



RETURN BIDS TO:

RETOURNER LES SOUMISSIONS À:

Travaux publics et Services gouvernementaux
Canada
Place Bonaventure, portail Sud-Oue
800, rue de La Gauchetière Ouest
7e étage, suite 7300
Montréal
Québec
H5A 1L6
FAX pour soumissions: (514) 496-3822

**SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

**Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur**

Issuing Office - Bureau de distribution

Travaux publics et Services gouvernementaux Canada
Place Bonaventure, portail Sud-Oue
800, rue de La Gauchetière Ouest
7e étage, suite 7300
Montréal
Québec
H5A 1L6

Title - Sujet UPS Installation System	
Solicitation No. - N° de l'invitation EF944-191801/A	Amendment No. - N° modif. 002
Client Reference No. - N° de référence du client R.094477.001	Date 2018-11-13
GETS Reference No. - N° de référence de SEAG PW-\$MTC-560-15079	
File No. - N° de dossier MTC-8-41214 (560)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2018-11-22	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Ghali, Camille	Buyer Id - Id de l'acheteur mtc560
Telephone No. - N° de téléphone (514) 607-2190 ()	FAX No. - N° de FAX (514) 496-3822
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction:	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

AMENDMENT No. 2

This amendment aims to answer some questions received during the call for tender and to include Addendum No.1.

Question: General Note No. 11 of plan A01 / 02, the underside of the floor (metal deck is to be squirted).

Is it the ceiling of the UPS room or floor and what area to squirt?

Answer: The underside is on the ceiling.
Squirt the entire surface of the ceiling.

- All other terms and conditions remain unchanged –

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 The present section includes all the sections in series 23, 25, 26 applicable to the scope of works in ventilation, air conditioning, electricity and controls and must be used conjointly with the following sections, considered as being an integral part of the documents.
 - .1 01 56 00 – Temporary barriers and enclosures
 - .2 01 33 00 - Submittal procedures
 - .3 01 74 11 – Cleaning

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises the construction of a new room for a new Uninterrupted Power Supply (UPS) unit, including the supply, installation, and connection of the UPS and a new air treatment unit as well as the dismantling of equipment at the Public services and Procurement Sante Canada site – Longueuil, located at 1001 St-Laurent, Longueuil, Québec, J4K 1C7, Canada
- .2 The contractor and sub-contractors must supply the manpower, all equipment, tools and materials necessary for the fabrication, installation and start-up of the systems, such as described in the specification sections and on the plans. The electrical works described below does not constitute a limitation of all the works to be carried out. Any additional work, not described but required for the completion of the project, will be considered as part of the tasks to be performed.
 - .1 Architectural works
 - .1 Create a housekeeping base
 - .2 Create an opening in the existing wall and dismantling certain finishes
 - .3 Supply and install new drywall
 - .4 Supply and install door frames and hardware
 - .5 Supply and install a new floor covering including baseboards
 - .6 Carry out necessary painting work
 - .7 Start-up of the building automation system. Demonstrate proper operation of ventilation control sequences
 - .2 Ventilation and plumbing works
 - .1 Dismantle and dispose of the Air Handling Units (AHU).
 - .2 Dismantle and dispose of the ventilation ducts
 - .3 Dismantle and dispose of the network piping of the dismantled units.
 - .4 Remove and dispose of the outdated ventilation control equipment
 - .5 Supply and install the following new AHU and their respective equipment.
 - .6 Supply and install the new ventilation duct sections and connect the new equipment. Adjust the size of the duct to connect the new units to existing ventilation ducts.

- .7 Supply and install a transfer grille and a duct with acoustic insulation
- .8 Supply and install a return grille to be installed in duct upstream the new AHU.
- .9 Supply and install the new piping for the new AHU
- .10 Supply, install, connect and program to the Building Automation System (BAS).
- .11 Supply and install insulation and sound insulation for the ventilation ducts and piping. Replace the insulation sections removed during dismantlement and carry out any repairs due to their deterioration during the works.
- .12 Supply, install and connect the measuring and control equipment required (such as thermostats).
- .13 Provide and install anchors required for installation of equipment and ducts. Design anchorage and curbs to ensure an installation according to the codes in force. The design of seismic protection devices and systems must be performed by a specialized in the field of earthquake engineering and recognized in the Province of Quebec.
- .14 Supply training on the new equipment and control systems.
- .15 Supply a project manual
- .16 Supply the material and repair and patch the walls, ceilings and roof following the works.
- .17 Clean all the ventilation ducts of all ventilation systems on site. Supply and install the doors and access panels for the ventilation ducts and architectural ceilings.
- .18 Perform start-up of the new systems and new Building Automation System. Demonstrate the proper functioning of the ventilation control sequences.

1.3 ELECTRICAL WORK

- .1 General
 - .1 Sections dealing with the administrative arrangements mentioned above.
 - .2 Sections relating to utilities, works and temporary facilities, previously mentioned.
 - .3 Section 23 05 48 - Vibration and seismic systems and devices for piping and HVAC equipment;
 - .4 Section 26 05 01 - Electrical - General Requirements for Work Results
- .2 In general, the work to be done is shown in the following sections:
 - .1 Section 26 05 20 - Connectors for cables and boxes 0-1000 V
 - .2 Section 26 05 21 - Wires and cables
 - .3 Section 26 05 28 - Secondary Grounding
 - .4 Section 26 05 29 - Mounts and Suspensions for Electrical Installations
 - .5 Section 26 05 32 - Outlet Boxes, Bypass Boxes and Accessories.
 - .6 Section 26 05 34 - Conduits, Fasteners and Conduit Fittings

- .7 Section 26 24 16.01 - Breaker Distribution Panels
- .8 Section 26 24 16.02 - Molded Case Circuit Breaker
- .9 Section 26 27 26 - Wiring Devices
- .10 Section 26 33 53 - Uninterruptible Power System
- .11 Section 26 52 00 - Security Lighting

- .3 Electrical work mainly includes:
 - .1 Modification to emergency electrical distribution;
 - .2 Removal of uninterruptible power system;
 - .3 Supply, installation of a new uninterruptible power supply system;
 - .4 Removal, modifications and / or connections to existing systems or apparatus, including fire alarm, earthing, lighting and accessories required, Lighting control, sockets and accessories required,
 - .5 Power supply, complete electrical connections for mechanical appliances: plumbing, heating and ventilation.
 - .6 Coordination with mechanical divisions:
 - .1 Consult all specifications, plans and tables of mechanics, for the exact and final location of plumbing systems, ventilation, air conditioning, heating, cooling, fire protection, automatic regulation, etc.
 - .2 Coordinate closely with the mechanical contractors to determine the exact characteristics (according to submitted shop drawings) of the systems mentioned above, and provide all appropriate facilities and connections to make them operational, all in accordance with the laws and regulations in force.
 - .7 Pay all applicable license fees.

1.4 CONTRACT METHOD

- .1 Construct Work a stipulated price contract.

1.5 CONTRACTOR USE OF PREMISES

- .1 Unrestricted use of site until Substantial Performance.
- .2 Limit use of premises for Work to allow:
 - .1 Owner occupancy.
 - .2 Work by other contractors (if necessary)
- .3 At completion of operations condition of existing work: equal to or better than that which existed before new work started.
- .4 Set up and build temporary access and protection in compliance with section 01 56 00
Access and temporary protection

1.6 OWNER OCCUPANCY

- .1 Schedule and substantially complete designated portions of Work for Owner's occupancy prior to Substantial Performance of entire Work.

1.7 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations and normal use of premises for this period of the year ie. Before the location is open to the public. Arrange with Departmental representative to facilitate execution of work.
- .2 Use only existing doors and stairways in building for moving workers and material.
 - .1 Protect doors, floors and walls, to satisfaction of Departmental representative prior to use.
 - .2 Accept liability for damage, safety of equipment and overloading of existing equipment.

1.8 EXISTING SERVICES

- .1 Notify Departmental representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental representative 48 hours' notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to the activities of PWGSC.
- .3 Provide alternative routes for personnel and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental representative of findings.
- .5 Submit schedule to and obtain approval from Departmental representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .7 Record locations of maintained, re-routed and abandoned service lines.
- .8 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.9 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.

- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

1.10 PROJECT MANUAL

- .1 Supply a project manual containing the following elements and all other pertinent information, which must be handed over to PWGSC at the end of the project
- .2 Prepare one copy (in a 3-ring binder) and an electronic version supplied on a USB key.
 - .1 Technical data sheets of equipment and accessories
 - .2 Manufacturers' installation instructions
 - .3 Manufacturers' operations and maintenance instructions
 - .4 Control details, screen captures of control systems
 - .5 As-Noted drawings

1.11 REFERENCE DOCUMENTS

- .1 WSP drawings
 - .1 Mechanical
 - .1 M-01: Drawing list, legend and basement floor plan - demolition
 - .2 M-02: Basement floor plan – New
 - .2 Electrical
 - .1 E01: Drawing list, legend and basement floor plan - demolition
 - .2 E-02: Basement floor plan – New
 - .3 E-03 : Diagram – demolition
 - .4 E-04 : Diagram – New

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion with Ministerial Representative, Consultant and contractor's representative to:
 - .1 Verify Project requirements.
 - .2 Review warranty requirements and manufacturer's installation instructions.
 - .2 Ministerial Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Consultant, four (4) final copies of operating and maintenance manuals in English and French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by process flow under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide CAD files in dwg format on CD.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00- Quality Control.

1.5 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Consultant and Ministerial Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.

- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Ministerial Representative and Consultant.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of blue line opaque drawings, and in copy of Project Manual, provided by the Consultant.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 Referenced Standards to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain field test records, manufacturer's certifications, inspection certifications, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.7 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

- .4 Additional requirements: as specified in individual specifications sections.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Ministerial Representative.

1.9 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, thirty (30) days before planned pre-warranty conference, to Consultant for approval.
- .3 Warranty management plan to include required actions and documents to assure that Ministerial Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, Consultant for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within [ten] days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include HVAC balancing, fire protection, and alarm systems.

- .3 Provide list for each warranted equipment, item, and feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
- .4 Procedure and status of tagging of equipment covered by extended warranties.
- .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .9 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .10 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Ministerial Representative to proceed with action against Contractor.

1.10 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by the Consultant.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.

.7 Construction Contractor's signature.

END OF SECTION

Addendum no. :	ME-01E	Project :	New UPS and Electrical room
Discipline :	Mechanical / Electrical		
WSP file:	181-03430-01	Title :	Various Modifications
Date :	2018-11-09	Client :	Public Works and Government Services Canada
Document(s) annex(es) :	No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>	Representative	Julie Ann Smith
Qty : 4	Sketch/Plans : 5	E-Mail :	JulieAnn.Smith@tpsgc-pwgsc.gc.ca

Copies to :			
	Company :	Name :	E-Mail :
<input checked="" type="checkbox"/>	WSP	Rachid Bakour, P.Eng.	Rachid.Bakour@wsp.com
<input checked="" type="checkbox"/>	WSP	Jean Bergeron, P.Eng.	Jean.Bergeron@wsp.com
<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/>			

1. GENERAL
The present addendum is an integral part of the tender documents and must be read conjointly with the contractual documents.

2. OBJECTIVE
The intent of this addenda is to inform tenderers of additions or changes to tender documents.

3. ADDITIONAL INFORMATIONS
All bidders must read the clarifications, additions or modifications indicated in this addendum.

Please return this signed sheet as an acknowledgment of receipt of this addendum.

Bidder name : _____

SIGNATURES	
<p>Ing. Elec. 2018-11-12</p>	<p>2018-11-12</p>
Electrical engineer	Mechanical engineer

DESCRIPTIONS :

The following description presents the main changes. The Bidder should review the attached plans for any changes identified by revision clouds.

1 GÉNÉRALE

1.1 Modification to specifications

- .1 Section 01 11 00 - Section added
- .2 Section 01 78 00 - Section added

2 Electrical

2.1 Modification to specifications

- .1 Section 26 02 21
 - Article 2.4.1 is repealed
 - Replace article 3.1.1.5 with 3.1.1.3
- .2 Section 26 05 2
 - Article 2.2 is repealed
- .3 Section 26 24 16.1
 - Article 2.4 is repealed
- .4 Section 26 28 16.2 replace the section number by 26 24 16.2
 - Article 2.5 is repealed
- .5 Section 26 27 26
 - Article 2.1.7 is repealed
 - Article 2.2.1.6 is repealed
 - Article 2.3 is repealed
- .6 Section 26 33 53
 - Article 3.3 is repealed
 - Replace the description of batteries in article 2.1.4.4 by :

Battery Cabinet: Batteries should be sealed type without release of gas, without addition of electrolytes and with long life span. The new ASC unit must be modular and should allow for easy addition of modules for 25% future expansion, in terms of power and operation time, if required.

.1 Expected battery life: 200 complete full load discharge cycles when operated and maintained within specifications.

- .7 Section 26 52 00
 - Article 1.4 is repealed

2.2 Modification to plans

- .1 Plan E-01 (see CRE-01)
 - Addition of symbol for emergency lighting head.
 - Addition of symbol for fire alarm.
 - Modification of the description of the emergency lighting battery.
 - Existing strobe relocated

- .2 Plan E-02 (see CRE-02)
 - Modification to supply circuit of the heat pump P-01.
 - Existing strobe relocated

- .3 Plan E-02 (see CRE-03)
 - Addition of detail for the UPS housekeeping base.

- .4 Plan E-03 (see CRE-04)
 - Addition of a new note to the general notes.

- .5 Plan E-04 (see CRE-05)
 - Modification of UPS detail.
 - Modification of load calculations.

3 Mechanical

3.1 Modification to specifications

- .1 Section 25 00 00 Controls-CL - Section replaced

- .2 Section 25 01 11 START-UP, VERIFICATION AND COMMISSIONING - Section added.

- .3 Anticipate a lump sum of \$700 for the replacement of the sprinkler heads in the UPS room.

END OF ADDENDA

MONTREAL	1600, boul. René-Lévesque Ouest, 16 ^e étage, Montréal (Québec) H3H 1P9	Tél. : (514) 340-0046	Fax : (514) 340-1337	<input type="checkbox"/>
BROSSARD	9160, boul. Leduc, bureau 210, Quartier Dix30, Brossard (Québec) J4Y 0E3	Tél. : (450) 679-7220	Fax : (450) 670-9076	<input type="checkbox"/>
LAVAL	2525, boul. Daniel-Johnson, bureau 525, Laval (Québec) H7T 1S9	Tél. : (450) 686-0980	Fax : (450) 686-0987	<input checked="" type="checkbox"/>

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ÉCLAIRAGE D'URGENCE / EMERGENCY LIGHTING


 UNITÉ D'ÉCLAIRAGE D'URGENCE À ACCUMULATEUR 12V, 72W.
 TENSION UNIVERSELLE AVEC PHARE DOUBLE LED 2x4W /
 EMERGENCY LIGHTING UNIT WITH 12V, 72W ACCUMULATOR.
 UNIVERSAL VOLTAGE WITH LED DOUBLE HEADLIGHT 2x4W


 APPAREIL D'ÉCLAIRAGE D'URGENCE BASSE TENSION À 2 PHARES
 MURAL / AU PLAFOND
 EMERGENCY LIGHTING APPARATUS WITH 2 LIGHTS HEADLIGHT 2x4W
 WALL / CEILING

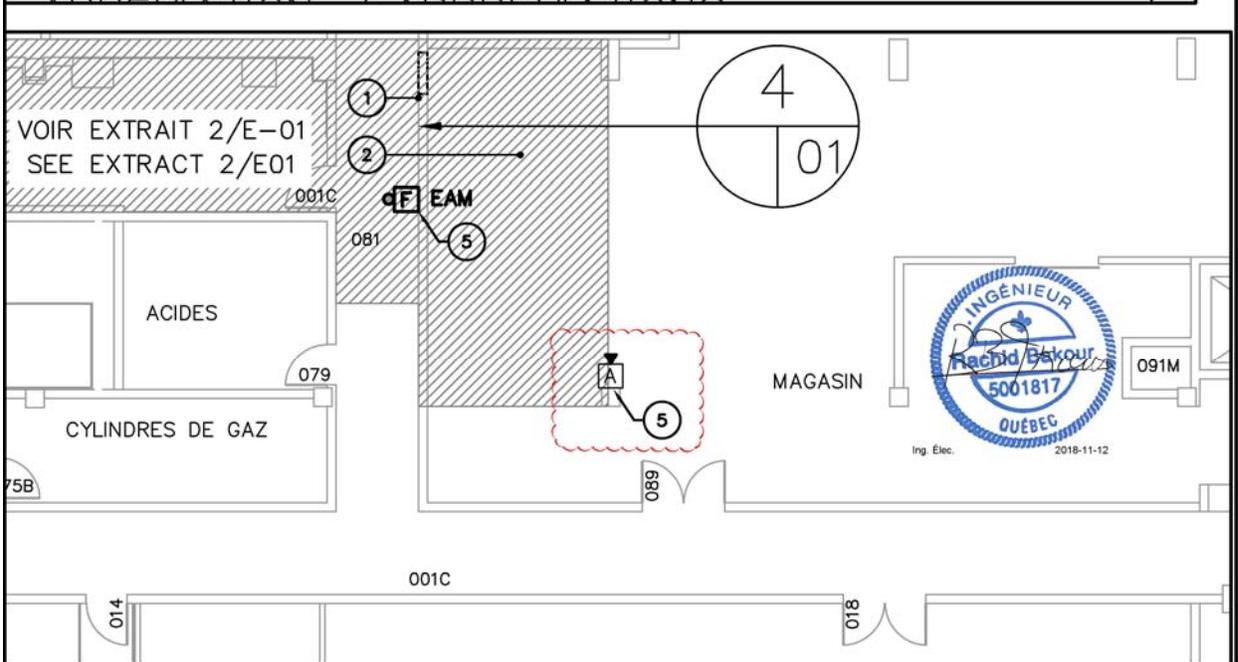
ALARME INCENDIE / FIRE ALARM


 CLOCHE D'ALARME INCENDIE /
 FIRE ALARM BELL


 DÉTECTEUR DE CHALEUR /
 HEAT DETECTOR

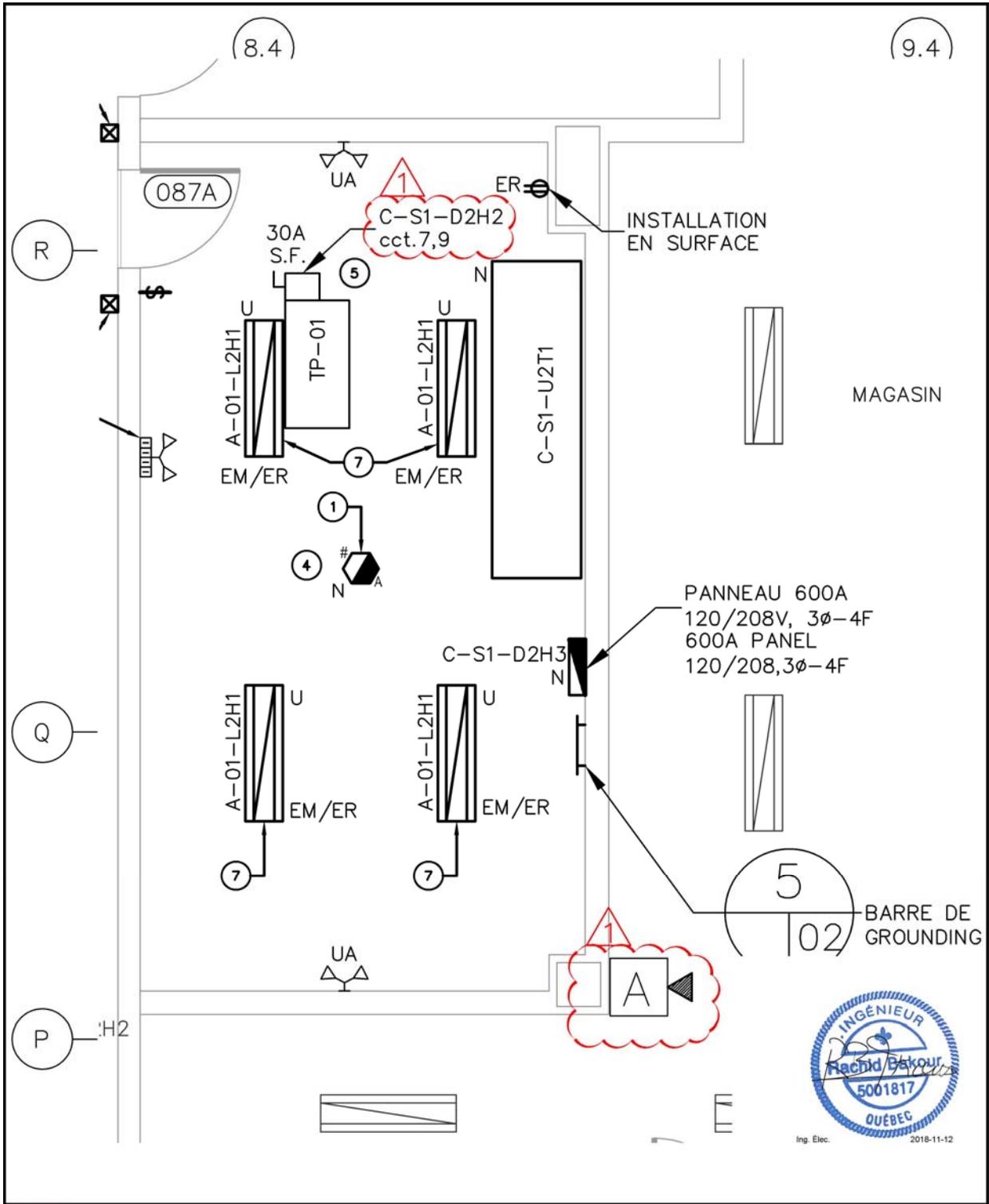

 KLAXON D'ALARME-INCENDIE C/A STROBOSCOPE /
 FIRE ALARM KLAXON WITH STROBOSCOPE

} ③



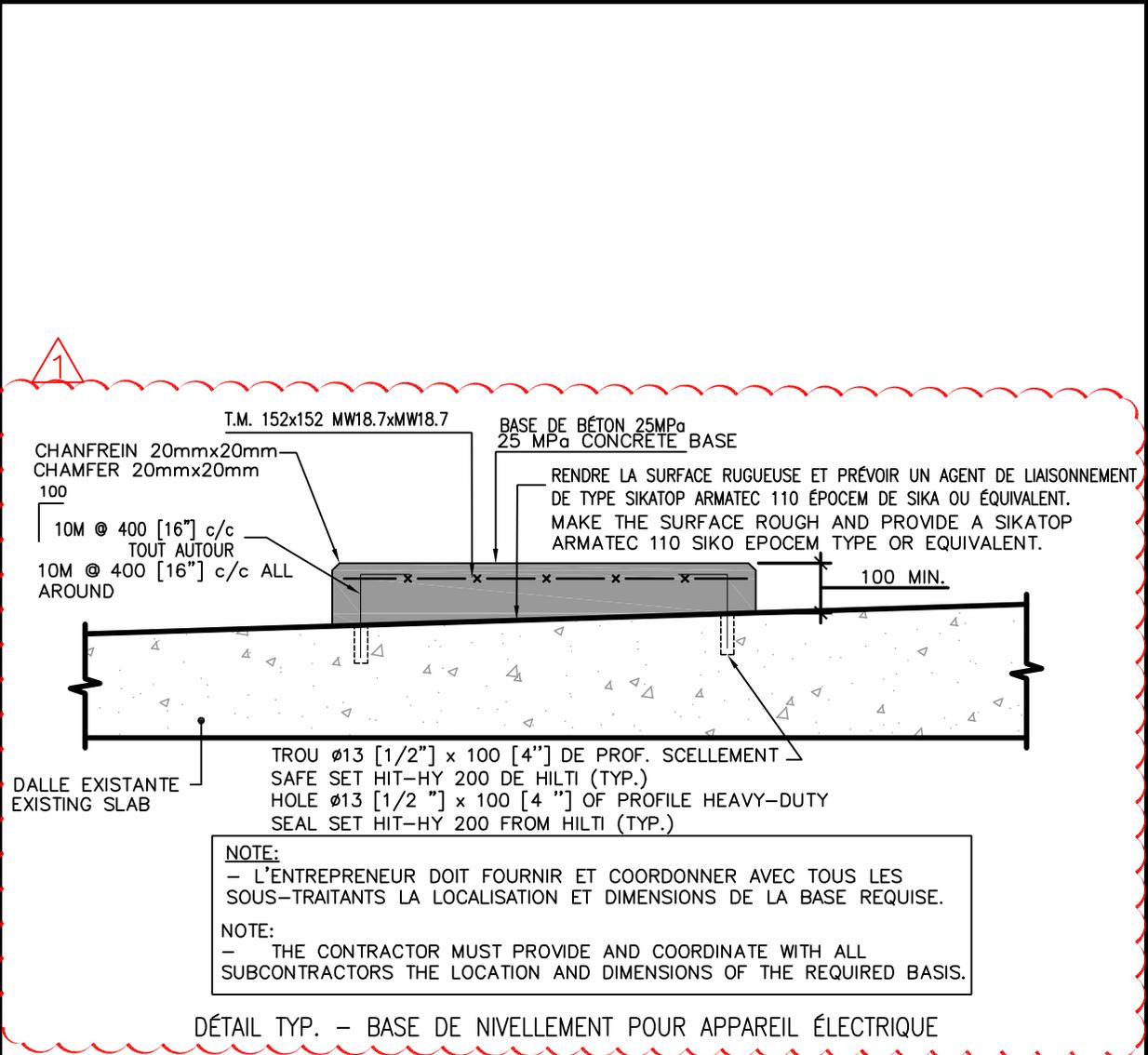
 Travaux publics et Services gouvernementaux Canada Direction générale des biens immobiliers Région du Québec	Public Works and Government Services Canada Real Property branch Quebec region 	Projet/Project A&G RELOCALISATION DU LOCAL UPS		Titre du dessin/Drawing title: LÉGENDE			
		conçu par/ <i>designed by:</i> R. BAKOUR, ing.		date: 2018-11-06		approuvé par/ <i>approved by:</i> R. BAKOUR, ing.	
TPSGC 1001 SAINT-LAURENT OUEST, LONGEUIL, QUÉBEC		dessiné par/ <i>drawn by:</i> G. CARRASCO, tech.		date: 2018-11-06			
		révisions: AD-ME-01		échelle/ <i>scale:</i> 1:150		no. de projet/ <i>project no.</i> R.094477.001 date: MARS 2018	
				nom du fichier/ <i>file name</i> R.094777_001_E-01-PN-DS		CRE-1	

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Travaux publics et Services gouvernementaux Canada Direction générale des biens immobiliers Région du Québec	Public Works and Government Services Canada Real Property branch Quebec region 	Projet/Project A&G RELOCALISATION DU LOCAL UPS		Titre du dessin/Drawing title: EXTRAIT SALLE 087 - ÉCLAIRAGE - NOUVEAU					
		conçu par/ designed by: R. BAKOUR, ing.		date: 2018-11-06		approuvé par/ approved by: R. BAKOUR, ing.		date: 2018-11-09	
TPSGC 1001 SAINT-LAURENT OUEST, LONGEUIL, QUÉBEC		dessiné par/ drawn by: G. CARRASCO, tech.		date: 2018-11-06		no. de projet/ project no. R.094477.001		date: MARS 2018	
		révisions: AD-ME-01		échelle/ scale: 1:50		nom du fichier/ file name R.094777_001_E-02-PN-DS		CRE-2	

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Travaux publics et Services gouvernementaux Canada Direction générale des biens immobiliers Région du Québec	Public Works and Government Services Canada Real Property branch Quebec region 	Projet/Project A&G RELOCALISATION DU LOCAL UPS		Titre du dessin/Drawing title: DÉTAIL TYPIQUE DE BASE DE NIVELLEMENT POUR APPAREIL ÉLECTRIQUE					
		conçu par/ <i>designed by:</i> MARTIN PANNETON, ing.		date: 2018-11-08		approuvé par/ <i>approved by:</i> MARTIN PANNETON, ing.		date: 2018-11-08	
TPSGC 1001 SAINT-LAURENT OUEST, LONGUEUIL, QUÉBEC		dessiné par/ <i>drawn by:</i> G. CARRASCO, tech.		date: 2018-11-06		no. de projet/ <i>project no.</i> R.094477.001		date: MARS 2018	
		révisions: AD-ME-01		échelle/ <i>scale:</i> 1:10		nom du fichier/ <i>file name</i> R.094777_001_E-02-PN-DS		CRE-3/4	

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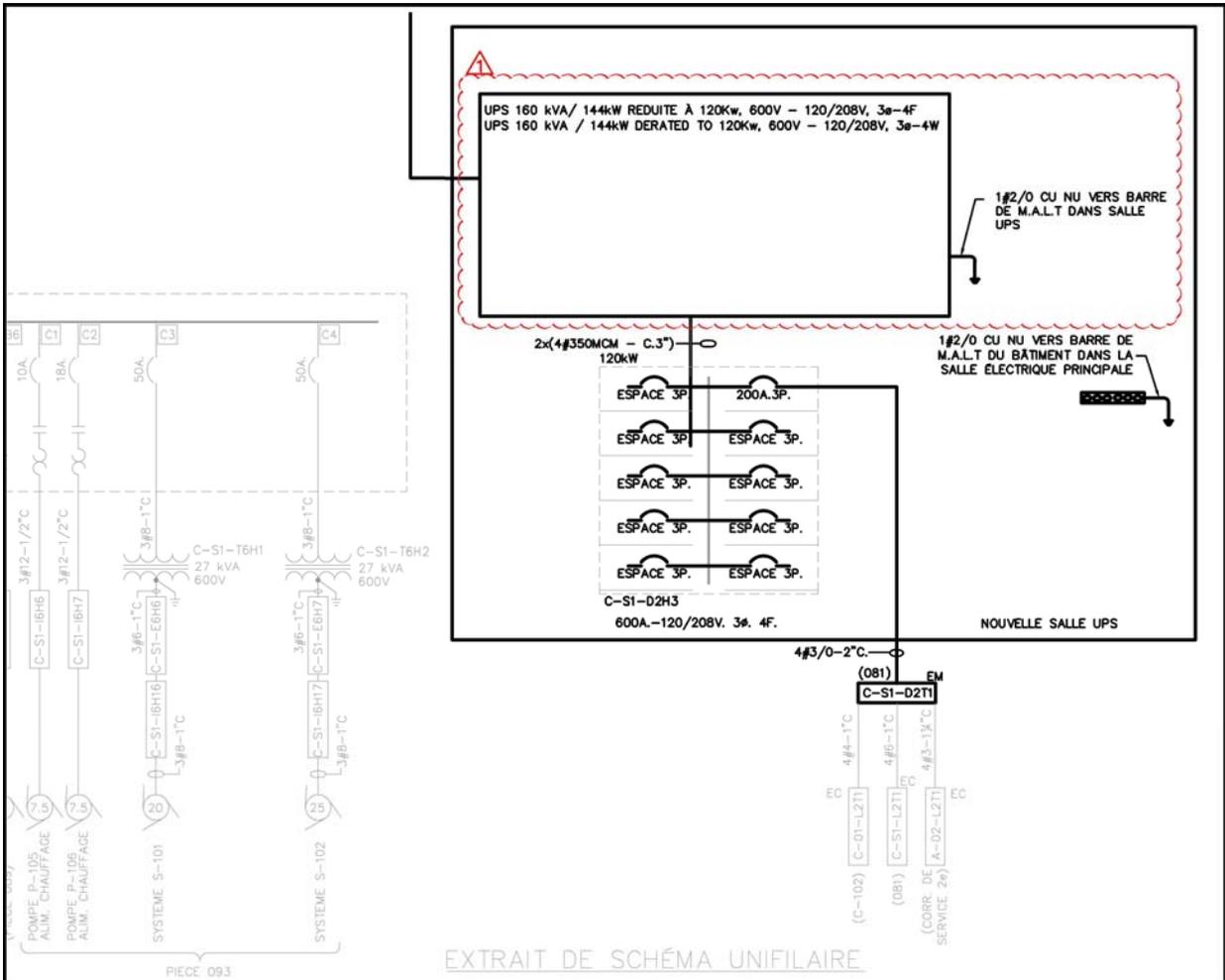
NOTES GÉNÉRALES / GENERAL NOTES:

- SAUF SI AUTREMENT INDIQUÉ, TOUS LES ÉQUIPEMENTS AU PLAN SONT EXISTANT À CONSERVER /
UNLESS OTHERWISE INDICATED, ALL EQUIPMENT ON THE PLAN IS EXISTANT AND IS TO BE RETAINED.
- ENLEVER TOUS LES ACCESSOIRES, CONDUITS, BOITES ET FILAGE JUSQU'À LA SOURCE DES ÉQUIPEMENTS À ENLEVER /
REMOVE ACCESSOIRES, CONDUITS, BOXES AND WIRING UP TO THE SOURCE OF THE EQUIPMENT TO BE MOVED.
- ASSURER LA CONTINUITÉ DES SERVICES ET COORDONNER LES PÉRIODES DE COUPURE D'ÉLECTRICITÉ AVEC LES OCCUPANTS /
ENSURE THE CONTINUITY OF SERVICES AND COORDINATED THE ELECTRICAL SHUT-DOWN PERIODS WITH THE OCCUPANTS.
- L'ENTREPRENEUR DOIT PRÉSENTER UN PROCÉDURE D'EXÉCUTION POUR LE TRANSFERT DES CHARGES EN ASSURANT LA CONTINUITÉ DES SERVICES /
THE CONTRACTOR MUST SUBMIT AN ENFORCEMENT PROCEDURE FOR THE TRANSFER OF CHARGES BY ENSURING THE CONTINUATION OF THE SERVICES.
- LES COUPURES D'ÉLECTRICITÉ SERONT EFFECTUÉ LE SOIR ENTRE 18H30 ET 5H00 HEURES DE MATIN ET/OU LES FIN DE SEMAINE. L'ENTREPRENEUR DOIT INFORMER LE REPRÉSENTANT DU MINISTÈRE 48 HEURES AVANT.
ELECTRICITY SHUT-DOWN WILL BE MADE IN THE EVENING BETWEEN 6:30 PM AND 5:00 AM MORNING AND / OR WEEKEND. THE CONTRACTOR MUST INFORM THE REPRESENTATIVE OF THE MINISTRY 48 HOURS BEFORE.



Travaux publics et Services gouvernementaux Canada Direction générale des biens immobiliers Région du Québec	Public Works and Government Services Canada Real Property branch Quebec region 	Projet/Project A&G RELOCALISATION DU LOCAL UPS		Titre du dessin/Drawing title: NOTES GÉNÉRALES ALIMENTATION D'URGENCE - SOUS-SOL - DÉMOLITION	
		conçu par/ <i>designed by:</i> R. BAKOUR, ing.	date: 2018-11-06	approuvé par/ <i>approved by:</i> R. BAKOUR, ing.	date: 2018-11-09
TPSGC 1001 SAINT-LAURENT OUEST, LONGEUIL, QUÉBEC		dessiné par/ <i>drawn by:</i> G. CARRASCO, tech.	date: 2018-11-06	no. de projet/ <i>project no.</i> R.094477.001	date: MARS 2018
		révisions: AD-ME-01	échelle/ <i>scale:</i> AUCUNE	nom du fichier/ <i>file name</i> R.094777_001_E-03-PN-DS	CRE-4

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CALCUL DE CHARGE DISPONIBLE SUR LA GÉNÉRATRICE:

Capacité nominale de la génératrice Nominal capacity of the generator	562.5 KVA
90% de la capacité (CSA 282) 90% of capacity (CSA c282)	506.70KVA
Charge réelle de fonctionnement de la génératrice (lecture sur instrument de mesure le 4 octobre 2018) Actual operating load of the generator (reading on measuring instrument on October 4, 2018)	250.0 KVA
Facteur de sécurité par rapport à la charge réelle observée de 30% Safety factor versus actual observed load of 30%	75.0 KVA
Charge totale avec Facteur de sécurité Total Load with Security Factor	325.0 KVA
L'unité d'alimentation sans coupure UPS à enlever UPS uninterruptible power supply unit to be removed	50.0 KVA
Nouvelle unité d'alimentation sans coupure à ajouter (UPS déclassé (derated) en usine) New uninterruptible power supply to add (UPS) derated at the factory	133.3 KVA
Charge sur la génératrice après modification Load on the generator after modification	408.3 KVA
La nouvelle charges disponibles sur la génératrice par rapport au 90% New load available on the generator compared to 90%	98.4 KVA



Travaux publics et Services gouvernementaux Canada Direction générale des biens immobiliers Région du Québec	Public Works and Government Services Canada Real Property branch Quebec region 	Projet/Project A&G RELOCALISATION DU LOCAL UPS		Titre du dessin/Drawing title: EXTRAIT DU SCHÉMA UNIFILAIRE ET CALCUL DE CHARGE	
		conçu par/designed by: R. BAKOUR, ing. date: 2018-11-06		approuvé par/approved by: R. BAKOUR, ing. date: 2018-11-09	
TPSGC 1001 SAINT-LAURENT OUEST, LONGUEUIL, QUÉBEC		dessiné par/drawn by: G. CARRASCO, tech. date: 2018-11-06		no. de projet/project no. date: R.094477.001 MARS 2018	
		révisions: AD-ME-01		échelle/scale: AUCUNE	
		nom du fichier/file name: R.094777_001_E-04-PN-DS		CRE-5	

Part 1 General

1.1 GENERAL

- .1 All the necessary work will be done by a company specializing in automatic control and energy management, which will be responsible for the division 25.
- .2 Automatic control systems to be supplied must be Procétech Automation (450-922-4346).
- .3 The control contractor will be a subcontractor of the main HVAC systems contractor. The CVAC contractor **shall include an amount of 7500\$** for the controls systems work.

1.2 SCOPE OF WORK

- .1 The work will include labour, supply and installation of equipment, programming, connection to the UPS for a running status, warranty, commissioning, tools and other items necessary for the thorough and full execution of what is described for this project in this section and as shown on drawings and shall meet control sequences as described in this section.
- .2 All materials and equipment used should be standard components manufactured and not custom specifically designed for this project. All systems and components shall have been subjected to extensive testing and shall be in use on the market for at least two years.
- .3 The specific work includes, but not limited to:
 - .1 Demolition of the related controls.
 - .2 Supply, installation and connection of controllers, local control panels and actuators.
 - .3 Supply, installation and connection of temperature, humidity, static pressure, differential pressure sensors, coils controllers, as well as the necessary transmitters, transformers, relay and accessories, etc.
 - .4 Supply, installation and connection of the communication cables between panels, local controllers and various controlled elements.
 - .5 The operator interface will include HVAC systems and distribution schematic.
 - .6 Programming and start-up.
 - .7 Staff training
 - .8 Power Supply (120 VAC) to controllers and local panels from circuit breakers as indicated in Division 26.
 - .9 Surface cable in mechanical and electrical rooms shall be installed into EMT conduit. Cable in ceilings may be of FT- 4 types.
 - .10 The automatic control subcontractor must provide WEB network manager with IP address provided by the client which will include the management of digital controllers and operator interface.
 - .11 All periphery controls components (sensors, actuators, etc.) will be new elements of the HVAC systems and rooms controls.

.12 Also, ensure to include required point of control for the exhaust systems.

1.3 SHOP DRAWING AND DIAGRAMS

- .1 Contractor from division 25 will provide shop drawings and data sheets of components for approval.
- .2 The shop drawings must be sufficiently complete and detailed to assess the quality and efficiency of the proposed systems. They will include the drawings of the systems and their components, systems architecture, schematic and electrical diagram of each system.
- .3 Also provide complete diagrams of all control systems after the execution of the work. These diagrams will be wrapped in rigid transparent plastic and will be installed close to each panel.
- .4 Obtain, from divisions 23, 26 and others, all required documentation.
- .5 A list of control points will be provided by the contractor when presenting shop drawings; it will clearly indicate the points used and those available.

1.4 MATERIAL IDENTIFICATION AND INSTALLATIONS

- .1 Execute all necessary identification work related to elements shown on drawings and control specifications and coordinate with other sections all identification works.

Part 2 Product

2.1 GENERAL

- .1 The control units will be chosen to ensure the best possible operation, stable while having adequate sensitivity.
- .2 Consult control diagrams and operating sequences on drawings and specifications and provide all the control components necessary for the systems operation.
- .3 Consult existing drawings of Parks Canada in order to take into consideration existing control elements.
- .4 Unless otherwise indicated, all similar devices such as thermostats, hygrometers, and others will come from a single manufacturer.
- .5 All temperature indication will be expressed in degrees Celsius (° C).

2.2 WEB INTERFACE

- .1 The communication with the control system will be done using a fixed WEB IP address provided by the client. The system will allow the command input functions, information management, network alarm management and database management.

2.3 WEB NETWORK SUPERVISOR (SR)

- .1 The network supervisor is software that makes the interconnection between all network managers (GR). It is installed on a server that will be used for all Project-Web graphics format. Among others, it should provide the following features:
 - .1 Global Access to Data: The SR must allow access to data distributed throughout the system

- .2 Distributed Control: The SR must allow to execute overall strategy controls based on objects in any GR locally or remotely
- .3 The SR must manage all schedules in the GR and in the BACnet controllers
- .4 Each GR under the SR supervision must be able to archive historical data, alarms and its database in the SR and this should be performed automatically. The archive must allow data collection for a period of over 2 years.

2.4 DIRECT NUMERICAL CONTROLLERS (CND)

- .1 Direct digital controllers (CND) must reside on the network on building level. Digital controllers of different types must use the same programming language and have the same help structure. The menus of the controllers must be in French and English and allow switching from one to another (the display language of the operator interface may be selected by the operator).
- .2 Acceptable Products: Distech Series ECB-203, ECB-300 or equivalent

2.5 TERMINAL EQUIPMENTS CONTROLLERS

- .1 Each component controller must operate as a standalone controller capable of performing its own specific regulation, independently of the other controllers on the network. Each controller must be a numerical processor, multitasking, real-time, controlled by a microprocessor.
- .2 Controllers must include all required inputs and outputs for proper execution of specified control sequences. Analogue outputs must be standard signals, such as 24 V floating command, or 0 to 10 V, allowing interfacing with a variety of modulating servomotors.
- .3 All sequences and operation of the controller must provide closed loop control for the intended application.
- .4 Acceptable Products: Distech ECB-VAV or equivalent.

2.6 OPERATOR INTERFACE – WORKING STATION

- .1 Description of the interface
 - .1 The operator interface software is new.
- .2 Dynamic color graphics displays
 - .1 The creation of floor level color graphics and schematics of each mechanical equipment components, including air handling units, and component terminals should be provided by the contractor of digital control system, as shown in the I/O (input/output) drawings and specifications, in order to optimize system performance analysis and speed up the alarms recognition.
 - .2 Operator interface must allow users to access various system diagrams and floor level via a graphic access plan, the selection by menus or text commands. The graphical software should allow to import scanned images to be used in the system or coming from AutoCAD.
 - .3 Dynamic temperature values, humidity values, flow values, indication status should be shown at their respective locations and be automatically updated to represent current conditions without operator intervention and without pre-set screen refresh interval.

- .1 Bar graphs with definable dimensions must be available to monitor and control analog values. The high and low alarm settings should be displayed on the analog scale. The user must be able to change the set-point by "clicking and dragging" the cursor.

2.7 CONTROL ELEMENTS

- .1 Supply and install all required instrumentation, for the monitoring control and optimization functions.
- .2 All control sensors to be used will be NIST certified.
 - .1 Temperature sensor:
 - .1 Room Temperature
 - .1 Room digital sensors must have a LCD display and manual slide adjustment.
 - .2 Range 13° to 35°C
 - .3 Output signal Modulating resistance
 - .4 Element Thermistor 10,000 ohms
 - .5 Calibration point Accuracy +/- 0.3 °C
 - .6 Acceptable Products: Distech EC-SMART or approved equivalent.
 - .2 Single point duct temperature
 - .1 Range -40° to 116°C
 - .2 Output signal Modulating resistance
 - .3 Element Platine 1000 ohms
 - .4 Calibration point Accuracy +/- 0.1%
 - .5 Acceptable Products : Siemens 544-339 or approved equivalent
 - .3 Average duct temperature
 - .1 Range -40 ° to 116 °C
 - .2 Output signal Modulating resistance
 - .3 Element Platine 1000 ohms
 - .4 Calibration point Accuracy +/- 0.1%
 - .5 Available cable lenght 7,6m, 45cm, 60cm, 1,2m
 - .6 Acceptable Products : Siemens 544-342/3/4/5 or approved equivalent
 - .4 Frost Thermostat
 - .1 Capillary controlled of "all or nothing" with manual reset, sensitive element of a suitable length to suit the box dimensions.
 - .2 Differential pressure transmitter for filters or two-way
 - .1 Output 4 to 20 ma
 - .2 Calibration settings Zéro and range (as per application)
 - .3 Accuracy +-1% of the range, or 0,4% (BL-3)
 - .4 Linearity +-0.96% of the range or +-0.38%(BL-3)
 - .5 Hysteresis +-0.2% of the range or 0,1% (BL-3)
 - .6 Acceptable Products : Setra model 264 or 264E(BL-3) or approved equivalent
 - .3 Air differential pressure switch:
 - .1 Range 250-3000kpa/12.5-250kpa
 - .2 Differential 62.5kpa/5kpa
 - .3 Electrical rating 15 amps

- .4 Acceptable Products : Siemens SW141 or approved equivalent
- .5 Humidity sensors
- .4 Humidity sensors
 - .1 Duct humidity sensors
 - .1 Range 0 to 100% d'HR
 - .2 Sensing element Capacitif Element
 - .3 Output signal 4 – 20 mA or 0-10Vdc
 - .4 Accuracy at 20°C + 2% d'HR
 - .5 Acceptable Products : Siemens Série QFM or approved equivalent
- .5 Limit Switches
 - .1 Unipolar contact bloc with quick action with appropriate sensing element for application.
- .6 Relay:
 - .1 Plug-in type relays with DPDT contact, 5 A at 240 VAC.
- .7 Electronic damper actuators
 - .1 Electrical control signal of damper must be provided by direct contact.
 - .2 Shutter actuators must be provided with brushless DC motors, with blocking protection, bidirectional, with integrated safety spring return, with metallic body, with manual override and when specified on drawings, a dual auxiliary switch, individually adjustable.
 - .3 All actuators must include necessary hardware, assembling and the proper connection for a standard 1/2 inch diameter axis or a damper blade.
 - .4 The actuators must be designed to be direct coupled on the damper shaft without connecting links.
 - .5 Damper actuators with output torque of more than 100 lb must have self centering axis clamps, to ensure concentric coupling alignment of the actuator and damper shaft. The self-centering clamp should have a pair of opposed « V » shaped toothed cradles with two rows of teeth for maximum retention force. A single clamping bolt must simultaneously bring the two cradles in contact with the damper shaft.
 - .6 All actuators with output torque of more than 100 lb must accept an axis of 1 inch in diameter, without the need for auxiliary adapters.
 - .7 All actuators must be designed and manufactured under ISO 9000 procedure, and must be approved according to UL873 standards and CSA22.2 No. 24-93.1.
 - .8 Acceptable Products: Belimo or Siemens Open-Air or approved equivalent.
- .8 Frigistats
 - .1 Install frigistats as indicated on drawings and provide protection for every square foot of the surface of the coil with a one foot linear element per square foot of coil. Provide a manual reset.
 - .2 Acceptable Products: Siemens 134-1504 or approved equivalent.
- .9 Current sensor relay :
 - .1 The current sensor with a binary output signal, self-powered and with an accuracy of 2%.

- .2 Required in the absence of variable frequency drive.
- .3 Required for motor without variable frequency drive.
- .4 Acceptable Products : Veris H-908 or approved equivalent

.10 Pressure switches (air)

- .1 Pressure switches will be adjusted with the appropriate pressure differential range to suite the application. They will be of industrial grade.
- .2 Acceptable Products :Greystone AFS series or approved equivalent

2.8 INDEPENDANT APPARATUS AND ACCESSORIES

- .1 Supply all autonomous components with the following characteristics described below and any other device and accessory required even if not specifically described in this specification.
 - .1 Air pressure drop indicator for filters.
 - .2 Type dial indicators and provided with 2 outputs; 100 mm (4 ") diameter dial, minimum scale 0-500 Pa (0-2" of water) and suitable for the application; accuracy of $\pm 2\%$.
 - .3 The indicator will be provided with two static pressure sampling tubes and rigid connecting tubes. Indicator will be installed recessed in the door of the local control panel.
 - .4 Required quality: DWYER, 2000 series.
- .2 Electrical transformer and power supplies
 - .1 The current transformers will be provided with Class 2 current limiting or provided with overload protection on the primary and secondary circuits for Class Service 2. Output current will be design with a safety factor of 50%. The units will be approved ULC. Primary voltage 120V ca. and secondary voltage 24V ca. Capacities will be suitable for the applications.

2.9 ELECTRICAL WIRING

- .1 Unless otherwise indicated on the drawings, electrical connection work from the electrical distribution panels including conduit, boxes and wiring for the supply of 120V control equipment or control panels are part of the division 25.
- .2 Legislation and Regulations: All installation described on the drawings and in this scope of work, temporary or permanent, must comply with the requirements of the Canadian Electrical Code and the Board of Electrical Examiners and the requirements of the scope of work of Division 26. On site, the standards C.C.Q. must be respected.
- .3 Approved parts: all components must be CSA approved or listed ULC where applicable.
- .4 Low voltage wiring in between ceilings and drywall will be orange FT-4 type, without metal reinforcement as recommended by the manufacturer of the control system.
- .5 In mechanical rooms, all wiring must be installed in EMT conduit.
- .6 Provide control wiring between the thermostats, motors, all the alarm wiring and control for all alarm and control devices for all sections of drawing and scope of work.

Part 3 Execution

3.1 INSTALLATION

- .1 The control contractor shall install all control elements related to this project. He must also install wiring between each controller and all sensors and control devices (dampers, flow control boxes, valves, etc.) and perform, if necessary, the 24 V AC power supply to controllers and control devices.
- .2 Electrical contractor shall install in the ceiling 120 volts feeding circuits for the connection of the controller.
- .3 Air supply terminal devices with reheat coils, air extraction terminal devices and valves are existing or to be installed by mechanical contractor.

3.2 START-UP

- .1 Division 25 will be responsible for commissioning and complete programming of the systems.
- .2 Division 25 will use a specialist for programming centralized control for units before and during the commissioning. The units will be provided with the necessary software to perform the operations described in the drawing and scope of work.
- .3 Division 25 will ensure reliable and complete operation of the controller system, control of components and controlled of equipment.
- .4 Commissioning Report
 - .1 The supplier will provide to the owner a complete commissioning report dated, stating that he checked each item and each control loop. This report shall include a description of each point with the settings and alarms. For each item, there will be the following checks:
 - .1 physical point connection;
 - .2 point setting and calibration;
 - .3 point programming.
 - .2 For each audit, the officer shall affix his initials.
 - .3 Then, an operation simulation will be made for each system with signature of a representative of the owner and / or this section.

3.3 WARRANTY AND TESTS

- .1 Be responsible of any defects that may occur in the first year after final acceptance of the work by the engineer, replacing as necessary, any defective equipment.
- .2 Operate systems in normal operation during cold and hot seasons, making all the necessary adjustments until the result is consistent with the engineer drawings and scope of work.
- .3 If for one reason, a device is not working properly, this contractor will be required, upon request of the client, to make necessary changes so that the system operates normally even if it meant thereby changing the connections, undo facilities, relocating control devices, repeat programming, etc. It shall provide all personnel and tools necessary to make these adjustments, and at his own expense.

3.4 STAFF TRAINING

- .1 Division 25 will also provide a French & English training courses to those concerned by the use of the newly installed system.
- .2 Training will be provided by competent instructors able to transmitting all the necessary knowledge to the staff assigned to the operation of the system. Instructors must know thoroughly all aspects of the subject they teach. All training participants will be provided with a loose-leaf binder containing specific training modules to the product for the newly installed system. All training must be provided during normal working hours from 8 am to 16 h 30, on week days.
- .3 Provide 8 hours of training to the client designated operating staff. Training should include as a minimum the following topics:
 - .1 Drawing, operating and maintenance manuals explanation
 - .2 Site visit to locate the control components
 - .3 Computer operator interface and devices
 - .4 Digital controller and operation of CPA
 - .5 Operator's control functions, including how to generating graphics and on site screen programming
 - .6 Use of mobile or remote operator interface if there are any.
 - .7 Explanation of how to do settings, calibration and components replacement
 - .8 Student binder with loose-leaf containing training modules
- .4 In addition to training, provide technical support for operating systems, according to the specific needs of the operator during the year of warranty.
- .5 Indicate in the annex to the submission hourly rate for additional hours of consultation hours in the contract.

Part 4 OPERATING SEQUENCES

4.1 TYPICAL SEQUENCE FOR REGULATION

- .1 Low frost limit: air supply systems will be equipped with a frost detector with adjustable time delay relays. The system will be stopped at 4 °C. This time delay relay will be used at start-up of the system and will be temporary cancelling the effect of the frost detector. Frost protections should not be through the CND system.
- .2 Smoke detection
 - .1 The systems will be equipped with a smoke detector and will be arrested on smoke detection.
 - .2 Connections between the smoke detector, the fire alarm system and motor starters fall under division 26 (electricity). All other connections related to control to motor starters are covered by this section.
- .3 Filters: filters for air conditioning units will be equipped with pressure differential transmitter.
- .4 Running status: a running confirmation of the ventilation systems will be provided using a current relay.

- .5 Preventing duct damaging:
 - .1 Time delay must be programmed between the starting and stopping of the fans and the position of the associated dampers to protect duct against excessive static pressure. The position of all dampers will be confirmed with limit switches.
- .6 Flow Control of new constant volume system
 - .1 A static pressure sensor located at 2/3 of the most restrictive ventilation branch of the system, will allow the control of the air volume of the ventilation system.
 - .2 The air volume control system will be done by a modulating signal to the variable frequency drive of the supply fan.
 - .3 Return / exhaust fan must meet a volumetric deviation from that power.
- .7 Deviation alarm: for each control point (input), a minimum and / or maximum will be scheduled. If these values are reached, an alarm will be displayed / sent showing indication of the source of alarm.

4.2 SYSTEM NO. 1 SEQUENCE OF OPERATION

- .1 The system No. TP-01 must be in continuously operation. Outside normal operating hours of the site, it can operate at reduced speed (if the owner chooses).
- .2 When the system is off, the fans are stopped, the motorized fresh air intake and exhaust dampers are closed, and the return dampers are open.
- .3 When the system is running, the fans are running, the motorized fresh air intake and exhaust dampers are opened the return dampers are open.
- .4 The system supply temperature is kept at all times at the set point - 23 °C (adjustable)
- .5 Lower protections limit are needed in order to stop the fans. The supply air temperature transmitter also acts as a lower limit with the set point to 13 deg C.
- .6 Temperature reading in the common return duct will be connected to the Building Automation System.
- .7 A smoke detector in the air supply will stop fan upon detection. The building security officer will be consulted to determine the best sequence in case of fire, all consistent with existing building standards.
- .8 Data will be collected and kept in memory:
 - .1 The analogic inputs and outputs readings.
 - .2 The discreet inputs and outputs readings.
 - .3 The interval between data records will be definable by the operator.
 - .4 Proof of operation will be sent to the building system.
 - .5 Proof of operation of the UPS is sent to the building system.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 ALR – Average Level of Reliability. Defined by the ratio of the duration of the test period minus any accumulated failure time during this period, to the test period.
- .2 Downtime: results whenever EMCS is unable to fulfill required functions due to malfunction of equipment defined under responsibility of EMCS contractor. Downtime is measured by duration, in time, between time that Contractor is notified of failure and time system is restored to proper operating condition. Downtime not to include following:
 - .1 Outage of main power supply in excess of back-up power sources, provided that:
 - .1 Automatic initiation of back-up was accomplished.
 - .2 Automatic shut-down and re-start of components was as specified.
 - .2 Failure of communications link, provided that:
 - .1 Controller automatically and correctly operated in stand-alone mode.
 - .2 Failure was not due to failure of any specified EMCS equipment.
 - .3 Functional failure resulting from individual sensor inputs or output devices, provided that:
 - .1 System recorded said fault.
 - .2 Equipment defaulted to fail-safe mode.
 - .3 AEL of total of all input sensors and output devices is at least 99% during test period.

1.2 DESIGN REQUIREMENTS

- .1 Confirm with Departmental Representative that Design Criteria and Design Intents are still applicable.
- .2 Commissioning personnel to be fully aware of and qualified to interpret Design Criteria and Design Intents.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with general requirements

1.4 CLOSE-OUT SUBMITTALS

- .1 Submit documentation, O & M manuals, and training plan for O & M Personnel in accordance with general requirements
- .2 Final Report: submit report to Departmental Representative.
 - .1 The format of the report must be approved by the departmental representative before start-up;

- .2 The final report must include the measured values, the final settings and the results of the certified tests.
- .3 Bear signature of commissioning technician and supervisor
- .4 Revise "as-built" documentation, commissioning reports to reflect changes, adjustments and modifications to EMCS as set during commissioning and submit to Departmental Representative in accordance with general requirements.
- .5 Recommend additional changes and/or modifications deemed advisable in order to improve performance, environmental conditions or energy consumption.

1.5 COMMISSIONING

- .1 Carry out commissioning under direction of Departmental Representative.
- .2 Inform, and obtain approval from, Departmental Representative in writing at least 14 days prior to commissioning or each test. Indicate:
 - .1 Location and part of system to be tested or commissioned.
 - .2 Testing/commissioning procedures, anticipated results.
 - .3 Names of testing/commissioning personnel.
- .3 Correct deficiencies, re-test in presence of Departmental Representative until satisfactory performance is obtained.
- .4 Acceptance of tests will not relieve Contractor from responsibility for ensuring that complete systems meet every requirement of Contract.
- .5 Load system with project software.
- .6 Perform tests as required.
- .7 The present section must ensure the reliable functioning of the complete system, controllers, control components.
- .8 Commissioning report and preoperational verification
 - .1 In Excel format
 - .2 Indicating that he has verified each point at each control loop
 - .3 Including the name, address, and description of each point with the adjustments and alarms.
 - .4 For each point, there should be the following verifications:
 - .1 Physical connection of the points;
 - .2 verification, adjustment and calibration of the reference point to another calibrated and certified measurement instrument
 - .3 programming related to this point.
 - .5 For each verification, the contractor must place his initials.
 - .6 When all the points of a system have been verified, an operation simulation will be done in the presence of the departmental representative.

1.6 COMPLETION OF COMMISSIONING

- .1 Commissioning to be considered as satisfactorily completed when objectives of commissioning have been achieved and reviewed by Departmental Representative.

1.7 ISSUANCE OF FINAL CERTIFICATE OF COMPLETION

- .1 Final Certificate of Completion will not be issued until receipt of written approval indicating successful completion of specified commissioning activities including receipt of commissioning documentation.

Part 2 Products

2.1 EQUIPMENT

- .1 Provide sufficient instrumentation to verify and commission the installed system. Provide two-way radios.
- .2 Instrumentation accuracy tolerances: higher order of magnitude than equipment or system being tested.
- .3 Independent testing laboratory to certify test equipment as accurate to within approved tolerances no more than 6 months prior to tests.
- .4 The engineer reserves the right to request the calibration certificate. In the case on non compliance, the engineer could insist that the verification be restarted after re-calibration, without extra cost.
- .5 Locations to be approved, readily accessible and readable.
- .6 Application: to conform to normal industry standards.

Part 3 Execution

3.1 PROCEDURES

- .1 Test each system independently and then in unison with other related systems.
- .2 Verify the systems in normal operating conditions during the cold and warm seasons, making necessary adjustments until the result is in compliance with the plans and specifications.
- .3 Commission each system using procedures prescribed by the Departmental Representative.
- .4 Commission integrated systems using procedures prescribed by Departmental Representative.
- .5 Debug system software.
- .6 Optimize operation and performance of systems by fine-tuning PID values and modifying CDLs as required.
- .7 Test full scale emergency evacuation and life safety procedures including operation and integrity of smoke management systems under normal and emergency power conditions as applicable.

3.2 FIELD QUALITY CONTROL

- .1 Pre-Installation Testing.
 - .1 General: consists of field tests of equipment just prior to installation.
 - .2 Testing may be on site or at Contractor's premises as approved by Departmental Representative.
 - .3 Configure major components to be tested in same architecture as designed system. Include BECC equipment and 2 sets of Building Controller's including MCU's, LCU's, and TCU's.
 - .4 Equip each Building Controller with sensor and controlled device of each type (AI, AO, DI, DO).
 - .5 Additional instruments to include:
 - .1 DP transmitters.
 - .2 VAV supply duct SP transmitters.
 - .3 DP switches used for dirty filter indication and fan status.
 - .6 In addition to test equipment, provide inclined manometer, digital micro-manometer, milli-amp meter, source of air pressure infinitely adjustable between 0 and 500 Pa, to hold steady at any setting and with direct output to milli-amp metre at source
 - .7 After setting, test zero and span in 10 % increments through entire range while both increasing and decreasing pressure.
 - .8 Transmitters above 0.5% error will be rejected.
 - .9 DP switches to open and close within 2% of setpoint.
- .2 Completion Testing.
 - .1 General: test after installation of each part of system and after completion of mechanical and electrical hook-ups, to verify correct installation and functioning.
 - .2 Verify that each instrument, component, control accessory, support, group of tubes, cable multiconductors, junction box, control panel terminal, tube and wiring are correctly installed and connected, to the satisfaction of the departmental representative.
 - .3 Include following activities:
 - .1 Test and calibrate field hardware including stand-alone capability of each controller.
 - .2 Verify each A-to-D convertor.
 - .3 Test and calibrate each AI using calibrated digital instruments.
 - .4 Test each DI to ensure proper settings and switching contacts.
 - .5 Test each DO to ensure proper operation and lag time.
 - .6 Test each AO to ensure proper operation of controlled devices. Verify tight closure and signals.
 - .7 Test operating software.
 - .8 Test application software and provide samples of logs and commands.

- .9 Verify each CDL including energy optimization programs.
 - .10 Debug software.
 - .11 Blow out flow measuring and static pressure stations with high pressure air at 700 kPa.
 - .12 Provide point verification list in table format including point identifier, point identifier expansion, point type and address, low and high limits and engineering units. Include space on commissioning technician and Departmental Representative. This document will be used in final startup testing.
- .4 Final Startup Testing: Upon satisfactory completion of tests, perform point-by-point test of entire system under direction of Departmental Representative and provide:
- .1 technical personnel capable of re-calibrating field hardware and modifying software.
 - .2 Detailed daily schedule showing items to be tested and personnel available.
 - .3 Commissioning to commence during final startup testing.
 - .4 O&M personnel to assist in commissioning procedures as part of training.
 - .5 Commissioning to be supervised by qualified supervisory personnel and Departmental Representative.
 - .6 Commission systems considered as life safety systems before affected parts of the facility are occupied.
 - .7 Operate systems as long as necessary to commission entire project.
 - .8 Monitor progress and keep detailed records of activities and results.
- .5 Final Operational Testing: to demonstrate that EMCS functions in accordance with contract requirements.
- .1 Prior to beginning test demonstrate that operating parameters (setpoints, alarm limits, operating control software, sequences of operation, trends, graphics and CDL's) have been implemented to ensure proper operation and operator notification in event of off-normal operation.
 - .2 Repetitive alarm conditions to be resolved to minimize reporting of nuisance conditions.
 - .3 Test to last at least 30 consecutive 24 hour days.
 - .4 Tests to include:
 - .1 Demonstration of correct operation of monitored and controlled points.
 - .2 Operation and capabilities of sequences, reports, special control algorithms, diagnostics, software.
 - .5 System will be accepted when:

- .1 EMCS equipment operates to meet overall performance requirements. Downtime as defined in this Section must not exceed allowable time calculated for this site.
- .2 Requirements of Contract have been met.
- .6 In event of failure to attain specified AEL during test period, extend test period on day-to-day basis until specified AEL is attained for test period.
- .7 Correct defects when they occur and before resuming tests.
- .6 Departmental Representative to verify reported results.

3.3 ADJUSTING

- .1 Final adjusting: upon completion of commissioning as reviewed by Departmental Representative, set and lock devices in final position and permanently mark settings.

3.4 DEMONSTRATION

- .1 Demonstrate to Departmental Representative operation of systems including sequence of operations in regular and emergency modes, under normal and emergency conditions, start-up, shut-down interlocks and lock-outs in accordance with Section training.

END OF SECTION