n/a
Total Job Factor		\$ -
Total Project Labour Rate		\$ -
No other markups allowed		

**END OF SECTION**

**01 29 00 PAYMENT PROCEDURES**

Indicate the Dalhousie Purchase Order Number P90XXXXX on each invoice.

Indicate the vendor's HST registration number on each invoice.

Send invoices to the assigned Dalhousie Project Manager via email OR:

**CANADA POST**

Facilities Management (ATTN Project Mgr)  
1459 Oxford Street  
Halifax, Nova Scotia  
B3H 4R2

**COURIER**

Facilities Management (ATTN Project Mgr)  
1236 Henry Street, 4<sup>th</sup> floor  
Halifax, Nova Scotia  
B3H 3J5

**PROGRESSIVE RELEASE OF HOLDBACK**

Nova Scotia allows for progressive release of holdback for individual trades. This allows for early trades that complete work well before project substantial completion to obtain release of holdback early.

**PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK**

Refer to CCDC 2, GC 5.5.

Amount authorized by certificate for payment of holdback amount is due and payable on day following expiration of holdback period stipulated in the Nova Scotia Builder's Lien Act. Owner may retain out of holdback amount any sums required by law to satisfy any liens against Work or, as permitted by Nova Scotia Builder's Lien Act, other third party monetary claims against Contractor which are enforceable against Owner.

**FINAL PAYMENT**

Refer to CCDC 2, GC 5.7.

Each subsequent invoice for completed work submitted after Substantial Completion shall show a reduction of 10% retainage for Lien holdback.

Submit an application for final payment including any remaining amounts and holdback upon this work when Work is totally complete.

Consultant will, no later than 10 days after receipt of an application for final payment, review Work to verify validity of application. Consultant will give notification that application is valid or give reasons why it is not valid, no later than 7 days after reviewing Work.

Consultant will issue final certificate for payment when application for final payment is found valid.



**01 31 00 PROJECT MANAGEMENT AND COORDINATION****START UP MEETING**

- a. Within 5 working days after notification by Dalhousie Purchasing Department of intent to award a Contract, and before any work commences on Dalhousie property, Contractor is to request a meeting of parties to discuss and resolve administrative procedures and responsibilities.
- b. Dalhousie's Project Manager, the Consultant, the Contractor, and major Subcontractors, are to be the parties in attendance.
- c. Dalhousie's Project Manager to establish time and location of meeting.
- d. The Project Manager shall bring to the meeting the Contract, for execution.
- e. Agenda to include following:
  1. Appointment of official representative of participants in the Work;
  2. Establish project coordination meeting frequency and required attendees;
  3. Schedule of Work, showing key milestones such as equipment/material delivery dates and substantial completion date;
  4. Schedule of submission of shop drawings, samples, and finish samples. See Section 01 33 00 - Submittal Procedures, where applicable;
  5. Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences and laydown areas. See Section 01 51 00 - Temporary Utilities, where applicable;
  6. Dalhousie's Project Hazard Assessment Worksheet and Dalhousie's Contractor Safety Policy will be reviewed and signed by the Contractor;
  7. Security requirements will be reviewed. See Section 01 52 00 - Construction Facilities, where applicable;
  8. Administrative process for proposed changes, change orders, mark-up percentages permitted, time extensions, overtime, and other administrative requirements;
  9. Owner-furnished Products;
  10. Hot Work Checklist review;
  11. Department of Labour site visit procedures;
  12. Insurance certificates and Building Permit;
  13. Hours of work and site supervision requirements.

**01 35 23 OWNER SAFETY REQUIREMENTS****REFERENCES**

- a. Occupational Health and Safety Act of Nova Scotia
- b. Occupational Safety General Regulations of Nova Scotia
- c. Dalhousie's Contractor Safety Policy

**SUBMITTALS**

1. Submit to the Dalhousie University Project Manager a site specific safety plan, including a site specific hazard assessment.
2. Maintain on site all current Safety Data Sheets (SDS), no older than three years, for all controlled products to be used on the project.
3. Submit to the Dalhousie University Project Manager copies of all project safety meeting minutes.
4. Submit to the Dalhousie Project Manager incident reports for each near miss occurrence and accident reports for injuries requiring medical attention.

5. Submit to the Dalhousie Project Manager at project closeout all current SDS's for any controlled products that will remain on the site for ongoing operations and/or maintenance.
6. Any other submittals that may be required for the Work.

## EXECUTION

1. Ensure all Work, including that performed by others under Contractor supervision, undertaken for the University conforms to the requirements of all municipal, provincial and federal by-laws, acts and regulations in matters of health, safety and environmental protection.
2. Conduct a project start-up meeting before beginning contracted work. Safety will be a topic on the agenda and the University Representative responsible for the purposes of this Policy will be identified.
3. Perform a site hazard assessment and create a site specific safety plan. The purpose of the site hazard assessment is to identify potential risks of illness, injury or property damage associated with the Work.
4. Describe the steps and precautions which must be taken by the Contractor, subcontractor and their respective employees to avoid identified risks in the hazard assessment. Review the safety plan and update as necessary and, when a person responsible for directing or performing the work identifies any deficiency in the existing safety plan make appropriate modifications.
5. Make the safety plan available to everyone working on the site. This safety plan will be in accordance with all relevant University guidelines, policies and programs. A copy of the safety plan will be provided to the University Representative.
6. Identify the employee responsible for safety. This employee will provide the University Representative with copies of minutes of all safety meetings and safety inspections which deal with Work carried out under the contract.
7. Ensure all equipment used to perform the Work is in safe working order, that all safety features are in good working order and that the equipment is maintained in this condition.
8. Ensure a current material safety data sheet (SDS) for all controlled substances, as defined in WHMIS legislation, to be used in the course of the Work is kept at the worksite.
9. Maintain the work-site in a neat and safe fashion. Upon the completion of the work, remove all equipment, supplies, debris, etc. from the property.
10. Ensure all employees and subcontractors have appropriate personal protective equipment to deal with hazards where they cannot be otherwise controlled. Ensure the equipment is used when needed and kept in good condition. Ensure appropriate safety precautions are in place to avoid injury or damage by the hazard to property, employees of the Contractor and its subcontractors, and members of the public.
11. Provide a first aid attendant and supplies as appropriate to the nature of the work and the requirements of applicable legislative/regulatory requirements. In the event of an accident, the Contractor must contact Dalhousie Security at **494-4109**.
12. Promptly notify the University Representative of any accident which resulted or could have resulted in an injury or property damage. Provide the University Representative with a report of the incident and assist the University in any resulting investigation.

13. Adhere to University guidelines, policies and programs which are applicable to the nature of the Work under this Contract. Contractors are responsible to review applicable guidelines, policies and programs and to educate their subcontractors and their respective employees prior to commencing work.

**01 35 13.01 SPECIAL PROCEDURES FOR BACNET INTEGRATION**

**NOTE TO CONSULTANT:** Division 01 35 13.01 to 13.03 deal with third party equipment that has a microprocessor based controller containing data to be integrated into the campus' Building Management System (BMS); Johnson Controls Metasys for Halifax campuses and Delta Controls enteliWEB for Bible Hill. The mechanical and/or electrical consultant are responsible to identify equipment that is to be integrated and make reference to these three Division 01 sections in that equipment's specification section so M&E suppliers do not miss this critical information. **This paragraph to be removed before creating spec.**

**BACKGROUND**

The University Building Management System (BMS), Johnson Controls Metasys, uses an open architecture and fully supports IT (Information Technology) standards and a multi-vendor environment. The Network Controllers directly use and support IT, BACnet/IP and BACnet MS/TP open communication protocol standards in order to integrate a wide variety of third-party devices and applications.

**GENERAL**

It is the Non Johnson Controls System vendor's responsibility to collaborate with Johnson Controls (local, regional or corporate), at their own cost, to ensure that the features and functionality specified in this section exist post integration with the BMS.

If, post integration, a specified feature or functionality is found to not exist, it will be considered a project deficiency and the Equipment Supplier's responsibility to remedy, including costs outside of their own.

It is encouraged that Device B vendors conduct a pre-installation Plug Fest with Johnson Controls' Metasys BMS

- A. The original equipment manufacturers (OEM) supplied controllers must directly use BACnet/IP and/or BACnet MS/TP communication. Gateway or Router devices to convert proprietary protocols, or non-BACnet protocols, to BACnet are not acceptable unless approved in advance and in writing by the Consultant and the University subsequent to a successful 'Interoperability Test' with the Metasys BAS. The test shall follow the 'Testing and Verification' procedure listed in this document.
- B. The OEM device must support a BACnet ID, or Instance Number, range of 1 - 4194302.
  - a. BACnet ID, or Instance Numbers, for all devices shall be coordinated through the Johnson Controls project team. The vendor will supply the count of instance numbers required and Johnson Controls will supply them for the particular project. Unique device Instance numbers shall be organized by equipment type, where applicable, per the following table.

Equipment Type	Instance Number Range
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Metasys	000001 - 049999
Fire System	050000 - 059999
Security	060000 - 069999
Mechanical Equipment	070000 - 071999
Lighting	082000 - 089999
TEC Controllers	072000 - 072999
TEC Controllers	073000 - 073999
SPARE	074000 - 075999
TEC Controllers	076000 - 076999
Siemens	077000 - 079999
OptiNet	080000 - 080999
SPARE	081000 - 081999
Honeywell	090000 - 099999
Phoenix	100000 - 199999

- C. Network controllers and other IP based OEM controllers shall communicate using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol and BACnet/IP addressing as specified in ANSI/ASHRAE Standard 135-2012, BACnet Annex J and shall be BTL-listed as B-BC.
- D. IP based OEM devices shall be DHCP capable.
- E. Field Controllers shall be BTL-listed as B-ASC or higher, and shall be configured and programmed to communicate using the BACnet Standard MS/TP Bus Protocol ANSI/ASHRAE Standard 135-2012. Non field adjustable MSTP addressing is not acceptable.
- F. Fieldbus Controllers (FC) that support communications using other protocols shall have all other protocols, except BACnet, turned off, or otherwise disabled, so that the FC communicates using BACnet MS/TP only.
- G. The FC communications bus shall be RS-485 as described in ANSI/ASHRAE Standard 135-2012. The use of BACnet over ARCNET will not be permitted in this project at ANY Level.
- H. All of the inputs, outputs, set points, limits, schedules, alarms, trends and events must be (standard) BACnet objects with (standard) BACnet properties.
- I. All devices shall utilize NOVRAM to store their programs, input/output points and parameters to ensure all information is archived appropriately at the local device level without requiring database uploads and downloads from a connected PC to archive/restore the database to the device.
- J. A backup copy of each device's database file shall be provided to the University at project completion. Backup will contain the operational sequence of operations program and all operational setpoints/parameters and input/output objects.
- K. The most current copy of software tools required to configure/program and upload/download devices shall be provided to the University at project completion.

#### **OEM CONTROLS INTEGRATION WITH BMS**

- A. The Contractor who supplies equipment, herein after called the Equipment Provider, shall be responsible for providing all necessary engineering, labor, field support, documentation, software tools, PICS (protocol implementation conformance statements), programming code and all necessary hardware to ensure that the OEM packaged control system(s) and the BMS integrate and communicate with one another as described in this section.
- B. The Equipment Provider shall also be responsible for providing Testing and Verification of their controllers associated with the equipment, including trained and experienced staff, and all necessary engineering, labor, software tools, and documentation.

- C. The Equipment Provider must ensure that all of the objects and properties in the OEM controllers are exposed and read/write accessible, for control/override, trending, scheduling, and alarm strategies, via BACnet IP and/or BACnet MS/TP as described in this specification.
- i. This will include: expose and make visible as BACnet standard objects and properties the real-time value and status of any/all objects from the OEM controller. Objects include raw input and output values, input/output values and status in derived engineering units, point attributes such control priority, limits, and setpoints. Schedules and the associated attributes, trends, and alarms and the associated attributes shall also be included in the OEM objects if the controllers contain these objects.
  - ii. Command (override/write) any set-point, output point, limit, or control object from the OEM controller
  - iii. All Multistate Inputs, Outputs and Value objects will use appropriate text values for the Multistate 'States Text'. State Text for all Multistate objects will be reviewed and accepted/rejected by the consultant and University
  - iv. 3rd party devices to have Writeable (and assigned appropriate name by the supplier prior to being sent to site, or by their start-up rep):
    - i. Device Names (Not just Device 1 for all the devices)
    - ii. Mappable Points (not AI-1, AI-2, etc.). If this is not available, a spreadsheet, sortable by instance number, shall be provided in advance of any auto-discovery by the BMS. The spreadsheet will include all Object attributes such as engineering units, enumeration sets, etc.
- D. Programming, configuration and Object naming in the OEM supplied controllers/devices must comply with Dalhousie University BMS standards.
- a. In the case that Device Names, Mappable Point Names, or Object Names are not formatted according to the Dalhousie University BMS standards in the OEM supplied controllers after auto discovery, it will be the responsibility of the Contractor providing the OEM equipment to rename/reconfigure the names appropriately.
  - b. In the event that the OEM supplied controllers do not have the ability to conform to the Dalhousie University BMS standard for Device Names, Mappable Point Names or Object Names then the Contractor providing the OEM controllers shall be responsible for the cost of manual configuration of these names in the Metasys System database to conform to the Dalhousie University BMS standards.
- E. BACnet Change of Value (COV) Subscription service must be fully implemented in the OEM supplied controllers/devices. All objects from the OEM supplied controllers/devices mapped to the Metasys BMS will utilize this service to ensure optimum use of communications bandwidth on the MSTP and IP networks. Further, the OEM controller/device must accept COV Subscriptions from any controller on the network and must also initiate COV Subscriptions when requesting data from other controllers on the network. In this manner all Object Present Value attribute updates to and from the controller will be accomplished with Change Of Value reporting.

Specific sequences of operation and object lists can be found in relevant technical specification sections.

If information is discovered that was not provided prior to tender, or during shop drawing review, that affects what can be integrated, additional information may be required to be integrated. The cost associated with this shall be the Equipment Supplier's.

## **PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENTS (PICS)**

As part of the vendor's submittal package, a PICS should be submitted for each BACnet device in the system. At a minimum, the PICS should demonstrate the device's BACnet capability and will adhere to the following minimum requirements:

- A. For the minimum requirements for a BACnet/IP based controller that conform to the B-BC listing refer to Attachment – “Protocol Implementation Conformance Statement (PICS) – IP”. Note the BIBBs, as outlined in the PICS statements attached form the minimum requirements. These were derived from Annex K of ANSI/ASHRAE Standard 135-2012 and our requirements.
- B. For the minimum requirements for a BACnet MS/TP based controller that conform to the B-ASC or B-AAC listing, refer to Attachment - “Protocol Implementation Conformance Statement (PICS) – MSTP”. Note the BIBBs, as outlined in the PICS statements attached form the minimum requirements. These were derived from Annex K of ANSI/ASHRAE Standard 135-2012 and our requirements.

### TESTING AND VERIFICATION

The Testing and Verification process will demonstrate integration of and recording of controller communication faults, point and controller faults and offline conditions, and return to normal conditions. The Testing and Verification process shall include:

- A. The OEM shall provide the necessary on-site support to help integrate their device into the BMS network.
- B. View the real-time value and status of any/all objects (points) from the (OEM) packaged controllers in the Metasys BMS User Interface (UI) screen/graphic.
- C. Command (override) any set-point, output point, limit, or control priority object from the Metasys BMS UI screen/graphic.
- D. Create a Metasys BMS occupancy schedule to turn ON/OFF a point or flag to the (OEM) packaged controller's, equipment and/or spaces to ensure proper functionality of the Priority attribute on output control objects.
- E. Create a Metasys BMS point sampling trend to archive the real-time value or status of a point or object; View the trended value or status of a point or object over a time interval to ensure COV updates to the trending occur appropriately. COV trends will only show trends samples when the trended value exceeds the COV Increment as programmed in the Trend object.
- F. Create a Metasys BMS alarm strategy that uses/requires the real-time value, COV status of a (OEM) packaged controller's object or point, and initiates an alarm within 15 seconds.
- G. View and trend the (OEM) packaged controller's communications faults
- H. View and trend from the Metasys BMS the (OEM) packaged controller's “offline” and point “offline” and “return to normal” status.

Should the OEM's controller require a firmware or software change to accomplish specified functionality, the cost of retesting by non OEM entities to validate functionality shall be the responsibility of the OEM.

**END OF SECTION**

**01 35 13.02 PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (PICS) - IP**

*This is a Protocol Implementation Conformance Statement (PICS) containing the minimum requirements to be included on PICS documentation for B-BC class devices utilizing the BACnet/IP communication method. The BIBBs listed are the minimum R (Required) and preferred O (Optional) BIBBs for these devices. The Object types listed are the minimum required object types supported on these devices. The Data Link Layer options are the minimum required communication method supported on these devices and the Character Sets listed are the minimum required character sets supported on these devices.*

**Part 2 Detailed Product and Manufacturer Information**

Vendor		BACnet Testing Lab Certified
Detailed information of product manufacturer		Declare if the product is BACnet Testing Lab (BTL) certified
Revision Date of the Product	BACnet Protocol Revision	Date Tested
July 2009	Revision of the BACnet Protocol that the product is certified to.	Date of BTL certification

Product Name	Model Number	Software Version
Specific Product Name	Specific Product Model #	Specific Software Revision of Product

**Part 3 Device Profiles**

Profile	Model Numbers
Specific BACnet Device Profile of product	Specific Model # of Device

**Part 4 BIBBs Supported**

	List <b>all</b> the Data Sharing BIBBs supported on the Device		R=Required O=Optional
Data Sharing	Read Property-B	DS-RP-B	R
	Read Property Multiple-B	DS-RPM-B	R
	Write Property-B	DS-WP-B	R
	Write Property Multiple-B	DS-WPM-B	R
	Change of Value-B	DS-COV-B	R
	Change of Property-B	DS-COVP-B	R

	List <b>all</b> the Device and Network Management BIBBs supported on the Device		R=Required O=Optional
Device and Network Management	Dynamic Device Binding-B	DM-DDB-B	R
	Dynamic Object Binding-B	DM-DOB-B	R
	Device Communication Control-B	DM-DCC-B	R
	Time Synchronization-B	DM-TS-B	R
	UTC Time Synchronization-B	DM-UTC-B	R
	Reinitialize Device-B	DM-RD-B	O
	Restart-B	DM-R-B	O

	List <b>all</b> the Alarm and Event Notification BIBBs supported on the Device		
Alarm and Event Notification			

	List <b>all</b> the Scheduling BIBBs supported on the Device		
Scheduling			

	List <b>all</b> the Trending BIBBs supported on the Device		
Trending			



**Part 5 Object Type Support**

List <b>all</b> the Object Types Supported on the Device		
Analog Input	Analog Output	Analog Value
Binary Input	Binary Output	Binary Value
Multi-State Value		

	List <b>all</b> the Device Communications Faults, Statistics, and Online/Offline data available as Standard BACnet Objects or Attributes of Standard BACnet Objects supported on the Device	O=Standard BACnet Object A=Attribute of Object	R=Required O=Optional
Device Communication	Faults	A	R
	Offline/Online	A	R
	CPU Usage	A	R
	Has Unbound References	A	R
	Memory Usage	A	R
	Object Count	A	R
	Flash Usage	A	O
	Object Memory Usage	A	O
Point Object Status	Out Of Service	A	R
	Offline/Online	A	R
	Unreliable	A	R

**Part 6 Data Link Layer Options**

Media	Options
BACnet/IP	BBMD

**Part 7 Character Set Support**

List all the Character Sets Supported on the Device
ISO 10646 (UTF-8) ISO 10646 (UCS-2)

**END OF SECTION**

**01 35 13.03 PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (PICS) - MSTP**

*This is a Protocol Implementation Conformance Statement (PICS) containing the minimum requirements to be included on PICS documentation for B-AAC or B-ASC class devices utilizing the BACnet MS/TP communication method. The BIBBs listed are the minimum R (Required) and preferred O (Optional) BIBBs for these devices. The Object types listed are the minimum required object types supported on these devices. The Baud rates listed are the minimum required baud rates supported on these devices and the Character Sets listed are the minimum required character sets supported on these devices.*

**Part 8 Detailed Product and Manufacturer Information**

Vendor		BACnet Testing Lab Certified
Detailed information of product manufacturer		Declare if the product is BACnet Testing Lab (BTL) certified
Revision Date of the Product	BACnet Protocol Revision	Date Tested
July 2009	Revision of the BACnet Protocol that the product is certified to.	Date of BTL certification

Product Name	Model Number	Software Version
Specific Product Name	Specific Product Model #	Specific Software Revision of Product

**Part 9 Device Profiles**

Profile	Model Numbers
Specific BACnet Device Profile of product	Specific Model # of Device

**Part 10**                      **BIBBs Supported**

	List <b>all</b> the Data Sharing BIBBs supported on the Device		R=Required O=Optional
Data Sharing	Read Property-B	DS-RP-B	R
	Read Property Multiple-B	DS-RPM-B	O
	Write Property-B	DS-WP-B	R
	Write Property Multiple-B	DS-WPM-B	O
	Change of Value-B	DS-COV-B	R
	Change of Property-B	DS-COVP-B	O

	List <b>all</b> the Device and Network Management BIBBs supported on the Device		R=Required O=Optional
Device and Network Management	Dynamic Device Binding-B	DM-DDB-B	R
	Dynamic Object Binding-B	DM-DOB-B	R
	Device Communication Control-B	DM-DCC-B	R
	Time Synchronization-B	DM-TS-B	O
	UTC Time Synchronization-B	DM-UTC-B	O
	Reinitialize Device-B	DM-RD-B	O
	Restart-B	DM-R-B	O

	List <b>all</b> the Alarm and Event Notification BIBBs supported on the Device		
Alarm and Event Notification			

	List <b>all</b> the Scheduling BIBBs supported on the Device		
Scheduling			

	List <b>all</b> the Trending BIBBs supported on the Device		
Trending			

**Part 11 Object Type Support**

List <b>all</b> the Object Types Supported on the Device		
Analog Input	Analog Output	Analog Value
Binary Input	Binary Output	Binary Value
Multi-State Value		

	List <b>all</b> the Device Communications Faults, Statistics, and Online/Offline data available as Standard BACnet Objects or Attributes of Standard BACnet Objects supported on the Device	O=Standard BACnet Object A=Attribute of Object	R=Required O=Optional
Device Communication	Faults	A	R
	Offline/Online	A	R
	CPU Usage	A	R
	Has Unbound References	A	R
	Memory Usage	A	R
	Object Count	A	R
	Flash Usage	A	O
	Object Memory Usage	A	O
Point Object Status	Out Of Service	A	R
	Offline/Online	A	R
	Unreliable	A	R

**Part 12 Data Link Layer Options**

Media	Options
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MS/TP master	38400, 76800
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### Part 13 Character Set Support

List all the Character Sets Supported on the Device
ANSI X3.4 ISO 10646 (UCS-2)

## END OF SECTION

### 01 41 00 REGULATORY REQUIREMENTS

**Note to Consultant:**

**The clause below applies unless Owner has previously obtained building permit prior to award of contract.**

Obtain (apply and make payment) and maintain all required Permits. This includes all required inspections to the satisfaction of Authorities having Jurisdiction. This applies to all permits required by law for work, including but not limited to Building Permits, Electrical Permits, Communication Permits, Plumbing Permits, Traffic Permits, Sidewalk Permits, and Fuel Safety Permits.

### 01 51 00 TEMPORARY UTILITIES

**Note to Consultant:**

**Each project is different. Discuss with Owner's Project Manager use of temporary electrical, water and heat before work is tendered.**

#### **ELECTRICAL**

Use of Dalhousie electrical power is permitted. Usage charges will be paid by Owner, at no cost to Contractor. Make temporary connections, as approved by Owner's Project Manager, at own cost.

#### **WATER**

Use of Dalhousie water supply is permitted. Usage charges will be paid by Owner, at no cost to the Contractor. Make temporary connections, as approved by Owner's Project Manager, at own cost. Ensure use of backflow preventors at all times.

#### **HEAT**

Connection to Dalhousie heating equipment is prohibited. All temporary heat and related costs are the responsibility of the Contractor.

#### **COMMUNICATIONS**

Provide temporary telephone, fax, and computer hook-ups at own cost. Use of Dalhousie communication infrastructure is not permitted. Wireless connection to Dalhousie network shall not be provided.

#### **FIRE DETECTION, SUPPRESSION AND ALARM**

1. Ensure integrity of all fire protection systems is maintained at all times within the workplace.
2. Develop a “Proposed Safety Plan”, should any piece and or section of detection, suppression or alarm system(s) is to be removed from service.
3. Obtain necessary approval of the “Proposed Safety Plan” from the Authority(s) Having Jurisdiction,
4. Pay for all costs associated with the measures within the “Approved Safety Plan”.

## **01 52 00 CONSTRUCTION FACILITIES**

### **ACCESS TO CAMPUS AFTER HOURS**

Obtain approval from the Owner’s Project Manager for any work after regular working hours. If approval is granted, access is obtained through Dalhousie Security Services (located at 1252 LeMarchant Street). Security Services will deny access if approval of the Project Manager is missing. Security Services is open 24/7, 365 days per year.

### **DAMAGE TO PROPERTY**

Make good any damage to Dalhousie property prior to completion of the Work.

## **01 55 00 VEHICULAR PARKING**

### **CONTRACTOR PARKING IN DALHOUSIE LOTS**

Temporary parking permits, if seasonally available, permit a contractor vehicle to park in “Regular surface lots” with temporary permit displayed in windshield. Discuss availability of these permits with the Owner’s project manager. These permits are restricted to two per project, when available, and shall be paid for by the Contractor at the posted cost.

The term “Regular surface lots” excludes:

- Reserved parking
- Ride Share spots
- Accessible spots
- Park n Pay lots - these are available for contractor parking if the valid Park n Pay ticket is obtained at the kiosk in the lot and displayed in the windshield.
- Metered spots – these are available for contractor parking if meter is used as intended, with cash.

### **CONTRACTOR PARKING IN CONSTRUCTION COMPOUNDS**

Obtain approval from Owner’s Project Manager to park contractor vehicles within an enclosed compound that forms part of the construction site. The conditions relating to this are as follows:

1. Use of compounds for contractor parking is discouraged, especially during the fall and winter school terms.

2. Compound location, dimensions, and duration of operation must:
  - i. Be approved at least one week in advance by the Project Manager and Security Services. These dimensions and durations shall not be changed without approval.
  - ii. Compound enclosure shall be 6'-0" high modular interlocking fencing. Contractor shall ensure that the integrity of the enclosure is maintained at all times, including providing gates and locks when required.
3. Provide a written site-specific safety plan, including a traffic control plan, indicating safe work procedures to ensure the safety of pedestrians and the protection of Dalhousie property.
4. Only Contractor vehicles shall be permitted to park within the enclosure. Parking shall be at the risk of the Contractor. Dalhousie shall not be responsible for any damage to vehicles parked within the enclosure.
5. Contractor shall be responsible to repair and make-good the area of the compound after completion of the work to match the prior existing conditions. All work shall be executed as per the requirements of 01 14 00 WORK RESTRICTIONS - Traversing Landscaped Areas.

### **01 56 00 TEMPORARY BARRIERS AND ENCLOSURES**

#### **SCAFFOLDING/HOARDING**

1. Hoard scaffolding to a height of 8' with a material, and in a manner, that prevents climbing.
2. If there are windows on the building façade, there should be a method of preventing unauthorized access to the scaffold through a building window.
3. Use new wood for scaffold hoarding.
4. Paint wooden hoarding if it will be in place for longer than one month.
5. Use new materials for hoarding that is used for other purposes whether interior or exterior. (plastic sheeting, Gyproc, or plywood)
6. Maintain all hoarding in good condition at all times.

#### **FENCING**

1. On exterior projects that require fencing to restrict pedestrian access to the site the minimum standard is a modular metal fencing system (Modulok) to a minimum height of six feet.
2. Erect and maintain fencing in a secure condition as intended by the manufacturer.
3. Snow fence is not permitted.
4. Chain link fence may be required in some instances. Consultant to discuss with Project Manager.

### **01 58 00 PROJECT IDENTIFICATION**

Erect project specific safety sign(s), clearly identifying area of construction and required personal protective equipment necessary within the construction area. The signage shall be posted at all entrances to the site.

Erect project identification sign(s) only after approval of the Owner's Project Manager. Such signage shall be branded to Dalhousie University requirements.

Use gender neutral language for all signs. for example: "~~Men Working Overhead~~" should read: "Work Overhead"

## 01 74 00 CLEANING AND WASTE MANAGEMENT

Stripping and waxing of finished floor products is not permitted. Leave protective floor coating on finished product for Owner's staff to inspect.

Make good all existing interior and exterior surfaces and finishes and assemblies to match adjacent surfaces and finishes and assemblies.

Use of Owner's rubbish bins is prohibited. Violations shall be fined up to \$1,000 for each instance where this can be proven.

Disassemble, remove and dispose of all demolition waste, including all equipment which must be removed to complete the scope of work, and which has not been designated for reuse by the Owner.

Burning of waste on site is prohibited.

## 01 78 00 CLOSEOUT SUBMITTALS

1. Submission Procedure
2. Project Record Drawings
3. Operation and Maintenance Manual
4. Warranty Manual
5. FAMIS Equipment Forms
6. Efficiency One Submittals

### **SUBMISSION PROCEDURE (NOTE TO CONSULTANT)**

All submissions begin with Contractor submitting documents to Consultant for review. This guideline describes what the Owner wishes to receive as closeout documents and how the documents are to be formatted. It is the Consultant's responsibility to ensure the Contractor is aware of and follows these requirements. All submissions shall be in electronic format.

### **PROJECT RECORD DRAWINGS**

Each discipline (Arch, HVAC, Sprink, Plumb, Elect, Landscape, Struct, etc) to have it's own two zip files: one for ACAD and one for PDF. Each sheet is to have its own ACAD and PDF files. The electronic file naming convention shall be as follows:

Sheet Identification Nomenclature:      Capital Project # - Building-Floor - Sheet



Basic Character Nomenclature: YYYYY-NNNN-ANNN-NN-AANNN- Description

Sample Name: 2010-0086-E280-03-A101-Level 1 Floor Plan

Where:	2010-0086 E280 03 A101 Level 1 Floor Plan	Capital Project # (obtain from Project Manager) Building Number (obtain from Project Manager) Floor Number Sheet Number Sheet Description
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## OPERATION AND MAINTENANCE MANUAL

O&M Manual Format:

Material shall be submitted in PDF format for each of Masterformat Specification Section. Format shall be such that each Section is searchable (has no scanned pages) and has a Table of Contents in which each line is hyper linked to the corresponding Section in the document, for ease of navigation. Table of Contents which shall also be replicated as Bookmarks within the PDF for further ease of navigation.

1. Master Contact List for the Work
  - a. A list of contractors, subcontractors, and suppliers involved with the system/assemblies and their contact information. Company Name, Individual Contact Name, Phone Number, Email Address
  
2. The Owner's Manual should contain, as a minimum, the following sections, for each "Specification Division". To be organized by Masterformat Number.
  - a. Cover Page including Contact Information
  - b. Approved Shop Drawing submittals.
    - i. A copy of the approved submittals for the components associated with the system/ assembly with all field modifications and accessories clearly marked. In addition, the comments from the review of the original submittals shall be included.
  - c. As-Built Riser Diagrams and Single Line Diagrams
  - d. Operations and Maintenance Manuals
    - i. The manufacturer's printed operations and maintenance manuals for the specific equipment/components provided for the system/assembly.
    - ii. A parts list, a troubleshooting guide for common situations, and one-line diagrams for each applicable system.
  - Maintenance procedures, schedules, and recommendations
    - iii. The manufacturer's recommendations for maintenance procedures and frequency when maintenance should be performed as well as maintenance parts required and necessary documentation.
  - e. Recommended Spare Parts
    - i. Source(s) and availability information for replacement parts shall be provided.

- ii. Recommendations for spare parts, special tools and maintenance materials based upon a risk assessment, complexity of the “*System/Assembly*” and availability (time necessary to obtain) of each.
- f. Applicable Testing and Verification Forms
- g. Applicable Certification Forms
- h. Current SDS’s for any controlled products that will remain on the site for ongoing operations and/or maintenance.

The Mechanical manual shall have as a minimum the following other Sections:

1. Legend of ceiling identifiers
2. Valve Schedule and Flow Diagrams
3. Air and Water Filter Size Chart by applicable System/Assembly.
4. Damper Schedule - Dampers are summarized by type (automatic, balancing, fire), size, location and/or System/Assembly
5. Valve and Tag Schedule (a laminated 36” x 48” copy is to be posted in Mechanical Rooms)

## **WARRANTY MANUAL**

1. Substantial Performance Date (Warranty Start Date)
2. Summary of Extended Warranties as specified in the Contract Documents. By Assembly/System document the details of warranties that extend beyond the typical one (1) year from Substantial Performance construction contract warranty.
3. List and Details of Extended Warranties:
4. By Assembly/System, warranties directly from manufacturers that exceed that of the Construction Documents that have been transferred to the Owner.

### **NOTES TO CONSULTANT ABOUT EXTENDED WARRANTIES:**

- a) Standard 12-month warranty for a project begins at Substantial Performance. Systems and or equipment that are not considered complete at the time of the project’s (or trade’s) Substantial Performance shall be noted as such on the Substantial Performance Certificate’s Punch List. The Standard 12 month warranty for incomplete systems’ equipment shall be one year from the date upon which it is removed from the Punch List.
- b) In some cases the cost of extended labour and material warranties is not deemed necessary by the Owner. However, many manufacturers offer extended warranties on their products at no additional cost. These extended material/equipment warranties shall be made available to the Owner at the time of shop drawing submission. The Consultant shall review each of these with the Owner’s Project Manager.
- c) The Consultant shall recommend to the Owner any extended warranties (including material and labour) and/or service agreements which it deems important. In all cases, these shall be listed as alternative ADD prices to the base project on the bid form.

## **FAMIS EQUIPMENT FORMS**

1. Complete and submit to Owner’s Project Manager a FAMIS equipment form for equipment identification purposes.

2. Apply an Owner supplied bar code sticker to both the equipment and the form. Owner to supply duplicate bar codes.

### **EFFICIENCY ONE SUBMITTALS**

The Efficiency One rebate process shall be adhered to as follows:

1. Contractor to provide a material list and/or equipment schedules indicating the specifications and quantities for all of the following equipment prior to ordering:
  - a. Variable frequency drives
    - i. Make and model
    - ii. Motor horsepower sizing
  - b. Air handling units
    - i. Make and model
    - ii. Sizing – airflow and static pressures
    - iii. Motor horsepower for all fans
  - c. Integrated/ECM sensorless circulation pumps
    - i. Make and model
    - ii. Sizing – GPM and ft of head
    - iii. Motor horsepower
  - d. Lighting
    - i. Make and model for each lamp/fixture type
    - ii. Counts of each lamp/fixture type must be provided
    - iii. Counts for occupancy sensors and daylight harvesting sensors
2. Provide invoices for each piece of equipment included above, once available.
3. Do not make any applications for rebates on above equipment. Owner shall obtain rebates directly from Efficiency One.