REQUEST FOR PROPOSAL (RFP)

Implementation of a Flatsat Facility at the Canadian Space Agency (CSA) at St-Hubert

Bid Submission Deadline:
December 9th, 2019 at 2:00 PM (EST)

Submit Bids to:
Canadian Space Agency
TENDERS RECEPTION OFFICE
Monday to Friday
Receiving/Shipping (8:00 to 16:30)
Closed between 12:00 and 13:00
6767 route de l'Aeroport
Saint-Hubert (Quebec) J3Y 8Y9, Canada

For the attention of : Alexandre Gentile

Reference: CSA File No. **9F030-20190459**

Note: Please read this Request for Proposal carefully for further details on the requirements and bid submission instructions.

November 22nd, 2019

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Introduction

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PART 1 - GENERAL INFORMATION

1. Submission of Bids

The submission of a bid constitutes an assertion that the Bidder has read these documents and accepts the terms and conditions set out therein.

General Instructions to Bidders is incorporated by reference and reproduced in the Standard Acquisition Clauses and Conditions (SACC) Manual issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC website: https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual

2. Summary

The Canadian Space Agency intends to retain the services of a general contractor licensed by the Régie du bâtiment du Québec to practice his profession in the Province of Quebec in order to provide the necessary services to carry out the project of the implementation of a Flatsat Facility at the John H. Chapman Centre.

- **Period of the Contract**
  From the contract award date to March 31, 2020

- **Work location**
  The work will take place at the Canadian Space Agency, at 6767 Route de l'Aéroport, Saint-Hubert, Québec.

3. Trade Agreements

The requirement is subject to the provisions of the Canadian Free Trade Agreement (CFTA) if it is in force.

4. Optional site visit

Arrangements have been made for non-mandatory site visit to be held on **November 29th, 2019, at 10:00am at the Canadian Space Agency (6767 Route de l'Aéroport, Saint-Hubert, Québec, J3Y 8Y9).**
The bidders should communicate with the Contracting Authority to confirm attendance and provide the names of the person(s) who will attend. Bidders will be required to sign an attendance form. Bidders should confirm in their bids that they have attended the site visit. Bidders who do not attend or send a representative will not be given an alternative appointment. Any clarifications or changes to the bid solicitation resulting from the site visit will be included as an amendment to the bid solicitation.

* For the site visit, you have to bring an identification card that you will show at the reception.

* For the site visit, it is recommended bringing the request for proposals documentation with you to be able to take notes.

5. Debriefings

After contract award, bidders may request a debriefing on the results of the bid solicitation. Bidders should make the request to the Contracting Authority within 15 working days of receipt of notification that their bid was unsuccessful. The debriefing may be provided in writing, by telephone or in person.

PART 2 - BIDDER INSTRUCTIONS

1. Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the Request for proposal (RFP) by number, date and title are set out in the Standard Acquisition Clauses and Conditions (SACC) Manual https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual issued by Public Works and Government Services Canada.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of this bid solicitation and accept the clauses and conditions of the resulting contract.

1.1. SACC Manual Clauses

Clauses R2410T (2019-05-30) General Instructions - Construction Service - are incorporated by reference into and form part of the bid solicitation.

https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2410T/17

2. Submission of Bids

THE DEADLINE FOR SUBMITTING BIDS IS INDICATED ON PAGE 1 OF THIS DOCUMENT.

It is the policy of the CSA to return, unopened, bids received after the stipulated closing date and time.

Submissions must be submitted by mail or in person at the following address:

Canadian Space Agency
TENDERS RECEPTION OFFICE
Warehouse / Reception (between 8h00 and 16h30)
6767 Airport Road
Saint-Hubert (Quebec) J3Y 8Y9
Canada

For the attention of: Alexandre Gentile

Fax or email submissions are not accepted.

3. Enquiries - Bid Solicitation

All enquiries must be submitted **BY E-MAIL ONLY** to the Contracting Authority alexandre.gentile@canada.ca **no later than two (2) calendar days** before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the questions or may request that the Bidder do so, so that the proprietary nature of the question is eliminated, and the enquiry can be answered with copies to all bidders. Enquiries not submitted in a form that can be distributed to all bidders may not be answered by Canada.

4. Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in **PROVINCE OF QUEBEC**.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the Bidders.

5. Communications Notification

As a courtesy, the Government of Canada requests that successful bidders notify the Contracting Authority in advance of their intention to make public an announcement related to the award of a contract.

6. Office of the Procurement Ombudsman clause

Clause for solicitation documents and regret letters for unsuccessful bidders

The Office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent venue for Canadian bidders to raise complaints regarding the award of federal contracts under $25,300 for goods and under $101,100 for services. Should you have any issues or concerns regarding the award of a federal contract below these dollar amounts, contact OPO by e-mail at boa.opo@boa-opo.gc.ca, by telephone at 1-866-734-5169, or by web at www.opo-boa.gc.ca. For more information about OPO, including the available services, please visit the OPO website.

7. Direct Deposit

The Government of Canada is phasing out paper cheques in favour of Direct Deposit for all payments issued by the Receiver General. Direct Deposit is a secure and reliable method of receiving payment, eliminating the risk of lost or stolen cheques. You will find all the information to enrol in direct deposit with Canadian Space Agency at : http://www.asc-csa.gc.ca/eng/forms/vendor-direct-depot-form.asp

PART 3 - BID PREPARATION INSTRUCTIONS

1. Bid Preparation Instructions

Bidders must send the original bid by the specified deadline (date and time) to the address indicated on page 1 of the RFP. Proposals can be submitted in English or French.

Prices must appear in the financial bid only. No price must be indicated in another section of the bid.

2. Price

The financial proposal must indicate the detailed breakdown of the total price proposed. The proposed payment terms must be given **as indicated in Appendix B**.

The price of the bid will be evaluated in Canadian dollars, Applicable Taxes excluded, FOB destination, Canadian customs duties and excise taxes included.

The Government of Canada requests that bidders follow the format instructions described below in the preparation of their bid.

a) use 8.5 "x 11" (216 mm x 279 mm) bond paper;
b) use a numbering system that corresponds to the bid solicitation;
c) include the certifications in a separate section of the bid.
d) Bidders must submit their financial bid in accordance with the Basis of Payment
e) the total amount of Goods and Services Tax (GST) or Harmonized Sales Tax (HST), if applicable, must be shown separately.

3. Commercial name and address of the Bidder

1) Name: _____

2) Address: _____

_____

3) Telephone: _____ Fax: _____

4) Email: _____

5) Email for financial questions (eg billing): _____

6) Business Number - Procurement (NEA): _____

7) Tax number: _____

8) Members of the Board of Directors:

_____
Name and title

_____
Name and title

_____

Name and title

4 Certifications

Bidders must submit the certifications required under Part 5.

PART 4 – EVALUATION PROCEDURES AND BASIS OF SELECTION

1. Evaluation Procedures

(a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
(b) An evaluation team composed of representatives of Canada will evaluate the bids.

2. Financial Evaluation

SACC Manual Clause A0220T (2014-06-26) Evaluation of Price.

3. Basis of Selection

A bid must comply with all the requirements specified in the bid preparation instructions to be declared responsive. The responsive bid meeting all of the mandatory criteria with the lowest evaluated price will be recommended for award of a contract.

PART 5 - CERTIFICATIONS

Bidders must provide the required certifications and additional information to be awarded a contract.

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue, whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

1. Certifications Required with the Bid

Bidders **MUST** submit the following duly completed certifications as part of their bid.

1.1 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available at the bottom of the page of the Employment and Social Development Canada (ESDC) - Labour's website (https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#).

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid list at the time of contract award.

1.2 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts with FPS, bidders must provide the information required below before contract award.

1.3.1 Definitions

For the purposes of this clause,
"former public servant" is any former member of a department as defined in the *Financial Administration Act*, R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

a. an individual;
b. an individual who has incorporated;
c. a partnership made of former public servants; or
d. a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

"lump sum payment period" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of

various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"pension" means a pension or annual allowance paid under the *Public Service Superannuation Act* (PSSA), R.S., 1985, c.P-36, and any increases paid pursuant to the *Supplementary Retirement Benefits Act*, R.S., 1985, c.S-24 as it affects the PSSA. It does not include pensions payable pursuant to the *Canadian Forces Superannuation Act*, R.S., 1985, c.C-17, the*Defence Services Pension Continuation Act*, 1970, c.D-3, the *Royal Canadian Mounted Police Pension Continuation Act* , 1970, c.R-10, and the *Royal Canadian Mounted Police Superannuation Act*, R.S., 1985, c.R-11, the*Members of Parliament Retiring Allowances Act* , R.S., 1985, c.M-5, and that portion of pension payable to the*Canada Pension Plan Act*, R.S., 1985, c.C-8.

1.3.2 Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension?
Yes ( ) **No** ( )

If so, the Bidder must provide the following information, for all FPS in receipt of a pension, as applicable:

a. name of former public servant;
b. date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with Contracting Policy Notice: 2012-2 and the Guidelines on the Proactive Disclosure of Contracts.

1.3.3 Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive?
Yes ( ) **No** ( )

If so, the Bidder must provide the following information:

a. name of former public servant;
b. conditions of the lump sum payment incentive;
c. date of termination of employment;
d. amount of lump sum payment;
e. rate of pay on which lump sum payment is based;
f. period of lump sum payment including start date, end date and number of weeks;
g. number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is $5,000, including Applicable Taxes.

1.3 Ineligibility and Suspension Policy

Bidders, offerors or suppliers certify to the following when submitting a bid:

- they have read and understand the **Ineligibility and Suspension Policy**; http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html

- they understand that certain domestic and foreign criminal charges and convictions, and other circumstances, will or may result in a determination of ineligibility or suspension;
- they are aware that Canada may request additional information, certifications and validations for the purposes of making a determination of ineligibility or suspension;
- they have provided a list of all foreign criminal charges and convictions;
- none of the domestic criminal offences and other circumstances described in the Policy applies to them, their affiliates and their first tier subcontractors; and
- they are not aware of a determination of ineligibility or suspension that applies to them.

1.4 Integrity Provisions – List of Names

- Bidders who are incorporated, including those bidding as a joint venture, **must provide a complete list of names of all individuals who are currently directors** of the Bidder. **(See Appendix F - Integrity Form)**.

- Bidders bidding as sole proprietorship, as well as those bidding as a joint venture, **must provide the name of the owner(s)**. **(See Appendix F - Integrity Form)**.

- Bidders bidding as societies, firms or partnerships do not need to provide lists of names.

1.5 Procurement Business Number

Suppliers are required to have a Procurement Business Number (PBN) before contract award. Suppliers may register for a PBN online at Supplier Registration Information https://srisupplier.contractscanada.gc.ca/.
For non-Internet registration, suppliers may contact the InfoLine at 1-800-811-1148 to obtain the telephone number of the nearest Supplier Registration Agent.

Procurement Business Number (PBN): _____

1.6 Certification

Compliance with the certifications provided by the Contractor in its bid is a condition of the Contract and subject to verification by Canada during the term of the Contract. If the Contractor does not comply with any certification or it is determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

CERTIFICATION SIGNATURE

We hereby certify compliance with the above noted certification requirements for:

1.1. Federal Contractors Program for Employment Equity - Bid Certification
1.2. Former Public Servant
1.3. Ineligibility and Suspension Policy
1.4. Integrity Provisions – List of Names
1.5. Procurement Business Number
1.6. Certification

_____ _____

Signature Date

_____

Name (print or type) of person authorized to sign on behalf of the Organization

Phone : _____

E-Mail : _____

PART 6 - RESULTING CONTRACT CLAUSES

1. Security Requirements

The work to be performed under this contract does not require a reliability status.

Site access will be provided as required and contractor(s) will be escorted at all times.

2. Description of requirement

The Contractor shall perform and complete the Work as per the statement of work at appendix C and specifications and plans at appendix D.

The work must be performed at the Canadian Space Agency (CSA) - 6767 route de l'aéroport, Saint-Hubert Québec J3Y 8Y9.

3. Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the Standard Acquisition Clauses and Conditions Manual issued by Public Works and Government Services Canada.

https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual

4. General Conditions

The following are the contract documents:
(a) Contract page when signed by government of Canada;
(b) Duly completed Bid and Acceptance Form and any Appendices attached thereto;
(c) Plans and Specifications;
(d) General Conditions:

- GC1 General Provisions R2810D (2017-11-28);
- GC2 Administration of the Contract R2820D (2016-01-28);
- GC3 Execution and Control of the Work R2830D (2018-06-21);
- GC4 Protective Measures R2840D (2008-05-12);
- GC5 Terms of payment R2850D (2016-01-28);
- GC6 Delays and Changes in the Work R2865D (2019-05-30);
- GC7 Default, Suspension or Termination of Contract R2870D (2018-06-21);
- GC8 Dispute resolution R2880D (2016-01-28);
- GC10 Insurance R2900D (2008-05-12);

(e) Allowable Costs for Contract Changes Under GC5 R2950D (2015-02-25);
(f) Any amendment issued or any allowable bid revision received before the date and time set for solicitation closing;
(g) Any amendment incorporated by mutual agreement between government of Canada and the Contractor before acceptance of the bid; and
(h) Any amendment or variation of the contract documents that is made in accordance with the General Conditions.

The language of the contract documents shall be the language of the Bid and Acceptance Form submitted.

5. Term of Contract

The contractor must have completed the work on or before March 31, 2020.

6. Priority of Documents

The documents listed below form part of and are incorporated into this Contract. If there is a discrepancy between the wording of one document and the wording of any other document, which appears on the list, the wording of the document, which first appears on the list shall prevail over the wording of any document which subsequently appears on the list:
a) the Contract document including appendices;
b) General Conditions as per indication above;
c) Appendix C, Statement of work;
d) the supplier quote dated _____

7. Basis of payment – Firm Price

No increase in the total liability of government of Canada or in the price of Work resulting from any design changes, modifications or interpretations of specifications, made by the Contractor, will be authorized or paid to the Contractor unless such changes, modifications or interpretations, have been approved, in writing, by the Contracting Authority, prior to their incorporation into the Work. The Contractor shall not be obliged to perform any work or provide any service that would cause the total liability of government of Canada to be exceeded, unless the Contracting Authority authorizes an increase.

8. Invoicing Instructions

The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions.
Invoices cannot be submitted until all work identified in the invoice is completed.

Each invoice must be supported by:

- **(a)** a copy of time sheets to support the time claimed;
- **(b)** a copy of the release document and any other documents as specified in the Contract;
- **(c)** a copy of the invoices, receipts, vouchers for all direct expenses, and all travel and living expenses;
- **(d)** a copy of the monthly progress report.

Invoices must be distributed as follows:

(a) One (1) copy must be forwarded to the following address for certification and payment

CANADIAN SPACE AGENCY
9F030 – FINANCIAL SERVICES
Seurity and Facilities
6767 Route de l'Aeroport
Saint-Hubert (Québec) J3Y 8Y9, CANADA

OR BY E-MAIL : asc.facturation-invoicing.csa@canada.ca

One (1) copy must be forwarded to the Project Authority

9. Electronic Payment of Invoices

The Government of Canada is phasing out paper cheques in favour of Direct Deposit for all payments issued by the Receiver General. Direct Deposit is a secure and reliable method of receiving payment, eliminating the risk of lost or stolen cheques. You will find all the information to enrol in direct deposit with Canadian Space Agency at : http://www.asc-csa.gc.ca/eng/forms/vendor-direct-depot-form.asp

10. Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Quebec.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the bidders.

11. Contracting Authority

The Contracting Authority for this resulting contract is:

Alexandre Gentile
Canadian Space Agency
6767 route de l'Aéroport
Saint-Hubert (Quebec) J3Y 8Y9
Canada
Telephone: (450) 926-4875
E-Mail: alexandre.gentile@canada.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

12. Project Authority

To be inserted at contract award.
Name: TBD
Canadian Space Agency
Address: 6767, Route de l'Aeroport
St-Hubert, Québec, J3Y 8Y9
Telephone:
E-Mail:

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority, however the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

13. Contractor's Representative

The Contractor's Representative for the Contract is:

Name:
Contractor:
Telephone:
E-Mail:

14. Performance Evaluation

Contractor shall take note that the performance of the Contractor during and upon completion of the work shall be evaluated by the Government of Canada. Should the Contractor's performance be considered unsatisfactory more than once, the Contractor's bidding privileges on future work may be suspended for a period of 18 months or 36 months.

Contractor Performance Evaluation Report Form is used to record the performance. See Appendix E.

15. Compliance

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

16. Proactive Disclosure of Contracts with Former Public Servants

By providing information on its status, with respect to being a former public servant in receipt of a *Public Service Superannuation Act* (PSSA) pension, the Contractor has agreed that this information will be reported on departmental websites as part of the published proactive disclosure reports, in accordance with Contracting Policy Notice: 2012-2 of the Treasury Board Secretariat of Canada.

17. Office of the Procurement Ombudsman clause

Contract Clauses - Dispute Resolution

The Parties agree to make every reasonable effort, in good faith, to settle amicably all disputes or claims relating to or arising from the Contract, through negotiations between the Parties' representatives authorized to settle. If the Parties do not reach a settlement within 10 working days, each party hereby consents to fully participate in and bear the cost of mediation led by the Procurement Ombudsman pursuant to Subsection 22.1(3)(d) of the *Department of Public Work and Government Services Act* and Section 23 of the *Procurement Ombudsman Regulations*.

The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169, by e-mail at boa.opo@boa-opo.gc.ca, or by web at www.opo-boa.gc.ca.

Contract clause – Contract Administration

The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will review a complaint filed by the complainant respecting the administration of the Contract if the requirements of Subsection 22.2(1) of the *Department of Public Works and Government Services Act* and Sections 15 and 16 of the *Procurement Ombudsman Regulations* have been met.

To file a complaint, the Office of the Procurement Ombudsman may be contacted by e-mail at boa.opo@boa-opo.gc.ca, by telephone at 1-866-734-5169, or by web at www.opo-boa.gc.ca.

APPENDIX “B”

Submission Slip

SUBMISSION TABLE

Firm price to complete the entire project by March 31, 2020
(price excluding taxes)

$ _____ *

* If possible, please also provide a cost breakdown of your financial proposal, if not provided it may be required before contract award.

APPENDIX C

STATEMENT OF WORK (SOW)

1. INVITATION

The Canadian Space Agency intends to retain the services of a general contractor licensed by the Régie du bâtiment du Québec to practice his profession in the Province of Quebec in order to provide the necessary services to carry out the project of the implementation of a Flatsat Facility at the John H. Chapman Centre.

2. IMPLEMENTATION

2.1 Labour

Assign qualified labour to carry out work according to drawings and specifications.

Make sure that all assigned labour has the competency cards required by law.

2.2 Equipment and tools

Provide all equipment and tools necessary to perform the work.

2.3 Materials

Except as otherwise specified, supply, deliver and install all materials necessary for project performance.

The Contractor shall have its materials delivered to the Space Centre loading dock, then taken to the construction site without delay. No materials may be stored inside the building except in the areas reserved for the work.

In the case of materials provided by CSA, the Contractor shall transport the materials from the warehouse to the construction site.

2.4 Occupational safety and health

Ensure that all personnel assigned to the projects have received the health and safety training required by the legislation governing construction sites.

The selected contractor shall fill out the health and safety procedure document for repair and construction projects carried out at the John H. Chapman Space Centre.

The selected contractor shall provide his health and safety procedure document.

Ensure that personnel comply with the OSH action plan.

2.5 Corporate safety

The contractor’s employees working inside the building must register every day at the main desk and will be escorted at all time by a security guard.

2.6 Service availability

Establish the work schedule with the CSA manager once the contract has been awarded.

All services shut down must be planned with the project manager and could be done outside the regular working hours.

Ensure that labour is able and available to carry out the work depending on the calendar, schedule and timetable agreed to by the Contractor and CSA.

Throughout the work performance period, ensure that the CSA representative can communicate at any time with the Contractor to report a breakage or abnormal situation that could put occupants in danger, imperil the integrity of the facilities or compromise the Space Centre's corporate security.

2.7 Obligation of result

The Contractor has an obligation of result and shall co-ordinate and plans all activities so as to be sure of achieving the project goals in terms of quality, schedule, cost control and the safety of individuals.

APPENDIX “D”

Plans and Specifications

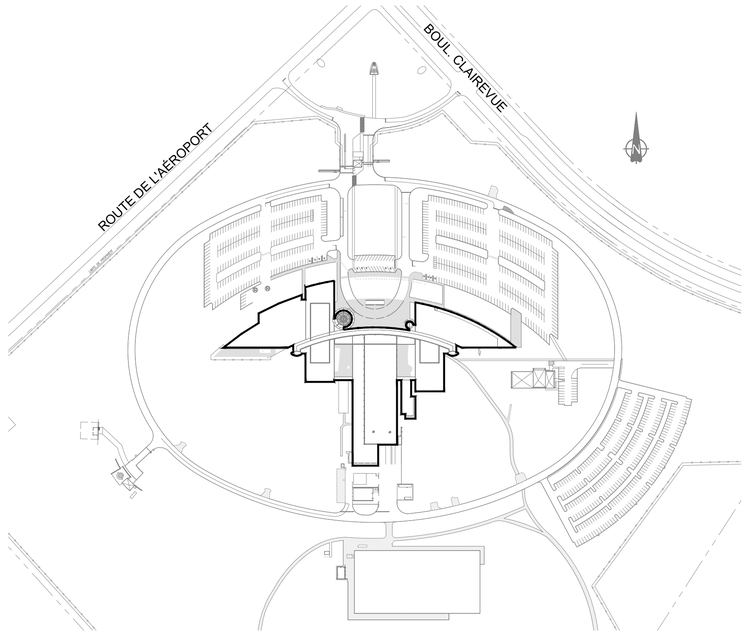
Agence spatiale Canadienne

Sécurité et installations
Centre spatial John-H.-Chapman
6767, route de l'Aéroport
Saint-Hubert (Québec) J3Y 8Y9

Canadian Space Agency

Security and Facilities
John H. Chapman Space Centre
6767 Route de l'Aéroport
Saint-Hubert, Quebec, J3Y 8Y9

Tel: (450) 926-4800
Fax: (450) 926-4352



«FLATSAT-FACILITY»
PROJECT RCM - ROOM 2E-102.A
PROJECT No. P-00019

MECHANICAL

Reference No. Rochon Experts-Conseils: 19-008-A

ISSUED FOR: TENDER
2019-11-04

LIST FOR MECHANICAL DRAWINGS	
# PLAN	PAGE TITLE
H-00en	MECHANICAL - COVERING/PRESENTATION PAGE
H-01en	MECHANICAL - SPECIFICATIONS AND SCOPE OF WORKS
H-02en	MECHANICLA - PLUMBING - LEVEL VIEWS, LEGEND, DETAILS AND SPECIFICATIONS
H-03en	MECHANICAL - VENTILATION - LEGEND AND SPECIFICATIONS
H-04en	MECHANICAL - VENTILATION - SPECIFICATIONS (CONTINUATION)
H-05en	MECHANICAL - VENTILATION AND REFRIGERATION - LEVEL 1, 2 AND 3 VIEWS
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MECHANICAL GENERAL PRESCRIPTIONS

1.0 GENERAL INSTRUCTIONS- MECHANICAL

1.01 GENERAL

.1 ALL MECHANICAL WORK SHALL BE AS NOTED ON PLANS INCLUDING THE FOLLOWING GENERAL INSTRUCTIONS WHICH ARE AN INTEGRAL PART OF THE CONTRACTUAL DOCUMENTS. THE SAME CONFORMITY OBLIGATIONS ARE APPLIED TO THE DETAILED DRAWINGS, CORRESPONDENCE AND TO ANY OTHER DOCUMENT THAT IS SUPPLIED OR WILL BE SUPPLIED BY THE ENGINEER.

1.02 PROPERTY AND INTERPRETATION OF PLANS AND SPECIFICATIONS

.1 ONLY THE ENGINEER WHO PREPARED THE PLANS CAN CORRECTLY INTERPRET THE INTENT ON THE PLANS AND DOCUMENTS AND ALL DOCUMENTS AND PLANS ARE THE SOLE PROPERTY OF THE ENGINEER. FURTHER MORE, THESE PLANS AND DOCUMENTS MAY NOT BE USED, IN PART OR IN WHOLE FOR ANY OTHER PROJECT OTHER THAN THE ONE IT WAS INTENDED FOR.

1.03 DOCUMENTS REVIEW

.1 NOTWITHSTANDING ARTICLE 1.01, AND DURING THE BID PROCESS, THE SUB–CONTRACTOR SHALL ANTICIPATE ALL WORK TO BE COMPLETED AS PER PLANS AND HE SHOULD ADVISE THE ENGINEER OF ANY/ALL ERRORS, OMISSIONS, MISSING INFORMATION OR ANY OTHER DISCREPANCY BETWEEN THE DOCUMENTS AND PLANS AND/OR NON–CONFORMITY IN THE RELATIONSHIP TO THE EXISTING.

.2 ALL THE ABOVE SHALL BE NOTED IN WRITING TO THE ENGINEER DURING THE BID PROCESS. FAILURE TO COMPLY SHALL RESULT IN ANY/ALL MODIFICATIONS TO BECOME THE RESPONSIBILITY OF THE SUB–CONTRACTOR.

1.04 SCOPE OF WORK

.1 SCOPE OF WORK INCLUDES:

THE SUPPLY, INSTALLATION AND CONNECTION OF ALL THAT IS SHOWN ON DRAWINGS OR MENTIONED IN THE SPECIFICATIONS, WITH ALL REQUIRED ACCESSORIES, EVEN THOSE NOT ILLUSTRATED ON PLANS AND SPECIFICATIONS BUT REQUIRED FOR GOOD OPERATION.

.2 THE OBLIGATION TO:

1. PERFORM START–UP OF ALL SYSTEMS ACCORDING TO ESTABLISHED PROCEDURES AND GOOD ENGINEERING PRACTICE AND IN CLOSE COLLABORATION WITH ALL OTHER TRADES INVOLVED.
2. PERFORM ALL MECHANICAL WORK AND SUPPLY ALL THE NECESSARY MATERIALS, TOOLING, EQUIPMENT, LABOUR AND SUPERVISION NECESSARY FOR TOTAL COMPLETION AS INDICATED, DESCRIBED OR REASONABLY IMPLIED ON THE DRAWINGS AND IN THE PRESENT "GENERAL INSTRUCTIONS".
3. PROTECT ALL WORK AGAINST WEATHER, FIRE, THEFT AND VANDALISM, THROUGHOUT THE WHOLE DURATION OF THE PROJECT.

.3 COMPLETE ALL ADDITIONAL WORK THE ENGINEER HAS REQUESTED IN WRITING WITH THE CONSENT OF THE OWNER. THE OWNER SHALL REFUSE ANY/ALL CLAIMS OF ADDITIONAL WORK COMPLETED WITHOUT WRITTEN CONSENT FROM THE ENGINEER.

.4 AT THE SUB–CONTRACTORS COST, HE SHALL PROTECT, BRACE, SUPPORT, DIVERT AND RESTORE IN GOOD ORDER, TO THE SATISFACTION OF THE ENGINEER, ALL EQUIPMENT PERTAINING TO:

1. WATER, GAS, SEWER AND DRAIN PIPING, ETC.;
2. MECHANICAL EQUIPMENTS AND SYSTEMS AND MISCELLANEOUS;
3. WALLS FLOORS, CEILINGS AND OTHER STRUCTURAL AND/OR ARCHITECTURAL ITEMS.

WITH RESPECT TO CLEARANCES, DAMAGE AND THE MOVING OF THE ABOVE ITEMS, IN THE PROCESS OF COMPLETING HIS WORK. ALL DAMAGE TO EXISTING SYSTEMS AND EQUIPMENT SHALL BE MADE GOOD AND RETURNED TO THEIR ORIGINAL CONDITION, TO THE SATISFACTION OF THE ENGINEER AND AT NO ADDITIONAL COST TO THE CLIENT.

.5 THE MECHANICAL DRAWINGS DO NOT INDICATE ALL ARCHITECTURAL AND STRUCTURAL DETAILS. EXACT INFORMATION SHALL BE OBTAINED, FIRST FROM ON SITE AND SECOND FROM ARCHITECTURAL AND STRUCTURAL DRAWINGS WHICH SHALL BE STUDIED. THE MECHANICAL DRAWINGS INDICATE, IN A GENERAL MANNER, THE POSITION OF EQUIPMENT FOR INSTALLATION AS SHOWN ON A SCHEMATIC DIAGRAM. THE DUCT INSTALLATION SHALL CONFORM TO THE FOLLOWING:

1. TO BE RUN PARALLEL TO THE BUILDING STRUCTURE, WHEN EXPOSED;
2. NO CUTTING OR BORING THROUGH STRUCTURAL ELEMENTS WITHOUT WRITTEN PERMISSION;
3. SHALL BE INSTALLED TO FACILITATE THE REMOVAL OF EQUIPMENT OR PARTS THERE OF, FOR REPAIRS, CLEANING & INSPECTION.
4. SHALL BE INSTALLED IN A MANNER TO FACILITATE FUTURE EQUIPMENT INSTALLATIONS.
5. TO RELOCATE, AT NO EXTRA COST, WITHIN 4.6M (15 FEET) OF INDICATED LOCATION.
6. TO HIDE FROM SIGHT AS MUCH AS POSSIBLE, ALL EQUIPMENT, DEVICES, CONDUITS & WIRING, FROM BEING EXPOSED.
7. TO RELOCATE, AT NO EXTRA COST, WHEN NOT IN ACCORDANCE WITH THE PRECEDING.

IF THE INSTALLATION OR EQUIPMENT CONNECTION IS DIFFERENT FROM THE ONE SHOWN ON THE DRAWINGS, THE ELECTRICAL CONDUITS SHALL BE MODIFIED ACCORDINGLY AND ACCORDING TO THE STANDARDS OUTLINED ABOVE.

.6 UNLESS OTHERWISE SPECIFIED, ALL DUCTS AND PIPES SHALL BE CONCEALED WITHIN WALL CAVITIES, IN CEILING SPACES AND/OR OTHER SUCH ARCHITECTURAL ENCLOSURES, EVEN THOUGH THE MAY BE DRAWN SURFACE MOUNTED. WHEN IN DOUBT, VERIFY AND CONFIRM WITH THE ENGINEER FOR PRECISIONS.

.7 ALL MODIFICATIONS TO MATERIALS, EQUIPMENT OR FIXTURES AND ALL DEVIATIONS TO THE CONDUIT RUNS AND OTHER ITEMS SHALL BE COMPLETED FOLLOWING APPROVAL FROM THE ENGINEER. CHANGES SHALL BE INDICATED IN RED ON ONE CLEAN SET OF DRAWINGS THAT EACH SUBCONTRACTOR WILL PREPARE AND SUBMIT TO THE ENGINEER FOR ISSUANCE AS AN "AS BUILT" DRAWING.

1.05 GUARANTEES

.1 THE ENTIRE WORK SHALL BE FREE OF MANUFACTURING, MATERIAL AND INSTALLATION DEFECTS. ALL MATERIAL EQUIPMENT AND UNITS SHALL BE NEW AND OF THE HIGHEST QUALITY.

.2 IF, DURING THE WARRANTY PERIOD IT IS PROVEN THAT SUCH DEFECTS EXISTS, THE SUBCONTRACTOR SHALL REPAIR OR REPLACE THE DEFECTIVE EQUIPMENT OR WORK WITHOUT CLAIMING AN ADDITIONAL AMOUNT FROM THE OWNER. IN ADDITION, DURING THE WARRANTY PERIOD, HE SHALL ASSUME THE RESPONSIBILITY OF ALL DELAYS OR DAMAGES CAUSED BY THESE DEFECTS, AND, IF REQUIRED, CORRECT ALL DAMAGES CAUSED TO THE ADJACENT SURFACES BY THE REPAIRS OR MODIFICATIONS WHILE IN THE EXECUTION OF THE WORK.

.3 A WRITTEN ONE (1) YEAR WARRANTY SHALL BE SUPPLIED BY EACH SUBCONTRACTOR FOR ALL THE EQUIPMENT AND FIXTURES, THEIR INSTALLATION AND OPERATION. THIS WARRANTY COMES INTO FORCE AT THE BEGINNING OF THE FINAL APPROVAL DATE OF THE WORK BY THE ENGINEER.

1.06 SHOP DRAWINGS

.1 BEFORE ORDERING MATERIAL AND EQUIPMENT, THE SUBCONTRACTOR SHALL SUBMIT TO THE ENGINEER ONE (1) COPY (PAPER OR PDF BY EMAIL) OF ALL SHOP DRAWINGS AND SAMPLES. THESE DRAWINGS SHALL BE REVIEWED AND NOTED BY THE PROJECT ENGINEER AND THE RETURNED BY EMAIL IN COLOR PDF FORMAT.

.2 THE SUBCONTRACTOR SHALL, WHEN INDICATED AND BEFORE ORDERING, SUPPLY MATERIAL SAMPLES TO BE USED FOR THE ENGINEER'S APPROVAL.

.3 THE STUDY AND THE APPROVAL OF THE DRAWINGS AND SAMPLES BY THE ENGINEER IS APPLICABLE ONLY TO THE GENERAL LAYOUT. ERRORS WILL BE NOTED, WHEN SEEN, BUT SHOP DRAWINGS APPROVAL WILL NOT FREE THE SUB–CONTRACTOR FROM HIS RESPONSIBILITY TO COMPLETE THE WORK IN ACCORDANCE WITH THE CONTRACTUAL DOCUMENTS.

.4 SHOP DRAWINGS SHALL SHOW MATERIAL CHARACTERISTICS, MANUFACTURING AND INSTALLATION DETAILS, INCLUDING ANY PARTICULAR USE OR STANDARDS TO BE FOLLOWED.

.5 THE FOLLOWING SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER. THIS LIST IS NEITHER LIMITED NOR COMPLETE. ANY OTHER SHOP DRAWING WHICH MAY BE JUDGED TO BE RELATIVE SHALL BE SUBMITTED TO THE ENGINEER BY THE CONTRACTORS CONCERNED.

PLUMBING :
- PIPING AND ACCESSORIES;
- PUMPS
- VALVES;
- INSULATION;
- IDENTIFICATION;
- ETC.

VENTILATION AND REFRIGERATION :
- AIR CONDITIONNING SYSTEMS;
- ELECTRIC DUCT HEATER;
- HUMIDIFIER AND IT'S ACCESSORIES AND CONTROLS;
- ACOUSTICAL LINER;
- THERMAL INSULATION OF DUCT SYSTEMS;
- REFRIGERATION PIPING AND ACCESSORIES;
- THERMAL INSULATION FOR REFRIGERATION PIPING;
- REFRIGERANT;
- SUPPORTS;
- IDENTIFICATION;
- ETC.

CONTROLS :
- CONTROL EQUIPMENTS;
- CONTROL SEQUENCES AND SCHEMATIC;
- SCHEMATIC FOR CONTROL ARCHITECTURAL NETWORK INTEGRATION;
- CONTROL DIAGRAMS;
- IDENTIFICATION.
- ETC.

1.07 EXECUTION DRAWINGS

.1 UNLESS OTHERWISE SPECIFIED, EACH SUBCONTRACTOR SHALL, BEFORE THE BEGINNING HIS WORKS, SUBMIT AT LEAST ONE (1) COPY OF HIS EXECUTION DRAWINGS FOR REVIEW AND APPROVAL TO THE PROJECT ENGINEER. THESE SHALL INCLUDE INSTALLATION AND LAYOUT OF DUCTS AND /OR PIPES VIS–À–VIS ARCHITECTURAL AND STRUCTURAL LAYOUTS. ANY AND ALL CHANGES OR MODIFICATIONS TO THE ENGINEER'S DRAWINGS THAT HAVE NOT BEEN PRE–APPROUVED BY THE ENGINEER SHALL BE CORRECTED TO THE ENGINEER'S SATISFACTION, AND THIS WITH NO ADDITIONAL CHARGES.

.2 THE SUBCONTRACTOR SHALL COORDINATE HIS DUCTS AND/OR PIPES WITH ALL OTHER SUBTRADES. NO ADDITION CHARGES WILL BE APPROVED FOR THE LACK OF COORDINATION BETWEEN SUBTRADES.

1.08 OPERATION AND MAINTENANCE

THE SUB CONTRACTORS ARE OBLIGED TO:

.1 START UP ALL SYSTEMS AND VERIFY THE OPERATING CONDITIONS AND PERFORMANCE CHARACTERISTICS AS SPECIFIED ON PLANS AND SPECS.

.2 VERIFY EACH SYSTEM BY SIMULATING ALL CONDITIONS AND PREPARE A REPORT INDICATING PERFORMANCE ACCORDING TO SPECS, PLANS, RECCOMANDATIONS AND MANUFACTURERS INSTRUCTIONS.

.3 SUBMIT ONE (1) BINDER CONTAINING SHOP DRAWINGS, TEST RESULTS AND INSTRUCTION MANUALS FOR USE AND MAINTENANCE.

1.09 LAWS, CODES, LICENSES AND STANDARDS

OBTAIN AND PAY THE REQUIRED FEES:

1. IT IS FORBIDDEN TO HIDE ALL WORK PRIOR TO INSPECTION BY THE ENGINEER AND/OR GOVERNING AUTHORITIES;
2. OBTAIN COMPLIANCE CERTIFICATES FROM GOVERNING AUTHORITIES (LABOUR MINISTRY, MUNICIPAL FIRE DEPT, MUNICIPAL PLUMBING AUTHORITIES AND OTHERS);
3. FOLLOW APPLICABLE CODES & STANDARDS (THE MOST SEVERE) FROM THE NBC, NPIC, LABOUR MINISTRY, MUNICIPAL SERVICES, ENVIRONMENTAL PROTECTION AND ANY OTHER CODE AND/OR STANDARD WHICH MAY BE RELATIVE TO THE PROJECT.
4. IN ADDITION, ALL FEES FOR TEMPORARY CONNECTIONS TO PUBLIC SERVICES (IE: WATER MAIN, SEWER, ETC) SHALL BE AT THE EXPENSE OF THE SPECIFIC CONTRACTOR.

1.10 WORK DISTRIBUTION

EXCEPT WHERE OTHERWISE SPECIFIED IN THE MECHANICAL AND ELECTRICAL PLANS AND SPECIFICATIONS, THE FOLLOWING WORKS SHALL BE DISTRIBUTED AS INDICATED :

1. PROTECTION: EVERY SUBCONTRACTOR SHALL ENSURE PROTECTION AGAINST BREAKING, THEFT, FIRE, VANDALISM OF ALL HIS EQUIPMENT AND MATERIALS UNTIL FINAL ACCEPTANCE BY THE OWNER AND SHALL ENSURE A SECURE INSTALLATION TO MAKE STEALING, BREAKING AND VANDALISM HARD TO PERFORM FOLLOWING THE DELIVERY OF THE WORK.
2. SLEEVES: SUPPLIED AND INSTALLED BY EVERY SUBCONTRACTOR CONCERNED, EXCEPT IN THE CASE OF LARGE OPENINGS SUCH AS MECHANICAL OR VENTILATION SHAFTS.
3. BASES AND SUPPORTS:
   ALL BASES AND/OR SUPPORTS REQUIRED FOR EQUIPMENTS INSTALLATION SHALL BE SUPPLIED AND INSTALLED BY THE CONCERNED MECHANICAL CONTRACTOR. THEY ALSO MUST BE "VIBRATION" TYPE EVERY WHERE IT IS REQUIRED TO REDUCE INDESIRABLE NOISE.
4. ACCES DOORS:
   WHEN THE MECHANICAL EQUIPMENT REQUIRES AN ACCESS FOR MAINTENANCE OR INSPECTION, ACCESS DOORS SHALL BE SUPPLIED AND INSTALLED BY THE CONCERNED MECHANICAL CONTRACTOR. WHEN ACCESS DOORS IS ALSO REQUIRED IN THE PARTITION (WALL OR CEILING), THE SUPPLYING OF AN ARCHITECTURAL ACCES DOOR SHALL BE DONE BY THE MECHANICAL CONTRACTOR, BUT THE INSTALLATION OF THIS ACCES DOOR IS DONE BY THE GENERAL CONTRACTOR.
5. THE FOLLOWING WORK SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR:
   a. DIRLLING OR OPENINGS REQUIRED FOR PIPING/CONDUITS LARGER THAN 4"ø (100mmø)
   b. FIRE PROTECTION SEALING AROUND MECHANICAL DUCT WORK;
   c. REPAIRS AND ADJUSTMENTS FOLLOWING DRILLING BY SUB CONTRACTORS;
   d. THE SEALING WITH A FIRE–PROOF MATERIAL FOR CONDUITS PASSING THRU WALLS AND FIRE STOP FLOORS;
   e. THE LEVELLING OF ALL NEW AND EXISTING SURFACES;

1.11 MOTORS

1. MOTORS TO BE SUPPLIED BY THE MECHANICAL CONTRACTORS SHALL BE TYPE "OPEN DRIP–PROOF" OR "TEFC" (TOTALLY ENCLOSED FAN COOL" AS INDICATED. SEE SPECIFICATIONS OF EQUIPMENTS TO DETERMINE DE TYPE OF MOTOR. ALL MOTORS SHALL BE HIGH EFFICIENCY AND BE LIFETIME LUBRIFICATED.

1.12 DRAINING DEVICES

1. ANY APPARATUS HAVING OR REQUIRING ANY DRAINAGE (EX.: OVERFLOW, DRAIN, EVAPORATOR, FRESH AIR PLENUMS AND OTHER SIMILAR), SHOULD BE CONNECTED TO THE NEAREST FLOOR DRAIN OR ON A COLUMN DRAINAGE PIPE WITH COPPER TUBING AT LEAST 1"INCH (25mm) DIAMETER.
2. THE CONNECTION TO THE APPLIANCE WILL BE PROVIDED BY THE SUBCONTRACTOR WHO SUPPLIES IT; HOWEVER, THE PIPING WILL BE MADE BY THE PLUMBING CONTRACTOR.

1.13 DIELECTRIC JOINTING AND ELECTRICAL CONTINUITY

1. UNDER ANY CIRCUMSTANCE SHALL COPPER PIPING COME INTO CONTACT WITH FERROUS AND/OR GALVANIZED METALS.
2. ELECTRICAL CURRENT BETWEEN TWO DIFFERENT METALS SHALL BE ELIMINATED BY THE USE OF INSULATED SLEEVES, INSULATED UNIONS AND INSULATED CLAMPS AND/OR BRACKETS.
3. CLAMPS SHALL BE OF THE PREFABRICATED TYPE, CONSISTING OF INSULATED CONTACT SURFACES AND MOUNTING STUDS SHALL BE SEPARATED FROM THE MOUNTING RODS BY A DIELECTRIC MATERIAL WITH BOLTS INSULATED FROM CLAMPS WITH SLEEVES and WASHERS OF THE SAME MATERIAL.
4. SUPPORT CLAMPS AND UNIONS SHALL NOT BE INSULATED IN ORDER TO FACILITATE FUTURE INSPECTIONS.
5. THE DIELECTRIC MATERIAL SHALL RESIST TEMPERATURES AND PRESSURES OF THE SYSTEM INSTALLED.
6. IN THE EVENT A FERROUS TYPE MATERIAL AND/OR EQUIPMENT IS TO BE INSTALLED ON A COPPER SYSTEM, A BONDING WIRE SHALL BE INSTALLED, AND EXTENDED ACROSS THIS MATERIAL/EQUIPMENT TO PROVIDE A CONTINUOUS DIELECTRIC BOND ALONG THE ENTIRE COPPER SYSTEM. THE CONTRACTOR INSTALLING THE FERROUS MATERIAL/EQUIPMENT SHALL PROVIDE AND CONNECT THIS BOND.

1.14 ANCHORS AND INSTALLATIONS OF MECHANICAL SYSTEMS

1. FOR ANY ANCHORAGE AND FIXING TO A CONCRETE SLAB, THE CONTRACTOR MUST, IN ALL ITS INSTALLATIONS, USE APPROPRIATE HEXAGONIC CONCRETE HEADS FOR SEISMIC APPLICATIONS AND CRACKED CONCRETE SUCH AS THE "HILTI" BRAND PRODUCT. MODEL KWIK #KH–EZI OR EQUIVALENT.
2. ANCHORAGES MUST BE INCLUDED WITH "ICC ESR–XXXX" RETRACABLE APPROVAL NUMBER.

1.15 RIGHTS AND LICENSES

1. AT NO ADDITIONAL EXPENSE TO THE CLIENT, THE CONTRACTOR SHALL MOVE, CHANGE, MODIFY ALL EQUIPMENT WHEN REQUESTED BY A COMPETENT GOVERNING BODY (INSPECTOR ETC).
2. THE CONTRACTOR SHALL PAY ALL ROYALTIES FOR THE USE OF PATENTED PRODUCTS. HE SHALL ALSO PROTECT THE OWNER FROM ANY/ALL CLAIMS WITH RESPECT TO THE USE OF PATENTED PRODUCTS WHICH MAY BE RELATED TO THE PATENT RIGHTS OF SUCH A PRODUCT AT THE TIME OF CONTRACT SIGNING.

1.16 PRECAUTION AND EQUIVALENCY

1. ALL EQUIPMENT, ACCESSORIES AND CONDUITS ARE SHOWN TO BE APPROXIMATE ON PLANS. THE FINAL LOCATION OF ALL EQUIPMENT, ACCESSORIES AND CONDUITS SHALL BE DETERMINED ON–SITE, AND DEPENDENT TO ON SITE CONDITIONS AND IN COORDINATION WITH OTHER TRADES.
2. UNLESS OTHERWISE NOTED, ALL MECHANICAL EQUIPMENT TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROMPTLY REMOVED FROM THE CONSTRUCTION SITE AT THE CONTRACTOR'S EXPENSE AFTER APPROVAL OF THE CLIENT.
3. AT ANY STAGE DURING THE PROJECT, IF SPECIFIC EQUIPMENT AND/OR ACCESSORIES (NEW OR EXISTING) CREATE AN OBSTACLE OR INTERFERE, AND/OR THE EQUIPMENT/ACCESSORY IS REQUIRED TO MAINTAIN SERVICE ON ANOTHER PIECE OF EQUIPMENT OR SYSTEM, THE CONTRACTOR SHALL LOCATE OR RELOCATE THIS EQUIPMENT AT AN APPROPRIATE LOCATION AND CONNECT ET ACCORDING TO PRESCRIBED STANDARDS.
4. ALL EQUIPMENT TO BE RELOCATED AND/OR REINSTALLED SHALL BE CLEANED AND/OR REPAIRED (IF REQUIRED) PRIOR TO FINAL INSTALLATION.
5. THE CONTRACTOR SHALL TAKE ALL THE NECESSARY STEPS TO ENSURE THAT NO DAMAGE IS CAUSED TO EXISTING EQUIPMENT/AND OR DECOR. ANY/ALL EQUIPMENT/DECOR JUDGED TO BE SOILED AND OR DAMAGED BY THE ENGINEER OR OWNER SHALL BE MADE GOOD AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE ENGINEER AND OR OWNER.
6. IN ORDER TO ACHIEVE MAXIMUM RESULTS, THE CONTRACTOR SHALL COORDINATE AND NEGOTIATE WITH OTHER TRADES, SUPPLIERS AND MANUFACTURERS TO PREVENT DELAYS. IN ADDITION AND DURING THE INITIAL STAGE OF THE PROJECT, THE CONTRACTOR SHALL INFORM THE ENGINEER OF ANY/ALL DELAYS IN DELIVERY OF SPECIFIED PRODUCTS/MATERIALS. IN THE EVENT A PRODUCT/EQUIPMENT MAY NOT BE AVAILABLE IN TIME, THE CONTRACTOR SHALL SUBMIT AN EQUIVALENT AND/OR SUBSTITUTE PRODUCT/EQUIPMENT. THE CONTRACTOR SHALL NOT PROCEED WITH OBTAINING THIS EQUIVALENT UNTIL IT HAS BEEN APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL APPLY AND INFORM THE OWNER OF ANY/ALL CREDITS FOR THIS EQUIVALENT.
7. UPON AWARD OF THE CONTRACT, THE CONTRACTOR SHALL HAVE THE RIGHT TO SUGGEST EQUIVALENT PRODUCTS TO THAT SPECIFIED ON PLANS. IN ADDITION, THE CONTRACTOR SHALL PAY ALL COSTS RELATED TO THE STUDY, THE SUPPLY OF DOCUMENTED AND FINAL APPROVAL OF THE SUBSTITUTE PRODUCTS. INSTALLATION OF SUBSTITUTE PRODUCTS SHALL NOT COMMENCE WITHOUT THE FINAL APPROVAL OF THE ENGINEER AND THE OWNER. NO ALTERNATIVE METHOD OF INSTALLATION OR DESIGN PARAMETERS SHALL BE ACCEPTED WITHOUT A CREDIT BEING DULY APPROVED BY THE ENGINEER AND THE OWNER.

1.17 DOCUMENTS TO SUBMIT

1. DURING PROVISIONAL INSPECTIONS, THE SUBCONTRACTOR SHALL SUBMIT THE FOLLOWING DOCUMENTS PERTAINING TO HIS SCOPE OF WORK.

PLUMBING:
a. WARRANTY;
b. INSTRUCTION AND MAINTENANCE MANUALS WITH APPROVED TECHNICAL DRAWINGS;
c. AS–BUILT DRAWINGS;
d. CERTIFICATE OF CONFORMITY OF SEISMIC FACILITIES;
e. AS–BUILT DRAWINGS OF THE SEISMIC INSTALLATION.

VENTILATION:
a. WARRANTY;
b. VENTILATION BALANCING REPORT;
c. START–UP AND CERTIFICATION REPORT ON THE CORRECT OPERATION OF HVAC SYSTEMS ACCORDING TO PLAN CRITERIA;
d. START–UP AND CERTIFICATION REPORT ON THE CORRECT OPERATION OF THE HUMIDIFIER ACCORDING TO PLAN CRITERIA AND CERTIFICATE OF THE MANUFACTURER;
e. START–UP AND CERTIFICATION REPORT ON THE CORRECT OPERATION OF AIR CONDITIONNING SYSTEMS (REFRIGERATION CONTRACTOR) ACCORDING TO PLAN CRITERIA;
d. CERTIFICATE OF CONFORMITY OF SEISMIC FACILITIES;
e. MANUAL COMPLETE WITH APPROVED SHOP DRAWINGS;
f. AS–BUILT DRAWINGS.

CONTROL:

a. WARRANTY;
b. START–UP AND CERTIFICATION REPORT ON THE CORRECT OPERATION OF REGULATORY EQUIPMENT;
c. WRITTEN CERTIFICATION THAT TRAINING HAS BEEN GIVEN TO CUSTOMER TECHNICAL PERSONNEL ON OPERATING SEQUENCES OF HVAC SYSTEMS AND INSTALLED CONTROL COMPONENTS AND SOFTWARE;
d. INSTRUCTION AND MAINTENANCE MANUALS WITH APPROVED TECHNICAL DRAWINGS, CONTROL DRAWINGS LISTE OF CONTROL POINTS, COMPLET PROGRAMMING AND SEQUENCE OF OPERATION OF THE SYSTEM.
e. AS–BUILT DRAWINGS.

NOTE: ALL DOCUMENTS MENTIONED ABOVE MUST BE SIGNED BY THE CONCERNED PARTY WITH THE REQUIRED COMPETENCIES. TO DO SO.

1.18 INTERRUPTION OF SERVICES

1. THE CONTRACTOR SHALL INFORM THE OWNER OF ANY/ALL SERVICE INTERRUPTIONS AT LEAST 24 HOURS IN ADVANCE. IF A SERVICE INTERRUPTION CANNOT BE SCHEDULED DURING NORMAL WORKING HOURS, THE CONTRACTOR SHALL SCHEDULE THE INTERRUPTION DURING EVENING AND/OR NIGHT HOURS.
2. ALL WORK TO BE PERFORMED IN OCCUPIED WORK SPACES SHALL BE PERFORMED IN A MANNER SO AS TO NOT DISTURB THOSE WORKING IN THAT AREA. THE CONTRACTOR SHALL VERIFY WITH THE OWNER IF HE MAY WORK IN A SPECIFIC OCCUPIED AREA DURING NORMAL WORKING HOURS. IF AN ARRANGEMENT CANNOT BE AGREED UPON, THE CONTRACTOR SHALL CONDUCT HIS WORK ACCORDING TO ANOTHER AGREED UPON PERIOD. AT THE END OF EACH WORK DAY PERIOD, OCCUPIED SPACES SHALL BE MADE CLEAN, FREE FROM DEBRIS, MATERIAL & TOOLS. FAILURE TO COMPLY TO THE ABOVE SHALL RESULT IN THE CONTRACTOR BEING BILLED FOR DELAYS CAUSED TO THE OWNER.

1.19 MISCELLANEOUS WORK

1. THE SUB–CONTRACTOR SHALL CARRY–OUT ALL MINOR WORK (NOT SHOWN) ON PLANS WHICH IS REQUIRED FOR COMPLETE SYSTEM OPERATION. THIS WORK MAY INCLUDE REQUESTS FROM THE ENGINEER OR TASKS WHICH ARE NORMALLY PART OF HIS TRADE AND SHALL ALWAYS BE COMPLETED TO THE SATISFACTION OF THE ENGINEER AND SHOULD BE INCLUDED IN HIS CALCULATIONS DURING THE BID PROCESS.

1.20 WORK IN THE EXISTING

VISITING THE WORK PLACE:
1. THE SUBCONTRACTOR IS REQUIRED TO VISIT THE WORK PLACE AND TO TAKE NOTE OF ALL EXISTING CONDITIONS THAT MAY AFFECT ITS WORK, FOR THE PREPARATION FOR TENDER. NO CLAIMS DUE TO THE IGNORANCE OF EXISTING CONDITIONS WILL BE RECOGNIZED BY OWNER, ARCHITECT OR ENGINEER.

WORK TIMETABLE :
1. WORK WILL BE CARRIED OUT DURING REGULAR HOURS OF WORK UNLESS SPECIFIC DIRECTIVES OF THE OWNER'S REPRESENTATIVE.

WORK PHASING:
1. PLANNING AND PERFORMING THE WORK IN STEPS TO AVOID INTERRUPTING THE CONTINUITY OF THE SERVICES AND OWNER'S ACTIVITIES.

EXISTING EQUIPMENT TO DISMANTLE:
1. CHECK WITH THE OWNER FOR EQUIPMENT THAT IS TO BE REMOVED AND NON–REUSED (SANITARY EQUIPMENT, FAN, DISCONNECT, LUMINAIRE, COMPONENT OF CONTROLS), THAT HE WISHES TO KEEP. STORE THIS EQUIPMENT AT THE PLACE SPECIFIED BY THE OWNER.
2. THE SUBCONTRACTOR MUST CLEAR THE WORKPLACE OF ALL EQUIPMENT, ACCESSORIES AND OTHER, NOT REUSE OR NOT RETAINED BY THE OWNER.

1.21 GENERAL NOTES IN DEMOLITION

1. INSPECT THE SITE AND VERIFY WITH THE ENGINEER AND/OR THE PROJECT MANAGER OF THE OWNER THE WORKS THAT MUST BE REMOVED, RELOCATED AND THOSE THAT HAVE TO REMAIN IN PLACE. NO CLAIMS WILL BE GRANTED FOR WORK PERFORMED BY ERROR, IF ANY, THESE WORK MUST BE REDUCED TO THE OWNER'S SATISFACTION AT THE EXPENSES OF THE CONTRACTOR CONCERNED.
2. REMOVE ALL MECHANICAL OR OTHER EQUIPMENT ACCORDING TO DEMOLITION PLANS, EXCEPT OTHERWISE. REMOVE ALL OTHER NON–NECESSARY MECHANICAL EQUIPMENT OR COMPONENTS FROM THE DEMOLISH AREAS, EVEN IF THEY ARE NOT ALL SHOWN IN THE DEMOLITION PLANS.
3. ALL EQUIPMENT REMOVED AND JUDGED IN GOOD CONDITIONS MUST BE GIVEN TO THE OWNER IF IT CHOOSES TO KEEP THEM.
4. ALL RESIDUES MUST BE CLEARED FROM THE SITE. THE CONTRACTOR IS RESPONSIBLE FOR FINDING THE PLACE, OUTSIDE THE SITE, FOR TRANSPORTING AND DEPOSITING RESIDUES ACCORDING TO THE LAWS AND REGULATIONS AS REGARDS THE ENVIRONMENT.
5. KEEP THE DEMOLITION SITE ALWAYS CLEAN DURING AND AFTER EACH DAY OF WORK.

1.22 PHASES FOR WORK EXECUTION

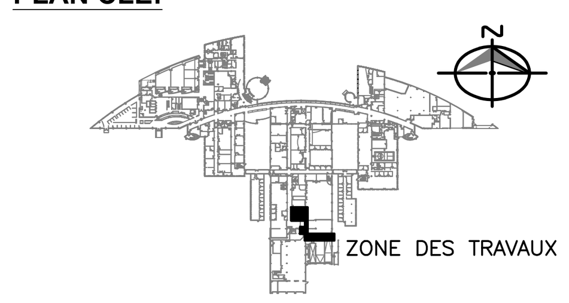
1. SEE ARCHITECTURAL AND/OR OWNER SPECIFICATIONS TO KNOW IF THE WORK HAVE TO BE DONE IN SOME PHASES.

1.23 TECHNICAL INSTRUCTIONS FOR SEISMIC PROTECTION DEVICES

1. RESPONSIBILITIES:
   1.1. EACH CONTRACTOR (MECH. & ELEC.) IS RESPONSIBLE FOR THE SEISMIC RESTRAINT MEASURES RELATED TO ITS DISCIPLINE.
   1.2. SEISMIC RESTRAINT DEVICES AND SYSTEMS SHALL BE DESIGNED AND DEVELOPED BY AN RECOGNIZED ENGINEER IN PROVINCE OF QUEBEC.
   1.3. ENGINEERING FEES SHALL BE INCLUDED IN SUBMITTAL FOR EACH CONTRACTOR.
   1.4. EACH CONTRACTOR SHALL INCLUDE ALL SEISMIC RESTRAINT DEVICES AND SYSTEM IN HIS BID, INCLUDING INSTALLATION. APPLICABLE FOR ALL MECHANICAL AND ELECTRICAL CONTRACTORS.
   1.5. THE SUPPLIES OF SEISMIC DEVICES, MUST BE ON THE PREMISES TO SUPERVISE THE INSTALLATION AND THE CONFORMITY OF SUCH PRODUCTS AS WELL OR SUBMIT A REPORT AND THE APPROPRIATE RECOMMENDATION TO THE PROJECT'S ENGINEER.
   1.6. ONCE INSTALLATION COMPLETED ALL SEISMIC DEVICES AND SYSTEMS SHALL BE INSPECTED BY A SEISMIC ENGINEER RECOGNIZED BY THE PROVINCE OF QUEBEC.
   1.7. A CERTIFICATE OF THE CONFORMITY OF THE INSTALLATION MUST SUBMITTED TO THE PROJECT'S ENGINEER, AS REQUIRED BY R.B.Q.
   1.8. ONCE THE CERTIFICATION IS GRANTED AND THE REPORT ACCEPTED, A DETAILED COPY OF THE PROJECT–REVIEWED AND ANNOTATED–DESCRIBING CONDITIONS AFTER IMPLEMENTATION MUST BE SUBMITTED TO THE PROJECT'S ENGINEER.
   1.9. ANY CORRECTIONS OR ADJUSTMENTS MADE BY THE CONTRACTOR MUST BE IN ACCORDANCE WITH WRITTEN REPORT PRESENTED BY THE MANUFACTURER OR THE R.B.Q.
2. APPLICABLAPPLICABLE CODES AND NORMS:
   2.1. ASHRAE – APPLICATIONS HANDBOOK (SI);
   2.2. ANSI/NFPA 13, INSTALLATION OF SPRINKLER SYSTEMS;
   2.3. SMACNA 1338, "PARASEISMIC MANUAL GUIDELINES FOR MECHANICAL SYSTEMS ";
   2.4. ADDENDUM NO. 1 TO PARASEISMIC MANUAL, GUIDELINES FOR MECHANICAL SYSTEMS.
   2.5. ASTM E–488
3. SHOP DRAWINGS AND DATA SHEETS
   3.1. SUBMITTED SHOP DRAWINGS WITH DESIGN CRITERIA CALCULATIONS. DOCUMENTS SHALL BE PREPARED BY A SPECIALIST RECOGNIZED IN PROVINCE OF QUEBEC.

CSA PROJECT NUMBER: P–00019

PLAN CLÉ:



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Agence spatiale canadienne | Canadian Space Agency

sceau: INGÉNIEUR • ENGINEER — MAX ROY JR. — QUÉBEC — 2019-11-05

sceau

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projet:
«FLATSAT-FACILITY» INSTALLATION PROJECT RCM ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

dessin:
MECHANICAL SPECIFICATIONS AND SCOPE OF WORKS

échelle: NONE	date: SEPTEMBER 2019
dessiné par: MARTIN DUVAL	#projet: 19–008–A
préparé par: MAX JR ROY, ing.	#feuille: **H-01en**

Format d'impression: Métrique ISO A1 (841 x 594mm)

PLUMBING AND HYDRONIC LEGEND

AER	CHILLED WATER SUPPLY
RER	CHILLED WATER RETURN
EFD	DOMESTIC COLD WATER
ECD	DOMESTIC HOT WATER
GN	NATURAL GAZ PIPING
C	CONDENSATE DRAIN PIPING
VAP	STEAM (HUMIDIFIER)
RN RN	CLEAN-OUT
	FLANGED UNION
	SLEEVE
	WATER OUTLET
P.A.	ACCESS DOOR
	CHECK VALVE
	STRAINER
	PIPING UP (E.H.)
	PIPING DOWN (E.B.)
	SHUTT OFF VALVE
DP-1	FLOOR DRAIN TYPE-1
DPE	FUNNEL FLOOR DRAIN
DN-1	NOMINAL DIAMETER 1 INCHES

PLUMBING AND HYDRONIC SPECIFICATIONS

DOMESTIC COLD WATER AND HUMIDIFIER STEAM PIPING:

ABOVE GROUND PIPING AND SUPPORTS: TYPE "L" HARD COPPER PER ASTM-B 88, CAST BRONZE FITTINGS, AQUASOL (LEAD FREE) WELDING. EACH 8'-0" ANVIL FIG. CT-99 OR CF-99C, C/W 3/8" THREADED ROD, ANCON SERIE A-500, A-600 AND P-600 STYROFOAM ADAPTOR OR EQUIVALENT.

THERMAL INSULATION: INSULATE ALL THE DOMESTIC COLD WATER AND STEAM PIPING WITH HALF-SHELL THERMAL INSULATION MADE OF FIBER GLASS WITH JACKET AND AUTO-STICKING FLIP ALL ALONG. INSTALL AS PER MANUFACTURER'S RECOMMANDATIONS. MICRO-LOK OF JOHNS-MANVILLE OR EQUIVALENT OF 1/2" (13mm) THICKNESS FOR DOMESTIC COLD WATER AND 1" (25mm) FOR STEAM. FINISH WITH PVC COVERING ON INSIDE INSTALLED PIPING.

VALVES:
- DN-2 AND LESS, WATTS B-6000 OR EQUIVALENT OF VICTAULIC, JENKINS, NH, BRONZE BODY WITH 100% OPENING OF THE BALL.
- INCLUDE THE STERN EXTENSION TO HANDLE INSULATION THICKNESS.
- USE DIELECTRIC FITTINGS TO JOIN DIELECTRIC MATERIALS, PER THE ASTM STANDARD F492.

CONDENSATE DRAINAGE PIPING:

PIPING AND SUPPORTS: DN-1 AND LESS, TYPE "L" PIPE COPPER WELDED JOINTS WITH 95% TIN, 5% ANTIMONY; DN-1¼ AND MORE, "DWV" TYPE COPPER PIPE WELDED 95% TIN, 5% ANTIMONY. SUPPORTS TO BE 8'-0" CENTERRED.

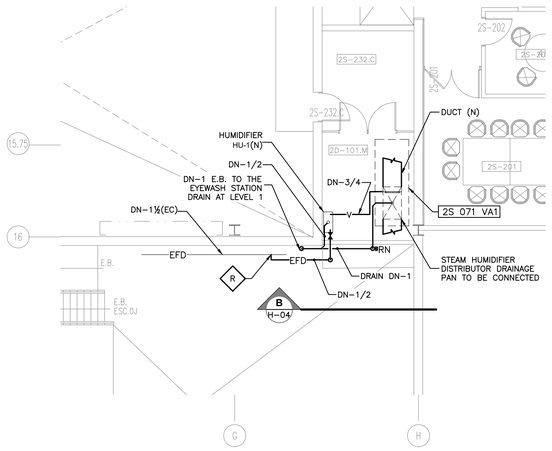
THERMAL INSULATION: HOT CONDENSATE PIPES NOT TO BE INSULATED

F-1 WATER TREATMENT FOR HUMIDIFIER WATER

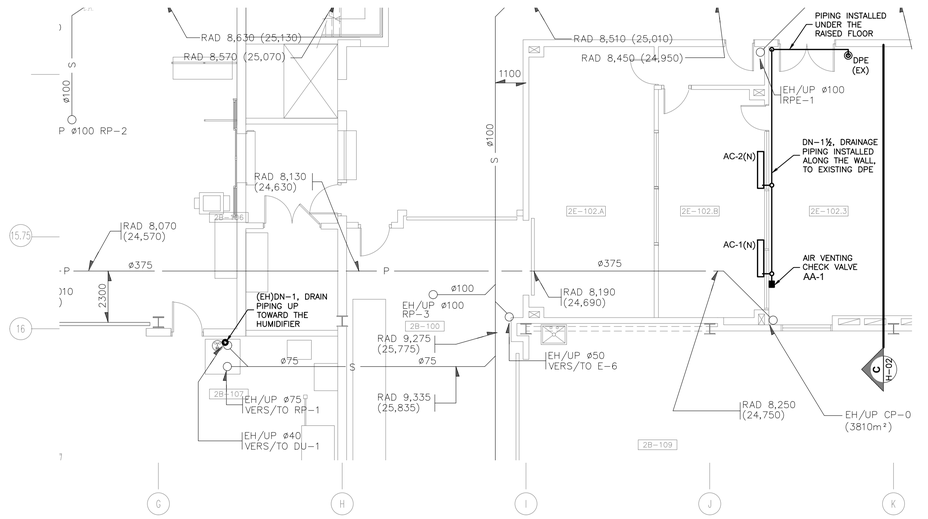
NOTE: INSTALL AND CONNECT THE FILTER SUPPLIED BY OTHERS, (SEE HU-1 VENTILATION SPECIFICATIONS).

AA-1 AIR VENTING CHECK VALVE

TRADE MARK: OATEY OR EQUIVALENT
MODEL: 390181
NOTE:
- COMPLY WITH ASSE 1050 AND 1051 STANDARDS
- APPROVED BY THE PLUMBING CODE



LEVEL 2 EXTRACT
PLUMBING - NEW INSTALLATIONS
SCALE: 1=100



LEVEL 1 EXTRACT
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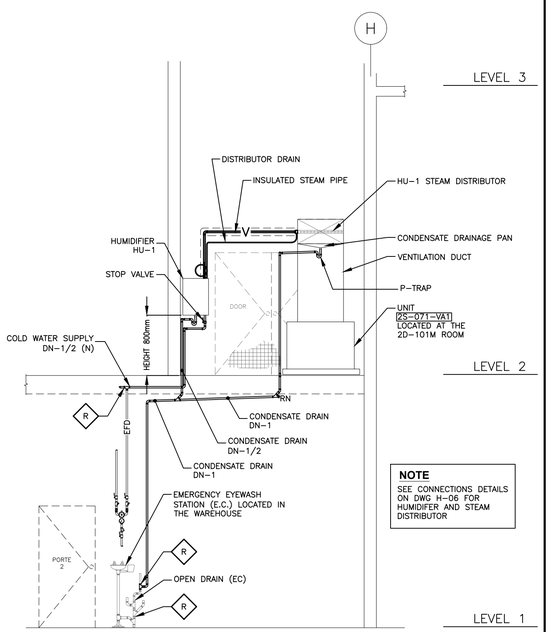
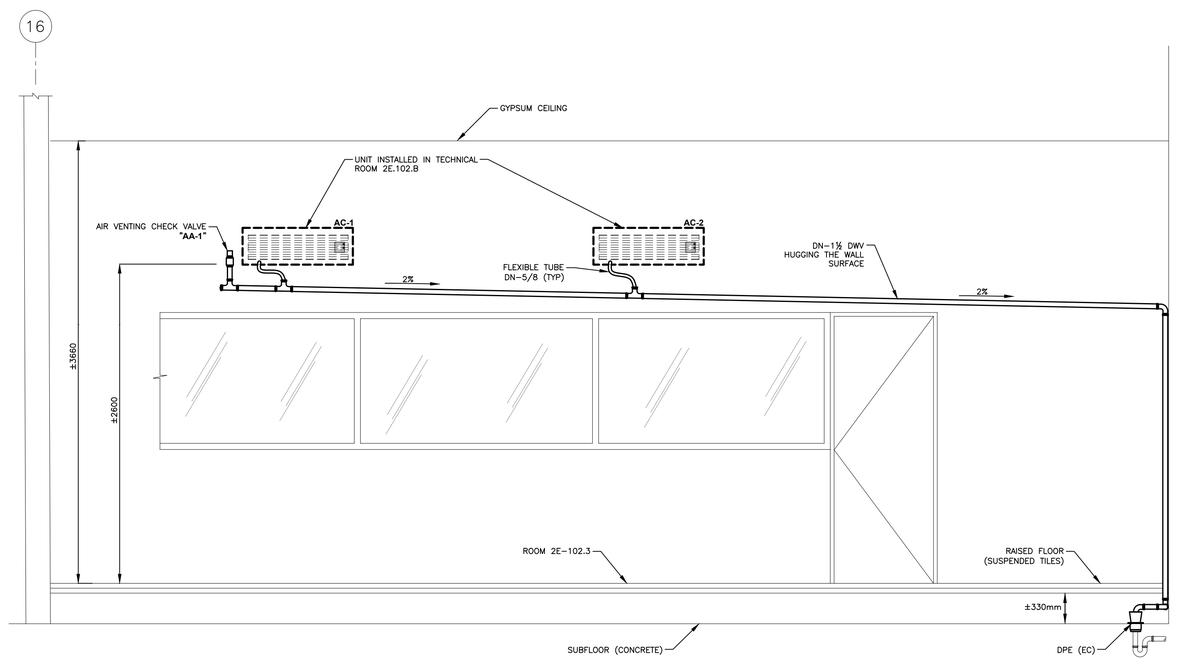
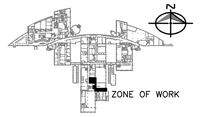


ELEVATION VIEW
SCALE: NTS



C H-02 **EVAPORATORS DRAINAGE DETAIL**
SCALE: NTS



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2019-11-05
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project:
«FLATSAT-FACILITY» INSTALLATION
PROJECT RCM
ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

drawing:
MECHANICAL - PLUMBING LEVEL VIEWS, DETAILS, LEGEND AND SPECIFICATIONS

scale: INDICATED	date: SEPTEMBER 2019
drawn by: MARTIN DUVAL	project: 19-008-A
prepared by: MAX JR ROY, ing.	sheet: **H-02en**

CSA PROJECT NUMBER: P-00019

VENTILATION LEGEND

- AxB — RECTANGULAR AIR DUCT
- C⌀ — ROUND AIR DUCT
- C⌀ — SPIRAL ROUND OR OVAL AIR DUCT
- C⌀ — FABRIC ROUND OR OVAL AIR DUCT
- AxB — AIR DUCT WITH ACOUSTICAL LINER
- AxB — THERMILLY INSULATED AIR DUCT
- FEXIBLE AIR CUCT
- CANEVAS JOINT
- ANTI-INTRUSION BARS
- RD1 / RD2 — REFRIGERANT PIPING
- VB — MANUAL BALANCING DAMPER
- VM — MOTORISED DAMPER
- VG — BACKDRAFT DAMPER
- VCF — FIRE DAMPER
- HUMIDIFICATION STEAM DISTRIBUTOR
- DUCT ELBOW WITH TURNING VANES
- VEA / VEA — AIR EXTRACTING DAMPER (V.E.A.)
- CONDENSATION DRAINAGE PAN
- UPWARD AIR SUPPLY DUCT
- UPWARD RETURN AIR OR EXHAUST AIR DUCT
- DOWNWARD AIR SUPPLY DUCT
- DOWNWARD RETURN AIR OR EXHAUST AIR DUCT
- ELECTRIC DUCT HEATER
- C⌀ TO AxB — RECTANGULAR TO ROUND AIR DUCT TRANSITION
- AxB TO AxB — RECTANGULAR TO RECTANGULAR AIR DUCT TRANSITION
- 4 WAY AIR DIFFUSER
- AIR DIFFUSER WITH A BLANKED OUTLET
- SUPPLY AIR GRILL
- RETURN OR EXHAUST AIR GRILL
- AIRFLOW DIRECTION, ALSO CORRESPONDS TO THE WAY OPENS ON AIR DIFFUSERS
- FAN
- PCM — AIRFLOW UNITS (CUBIC FEET PER MINUTES)
- L/S — AIRFLOW UNIOTS (LITER PER SECONDS)
- ACOUSTICAL RETURN AIR IN CEILING SPACE (SEE DETAIL)
- ACOUSTICAL SIOLENCER
- C/W — COMPLETE WITH
- DPF — INSTALLATION HEIGHT FROM FLOOR
- DDC — TOP OF AIR DUCT
- F/I — SUPPLY AND INSTALL
- I/R — INSTALL AND CONNECT
- F/I/R — SUPPLY, INSTALL AND CONNECT
- TA — ACCES DOOR TO AIR DUCT
- PA — ACCES DOOR IN ARCHITECTURAL WALLS
- EC — EQUIPMENT AND/OR AIR DUCT TO BE CONSERVED
- ER — EQUIPMENT AND/OR AIR DUCT TO BE RELOCATED
- EE — EQUIPMENT AND/OR AIR DUCT TO BE REMOVED
- R — EQUIPMENT AND/OR AIR DUCT RELAOCATED
- N — NEW EQUIPMENT AND/OR AIR DUCT
- C — EQUIPMENT AND/OR AIR DUCT CONSERVED
- R — CONNECTION TO THE EXISTING AIR DUCT OR EQUIPMENT AT THIS POINT
- E — AIR DUCT OR EQUIPMENT TO REMOVE FROM THIS POINT
- C — AIR DUCT OR EQUIPMENT TO BE CAPPED AT THIS POINT

CONTROL DEVICES LEGEND

- T — TEMPERATURE SENSOR
- CO — CARBONE MONOXYDE DETECTOR
- CO2 — CARBONE DIOXYDE DETECTOR
- NO2 — SONDE DÉTECTION DIOXYDE D'AZOTE
- DD — AIRFLOW DETECTOR
- H — HUMIDITY SENSOR
- P — PRESSURE DIFFERENTIAL INDICATOR
- CONTROL WIRING AND CONDUITS BY SPECIALISED CONTROL CONTRACTOR
- • — TO ELECTRICAL RELAY FOR PERIMETRIC BASEBOARDS
- IDP — PREDSSURE DIFFERENTIAL INDICATOR

REFRIGERATION LEGEND

- SUCC — SUCTION LINE REFRIGERANT PIPING
- LIQ — LIQUID LINE REFRIGERANT PIPING

VENTILATION SPECIFICATION

VENTILATION DUCTS
RECTANGULAR AIR DUCT,
ROUND AIR DUCT,
ROUND OR OVAL AIR DUCT WITH SPIRAL JOINTS

DESCRIPTIONS:
- THE RECTANGULAR AIR DUCTS SHALL BE GALVANIZED STEEL ASTM–A653 / A653M, ZINGAGE G90, IN ACCORDANCE WITH THE RECOMMENDATIONS OF CHAPTER 1 AND, SUBJECT TO THE "SEALING AIR CLASSES" TABLES, TO THE CONTENTS OF TABLES 1–1 ⊛ 1–13 INCLUDING SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL & FLEXIBLE", LATEST EDITION IN EFFECT;
- STANDARD OR SPIRAL ROUND AIR DUCTWORK WILL BE GALVANIZED STEEL ASTM–A653, ZINGAGE G90, IN ACCORDANCE WITH THE RECOMMENDATIONS OF CHAPTER 3 AND, SUBJECT TO THE "AIR DUCT SEALING CLASSIFICATION" TABLES, CONTENTS OF TABLES 3.1 ⊛ 3.4 INCLUDING SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL & FLEXIBLE", LATEST EDITION IN EFFECT;
- THE MANUFACTURER AND DUCT INSTALLER MUST SELECT THE FEATURES IN JOINT OPTIONS, REINFORCEMENTS, FITTINGS AND SUPPORTS THAT WILL PRODUCE A COMPOUND ASSEMBLY THAT WILL COMPLY WITH THE PERFORMANCE CRITERIA IDENTIFIED IN "SMACNA" MANUALS, HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE ", LATEST EDITION IN EFFECT;
- WHEN THE PRESSURE CLASS IS NOT INDICATED: USE CLASS "B" AND THIS, WHATEVER THE AIR SPEED IN THE DUCT. ALL CONDUITS DOWNSTREAM OF TERMINAL BOXES MUST BE DESIGNED FOR A "C" CLASS.

SUPPORTS AND FASTENERS:
- FOR THE SUSPENSION AND FIXING OF DUCTS (QUALITY AND SPACING REQUIRED), COMPLY WITH SMACNA'S RECOMMENDATIONS "HVAC DUCT CONSTRUCTION STANDARDS, METAL & FLEXIBLE" CHAPTER 4. NO PERFORATED METAL SUPPORT WILL BE ACCEPTED OR TOLERATED FOR DUCT SUPPORTS;
- MUNIT THE SUSPENSION CORNERS OF LOCK NUTS AND WASHERS
- THE INDICATIONS OF CHAPTER 4 OF THE SMACNA "HANGERS AND SUPPORTS" MUST BE USED IN CONJUNCTION WITH THE RECOMMENDATIONS OF THE PARASISMIC FIXING INSTRUCTIONS DESCRIBED IN THE MECHANICAL SPECIFICATIONS UNDER THE "SEISM PROTECTION TECHNICAL INSTRUCTIONS" SECTION. IF NECESSARY, ADJUST THE METHOD AND QUALITY OF THE SUPPORT AND ITS FASTENING TO MEET THE REQUIREMENTS THEN PRESCRIBED.

SEALING AND TESTS:

AIR DUCTS SEALING CLASS

	A	B	C
SYSTEM PRESSURE "H20. (Pa)	**4" ⊛ 10" H20. (1000 ⊛ 2500 Pa)**	**1¼" ⊛ 3½" H20 (312 ⊛ 875 Pa)**	**½" ⊛ 1" H20(125 ⊛ 250 Pa)**
REQUIRED SEALING TYPE	TRANSVERSE JOINTS, LONGITUDINAL, THE BACK TO ALL THE CONNECTIONS AND THROUGH WALL	CROSS–SECTIONAL, LONGITUDINAL JOINTS AND CONNECTIONS	TRANSVERSAL JOINTS AND CONNECTIONS
UNLESS OTHER INDICATIONS, THE MINIMAL LEAKING RATES ACCEPTED SHALL BE AS SMACNA "HVAC AIR DUCT LEAKAGE TEST MANUAL" (CL)			
RECTANGULAR AIR DUCTS	6	12	24
ROUND AIR DUCTS	3	6	12
LEAKAGE TESTS			
REQUIRED TESTS TO PERFORM ON SITE	YES (SEE FOLLOWING SPECIFIC SCOPE OF WORK)	NO	NO
LEAKAGE TESTS SHALL BE PERFORMED FOLOWING THE RECOMMANDATIONS OF "HVAC DUCT LEAKAGE TEST MANUAL" OF SMACNA, LAST EDITION.			
SEALING PRODUCT			
TYPE TO USE	TYPE S–2 (RED) FROM "DURO–DYNE"	TYPE DWN (GRAY) FROM "DURO–DYNE"	SEALING TAPE UL–181A ORCAN/ULC–S109
OUTDOOR DUCTS MUST BE SEALED BEFORE INSTALLING THERMAL INSULATION WITH A SEALANT DESIGNED FOR OUTDOOR INSTALLATION THAT CREATES A WATER AND AIR SEAL. THIS SHOULD BE CLEAN WITH THE METAL DUCT, REMAIN FLEXIBLE WITH METAL MOVEMENT AND MUST HAVE A TEMPERATURE SERVICE RANGE FROM –30°F (–34°C) TO 175° (79°C). IF SUN EXPOSED, IT MUST ALSO BE RESISTANT TO ULTRAVIOLET RADIATION AND OZONE. DO NOT SEAL JOINTS THAT CONNECT THE DUCTS TO A FIREPROOF COMPARTIMENT.			

SEALANTS (CLASS A AND B):
FLAME–RESISTANT POLYMER–BASED OIL RESISTANT, FIBERGLASS–FILLED MEMBRANE, WITH LAMINATED POLYVINYL TREATED, 2"(50 mm) WIDTH FIBER MEMBRANE, INSTALLED ON FIBER–GLASS–FIBER SEALED TAPE UL–181 STANDARD, SUCH AS DURO–DYNE FT–2 OR EQUIVALENT APPROVED.

TAPE OF SEALING (CLASS C):
2 1/2" (63 mm) ALUMINUM TAPE CONFORM TO CAN / ULC–S109 AND UL–181, SUCH AS POLYKEN 339 OR NASHUA 324A, OR EQUIVALENT APPROVED, NYLON RIBBONS ARE PROHIBITED.

CONNECTIONS:
- CONSTRUCTION ACCORDING TO SMACNA "HVAC DUCT CONSTRUCTION STANDARDS, METAL & FLEXIBLE", LATEST EDITION IN EFFECT.

INSTALLATION / SUPPORT
- EXECUTE THE WORK IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 90A STANDARDS AND SMACNA;
- AVOID INTERRUPTING THE CONTINUITY OF THE VAPOR BARRIER MEMBRANE BY POSITIONING THE STRAPS OR SUSPENSION RODS;
- PROVIDE FRAGILIZED JOINTS ON EACH SIDE OF THE SLEEVES OF THE FIRE–DAMPERS;
- FIXINGS TO THE STRUCTURE "HILTI" ACCORDING TO THE TYPE OF STRUCTURE.

WATERPROOF DUCTS
- CONDUITS NEXT MUST BE WATERPROOF:
  A. AIR EXTRACTION DUCTS CONNECTED TO A DISHWASHER;
  B. FRESH AIR INTAKE;
  C. UP AND DOWN CONDUITS OF HUMIDIFIERS MOUNTED IN CONDUIT, ON A TOTAL LENGTH OF AT LEAST 5'–0" (1500 mm), OR 2'–0" (600 mm) UPSTREAM AND 3'–0" (900 mm) IN DOWNSTREAM;
- SHAPE THE BACKGROUND OF HORIZONTAL CONDUITS WITHOUT LONGITUDINAL JOINTS. SEAL ALL JOINTS USING AN APPROPRIATE AIR DUCT SEALANT.
- GIVE HORIZONTAL CONDUITS A DESCENDING SLOPE TO ITS DRAINAGE POINT, EITHER
- 2" (50 mm) DEPTH CUTTING PAN WITH DEPTH. MOUNT A 1"⊛ (25 mm) MINIMUM DRAIN CONNECTION.

ELBOWS WITH WIND DEFLECTORS
- SINGLE–THICK OR DOUBLE–THICK FACTORY–TYPE, AERODYNAMIC SHAPED FACTORY OR WORKSHOP DEFLECTORS, IN ACCORDANCE WITH THE "SMACNA" RECOMMENDATIONS, FIXED WITH SELF–TAPPING SCREWS;
- MANUFACTURED IN ACCORDANCE WITH STANDARDS HVAC DUCT CONSTRUCTION STANDARDS OF SMACNA.

NOTES ON THE DUCTS OF THE 2S-071-VA1 SYSTEM

- ALL NEW CONDUITS AND FITTINGS WILL BE THE B–CLASS

REFRIGERATION PIPING

REFRIGERANT PIPES – SUCTION AND LIQUID
- LAMINATED COPPER (DUR) TYPE "ACR" WITH WELDED WELDINGS IN CONFORMING TO CLASSIFICATION BCUP–5: SILVER WELDING (14.5–15.5% AG, 4.8–5.2% P & 79.3–80.7% CU), AS SIL–FOS 15 (SILVALOY 15);
- APPROVED ASTM B 280;
- EXCEPT FOR CONNECTIONS SUPPLIED BY THE EQUIPMENT MANUFACTURER, ALL CONNECTIONS WITH DIRECTION CHANGE SHOULD BE OF LONG–RADIUS TYPE.

SUPPORTS:
- SUPPORTS SHALL BE INSTALLED AT EVERY 8'–0 "; FNW7816 TYPE CUSHION TIGHTENING C/W: 3/8"⊛ THREADED ROD, CANTRUSS TYPE FASTENING LEG;
- FIXINGS TO THE STRUCTURE "HILTI" ACCORDING TO THE TYPE OF STRUCTURE.

CONNECTIONS:
- OPERATING CONDITIONS: PRESSURE AND CALCULATION TEMPERATURE OF 300 PSI (2070 KPA) AND 250°F (121°C).
- WELDED COPPER BRUSH SOLDERING FITTINGS IN ACCORDANCE WITH ASME B16.22.
- BRONZE OR BRASS BRIDGE FITTINGS IN ACCORDANCE WITH ASME B16.24, CLASSES 150 AND 300.
- SEALANTS SUITABLE FOR VEHICLE FLUID.
- BOLTS, NUTS AND WASHERS ACCORDING TO ASTM STANDARD A 307, HEAVY SERIES.
- DRAINED CONNECTIONS TO ELEMENTS: BRONZE OR BRASS, DESIGNED FOR REFRIGERATING NETWORKS, ACCORDING TO ASME B16.26.

SLEEVES:
- SCREWED NUT OR STEEL SLEEVES, OF A DIAMETER SUITABLE FOR PASSING INSULATED OR UNSOLORIZED TUBES WITH, IN ANY CASE AS IN ANOTHER, ANNULAR AIR SPACE OF 6 mm IN WIDTH.

TAPS:
- DIAMETER VALVES EQUAL TO OR BELOW 7/8"⊛ (22 mm): VALVE VALVES, STRAIGHT OR ANGLE VALVES, GLOBE VALVES, CLASS 500, CATEGORY 3.5 MPA, MEMBRANE, NON–DIRECTIONAL, WITHOUT PRESS STRIP, TO BODY AND FORGED BRASS HATCH, WATERPROOF WATER SEAL FOR TEMPERATURES BELOW FREEZING POINT, AND SOLDERING BITS;

ARMAFLEX INSULATION:
FLEXIBLE INSULATION SOFT AND TUBULAR SHEETS WITH CLOSED MICRO–CELL STRUCTURE;
- COMPLIES WITH CAN / GCSB–51.40;
- 1/2 INCH THICKNESS (12 mm) INSTALL ON ALL DN–1 AND LESS PIPING;
- IN INTERIOR FACILITIES, IN MECHANICAL ROOMS AND FOR EXTERIOR INSTALLATIONS, COVER THE INSULATION WITH A PVC PROTECTION;
- GLUE 520 AND XG INSULATING TAPE;
- INSULATION AND GLUE IN ACCORDANCE WITH CAN / ULC S102 FOR PROPAGATION OF FLAMES AND SMOKE 25/50 UP TO 1 1/2" (38 mm) THICKNESS;
- INSTALLATION ACCORDING TO THE RECOMMENDATIONS OF THE MANUFACTURER.

VINYL POLYCHLORIDE COVERING PROTECTION (PVC):
- SINGLE–PIECE, PREFORMED, PREFORMED SHEATHINGS, COMPLYING WITH CAN / CGSB–51.53, PREFORMED AS NEEDED;
- THE PROOF OF WEATHER AND SUN RADIATION;
- WHITE COLOUR;
- MINIMUM SERVICE TEMPERATURE (–20°C) AND MAXIMUM (65°C);
- PERMEABILITY TO WATER VAPOR 0.02 PERM.;
- THICKNESS: 0.80 mm
- FASTENING: SOLVENT ADHESIVE COMPATIBLE WITH THE MATERIAL CALORIFUGE, FOR SEALING JOINTS AND OVERLAPS, SELF–ADHESIVE VINYL RIBBONS AND TABS;
- INSTALLATION ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS
- SUCH AS THE "ZESTON" COVER OF THE "JOHN MANVILLE" BRAND OR EQUIVALENT APPROVED.

NOTE CONCERNING THE INSTALLATION OF REFRIGERANT PIPING:
- INSTALL THE PIPING (RIGID OR FLEXIBLE) PARALLEL AND PERPENDICULAR TO THE STRUCTURE. SECURELY ATTACH TO STRUCTURE ACCORDING TO INDICATIONS;
- INSTALL THE FLEXIBLE PIPING AS RIGHT AS POSSIBLE AND WITHOUT VALLONS;
- IN COMBUSTIBLE CONSTRUCTIONS, INSTALL PIPING IN INTER–CEILING SPACES AND NOT BETWEEN WOOD STRUCTURE.

INSPECTION:
- VERIFYING THE CONDITIONS BEFORE PROCEEDING WITH THE PIPING SYSTEM FOR THE REFRIGERANT FLUID CIRCUIT, ENSURE THAT THE CONDITION OF SURFACES/SUPPORTS PREVIOUSLY IMPLEMENTED UNDER OTHER SECTIONS OR CONTRACTS IS ACCEPTABLE AND PERMITS REALIZATION WORK IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.

MANUFACTURER'S INSTRUCTIONS:
- CONFIRM MANUFACTURER'S REQUIREMENTS, RECOMMENDATIONS AND WRITTEN SPECIFICATIONS, INCLUDING ANY AVAILABLE TECHNICAL BULLETIN, HANDLING, STORAGE AND INSTALLATION INSTRUCTIONS AND SPECIFICATIONS.

INSTALLATION STANDARDS:
- INSTALL PIPING IN ACCORDANCE WITH CSA B52 AND ASME B31.5.

BRAZING METHOD:
- DISPENSE AN INERT GAS INSIDE THE PIPING DURING BREWING;
- REMOVE INTERNAL PARTS FROM FAUCET APPLIANCES, SOLENOID COILS OF ELECTROMAGNETIC VALVES, GLACES AND GLASS TUBES;
- AVOID APPLYING HEAT TO DETERIORS AND SENSITIVE ELEMENTS.

INSTALLATION OF PIPING:

HOT GAS PIPING;
- INSTALL THE HOT GAS PIPES FOLLOWING A DESCENDING SLOPE OF 1:240 IN THE DIRECTION OF FLOW TO PREVENT ANY OIL RETURN TO THE COMPRESSOR DURING OPERATION.
- PROVIDE BLEEDERS AND INSTALL THEM AT THE BOTTOM OF ALL RISERS MORE THAN 2400mm IN HEIGHT, THEN TO INTERVALS OF 7600mm.
- PROVIDE DEEP, FLOATING FLOAT TRAPS AND INSTALL AT THE TOP OF RISERS.
- INSTALL DOUBLE RISERS IN THE CASE OF COMPRESSORS WITH POWER CONTROL.
  - LARGER DIAMETER RISER: INSTALLING BLEEDERS AT PRESCRIBED LOCATIONS PREVIOUSLY.
  - RISER OF SMALL DIAMETER: DIMENSIONS FOR A FLOW OF 5.1m/s AT MINIMUM LOAD.
- TO CONNECT UPPER PURGERS MOUNTED ON THE RISER OF LARGER DIAMETER.

HYDROSTATIC AND SEALING TESTS:
- CLOSE FITTING MACHINES MOUNTED ON FACTORY–LOADED EQUIPMENT AND ON ALL OTHER APPARATUSES THAT DO NOT HAVE TO BE TESTED UNDER PRESSURE.
- CARRY OUT TESTS ACCORDING TO CSA B52 BEFORE RELIEVING 2 MPA AND 1 MPA RESPECTIVELY ON THE HIGH PRESSURE SIDE AND ON THE LOW PRESSURE SIDE.
- METHOD: RAISE THE PRESSURE AT 35 KPA WITH REFRIGERATED GAS FROM THE HIGH PRESSURE SIDE AND LOW PRESSURE SIDE. ADD NITROGEN AS REQUIRED UNTIL TEST PRESSURE REQUIRED IS REACHED. SEEK LEAKS USING AN ELECTRONIC DETECTOR OR HALIDE LAMP. IF NECESSARY, REPAIR DECREASED LEAKS AND TEST.

QUALITY CONTROL ON SITE:
- TESTS CARRIED OUT IN PLACE/INSPECTION: CLOSE SERVICE VALVES ON APPLIANCES THAT HAVE BEEN FILLED IN FACTORY.
- MAINTAIN AMBIENT TEMPERATURE AT LEAST 55°F (13°C) FOR AT LEAST 12 HOURS BEFORE DEHYDRATION AND FOR THE DURATION OF THIS WORK.
- USE COPPER PIPES OF THE LARGEST POSSIBLE DIAMETER TO MINIMIZE THE EVACUATION TIME.
- USE A 2 STAGE VACUUM PUMP WITH AIR ON THE SECOND STAGE, LUBRICATED WITH DEHYDRATED OIL, HAVING A PULL CAPACITY OF 0.1 PSF (5 PA) (ABSOLUTE PRESSURE).
- MEASURE PRESSURE WITHIN THE NETWORK USING A VACUOMETER. BEFORE TAKING READINGS, INSULATE THE VACUUM PUMP FROM THE NETWORK.
  - CHARGE:
  - LOAD THE NETWORK BY THE FILTER DEHYDRATOR AND THE FILL VALVE LOCATED HIGH PRESSURE SIDE. IT IS NOT PERMITTED TO LOAD BY THE LOW PRESSURE SIDE.
  - STOP THE COMPRESSORS THEN INSERT THE LOAD NECESSARY FOR THE PROPER OPERATION OF THE INSTALLATION. IF THE PRESSURES BALANCE BEFORE THE NETWORK IS COMPLETELY CHARGED, CLOSE THE LOAD VALVE AND PUT THE INSTALLATION INTO ROUTE. COMPLETE THE LOAD ONCE THE SYSTEM IS OPERATING.
  - PURGE CHARGE CHANNEL AGAIN IF REFRIGERANT CONTAINER IS CHANGED DURING LOAD OPERATION.
- CONTROLS/VERIFICATIONS:
  - MAKE VERIFICATIONS (VERIFY AND MEASURES) ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
  - RECORD THE MEASURES TAKEN AND SUBMIT THEM TO THE ENGINEER.

IDENTIFICATIONS OF SYSTEMS AND NETWORKS

IDENTIFICATION ACCORDING TO EXISTING SYSTEMS:
- IDENTIFY ADDED OR ENHANCED WORKS ACCORDING TO THE EXISTING IDENTIFICATION SYSTEM;
- WHERE THE EXISTING IDENTIFICATION SYSTEM DOES NOT PROVIDE FOR THE IDENTIFICATION OF THE NEW INSTALLED WORKS, THESE MUST BE IDENTIFIED ACCORDING TO THE REQUIREMENTS OF THIS SECTION;
- BEFORE BEGINNING THE WORK, WRITTEN APPROVAL OF THE IDENTIFICATION SYSTEM BY THE ENGINEER.

LAMECOID PLATES OR PANEL ADHESIVE TAPE
- LAMECOID PLATES, MECHANICALLY FASTENED TO SYSTEMS AND/OR EQUIPMENT WITH INSCRIPTIONS (LETTERS AND FIGURES) IN BLACK PLATE HOLLOWS WITH HIGH 1/4 INCH WHITE WRITING (6 mm);
- POLYESTER ADHESIVE TAPE WITH BRADY BRAND # B–593, 1"X6" LARGE INCH (25 mm X 150 mm), WITH PERMANENT WHITE BLACK ENTRIES, FITTED TO SYSTEMS AND / OR APPLIANCES. A BMP71 PRINTER IS REQUIRED .;
- THE NEXT ITEMS MUST BE IDENTIFIED:
  - ALL HVAC SYSTEMS;
  - EXHAUST FANS;
  - ELECTRIC DUCT HEATERS;
  - HUMIDIFIERS;
  - MOTORIZED DAMPERS;
  - VAV BOXES;
  - HOOD;
  - ENGINES;
  - CONTROL PANEL.

PIPING IDENTIFICATION (REFRIGERATION)
- THE FLUID VEHICLED IN THE PIPES MUST BE IDENTIFIED BY BACKGROUND COLOR MARKINGS, BY PICTOGRAMS (IF NECESSARY). THE DIRECTION OF FLOW MUST BE INDICATED BY ARROWS. UNLESS OTHERWISE INDICATED, PIPES MUST BE IDENTIFIED IN ACCORDANCE WITH CAN / CGSB 24.3;
- THE HEIGHT OF THE MARKING MUST BE SUFFICIENT TO COVER THE CIRCUMFERENCE OF THE PIPE/CALORIFUGE AND LENGTH MUST BE SUFFICIENT TO ALLOW THE APPOSITION OF THE PICTOGRAM AND ARROWS;
- COLORS: WHITE ON GREEN (EXCEPT OTHERWISE);
- PLASTIC, STICKER, PROTECTED AND SUB–SIDED LABELS COATED WITH WATERPROOF CONTACT ADHESIVE, DESIGNED TO WITHSTAND 100% RELATIVE HUMIDITY RATE, AT 302°F (150°C) CONSTANT HEAT AND INTERMITTENT HEAT OF 392°F (200°C).

IDENTIFICATION OF AIR DUCTS:
- 2" (50 mm) UPPERCASE TEXT AND 6" (150 mm) LENGTH X 2"(50 mm) HEIGHT FLOWING ARROW, MARKED WITH PLASTIC LABELS, STICKERS, PROTECTED AND SUB–FACE COATED WITH WATERPROOF CONTACT ADHESIVE, DESIGNED TO WITHSTAND 100% RELATIVE HUMIDITY RATE, WITH CONSTANT HEAT OF 302°F (150°C) AND INTERMITTENT HEAT 392°F (200°C);
- COLOR: BLACK, OR A CONTRASTING COLOR WITH THAT OF THE DUCT;
- THE DUCT SYSTEM NETWORKS WILL BE ALL IDENTICAL.

IDENTIFICATION OF NETWORKS AND CONTROL / REGULATION DEVICES:
- IDENTIFY COMPONENTS, APPARATUS, ELEMENTS, REGULATORS AND SENSORS USING IDENTIFICATION PLATES IN ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION;
- IDENTIFY THE FUNCTION OF EACH AND (IF APPLICABLE) THEIR SAFETY ADJUSTMENT.

REGISTRATION:
- ENTRIES FOR THE IDENTIFICATION OF SYSTEMS AND ELEMENTS MUST BE WRITTEN IN FRENCH.

LOCATIONS:
- PLATES AND LABELS MUST BE POSITIONED AT LOCATIONS WHERE THEY WILL BE WELL IN VIEW AND EASILY READABLE FROM THE WORK FLOOR IN THE MECHANICAL ROOMS.

BALANCING, TESTING AND VERIFICATIONS (E.R.E.)

1. THE VENTILATION CONTRACTOR WILL HIRE AN INDEPENDENT SUBCONTRACTOR SPECIALIZED IN BALANCING SYSTEMS. A WRITTEN REPORT WILL BE ISSUED TO THE ENGINEER FOR APPROVAL BY THIS COMPANY, AND SHALL INCLUDE ALL COMPLETE FINAL MEASURES FOR THE OPERATION OF EQUIPMENT, SYSTEMS AND APPLIANCES, WHEN BALANCED. PRECISION ERROR WILL BE BETWEEN 5% WITH PLANE VALUES.
2. THE ENGINEER RESERVES THE RIGHT TO PERFORM BALANCING ADJUSTMENTS FOLLOWING THE VERIFICATIONS OF THE FINAL BALANCE REPORT WITHOUT ADDITIONAL FEES. THE BALANCING COMPANY MUST INCLUDE A SUPPLEMENTARY VISIT WITH ALL THE MATERIALS NECESSARY TO CARRY OUT THESE ADJUSTMENTS AND TO CORRECT THE BALANCING REPORT.
3. PERFORM TESTS AND VERIFICATIONS FOR THE CORRECT OPERATION OF NEW INSTALLED EQUIPMENT AND EXISTING EQUIPMENT INVOLVED IN THE PROJECT;
   - .1 CHECK HVAC AIR SUPPLY TEMPERATURE IN COOLING MODE ACTIVATED;
   - .2 CHECK HVAC AIR SUPPLY TEMPERATURE WHEN THERE IS NO COOLING MODE ACTIVATED;
   - .3 CHECK HVAC AIR SUPPLY TEMPERATURE IN HEATING MODE ACTIVATED;
   - .4 CHECK MODULATING OF ELECTRIC DUCT HEATER OR ELECTRIC BASEBOARDS IN HEATING MODE ACTIVATED;
   - .5 MAKE THE ADJUSTMENT OF THE EQUIPMENT SET POINTS;
   - .6 CHECK SUPPLY TEMPERATURE IN ZONE COOLING DEMAND;
   - .7 CHECK SUPPLY TEMPERATURE AS REQUIRED FOR ZONE HEATING;
   - .8 CHECK OPENING DIRECTION OF BOX (HEATING / COOLING);
   - .9 CHECK THE THERMOSTAT VOTING RIGHT ON THE SYSTEM COOLING CONTROL ACCORDING TO THE OPERATING SEQUENCE DESCRIBED IN THE PLANS.
4. IF REQUIRED, THE BALANCING CONTRACTOR WILL REPLACE THE HVAC UNIT PULLEYS TO OBTAIN THE FLOW SPECIFIED FLOWS AND RESPECT THE PRECISION ERROR PERCENTAGE INDICATED ABOVE.

   NOTE: SUBMIT A WRITTEN REPORT OF THE RESULT OF THESE AUDITS;
5. OTHER REQUIREMENTS FOR "ERE" OPERATIONS

   SAS ROOM WHITE 2E–102.A:
   - MAINTAIN THE POSITIVE PRESSURE SAS OF 0.05"H2O ON NORMAL OPERATION OF THE HVAC SYSTEM.

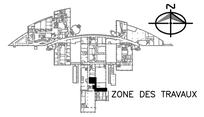
ACOUSTICAL LINER FOR HVAC DUCTS

DESCRIPTION OF DUCT RUNING	CODE ACIT	THICKNESS & THERMAL FACTOR "R"	INSTALLATION REQUIRED
SUPPLY AND RETURN AIR DUCTS TO HVAC SYSTEMS	CIF/1 CIR/1	1/2"(12mm) 1" (25mm) R=4.2	– ALL RECTANGULAR OR SQUARE DUCTS; – ALL SUPPLY AIR PLENUMS; – RETURN AIR TRASFERS BETWEEN 2 ROOMS; – AS INDICATED ON THE DRAWINGS. • ACOUSTICAL LINER TO COMPLY WITH ASHRAE 90.1. FOR AIR DUCTS INSTALLED IN THE CEILING SPACE, THE INSULATION SHALL HAVE A MINIMUM THERMAL RESISTANCE OF R–1.9.

ACCESSORIES FOR AIR DUCTS

- ACCESSORIES MUST BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS, SUCH AS: SOFT CUFFS (FLEXIBLE JOINTS), VISITORS, WIND DEFLECTORS, AND CONNECTIONS FOR TEST INSTRUMENTS, AIR DISTRIBUTOR REGISTERS, REGISTERS, FLOW CONTROL DAMPERS, FIRE DAMPER, SMOKE DAMPER, COMBINED FIRE AND SMOKE DAMPER, FIRE DOOR;
- INSTALL THE DAMPERS IN THE LOCATIONS INDICATED;
- INSTALL BALANCING DAMPERS IN TAKE OFFS IN THE CASE OF SUPPLY, RETURN AND EXHAUST AIR SYSTEMS;
- INSTALL A BALANCING DAMPER IN EACH OF BRANCH TO A REGISTER OR DIFFUSER, AND PLACE IT AS CLOSE AS POSSIBLE FROM THE MAIN DUCT;
- INSTALL THE DAMPERS IN ANY WAY TO PREVENT VIBRATION;
- INSTALL THE CONTROL DEVICES IN LOCATIONS WHERE THEY ARE VISIBLE AND ACCESSIBLE;
- SEALING JOINTS OF REGULATED MODULES USING A SILICONE–BASED SEALANT;
- INSTALL ACCESS DOOR IN THE DUCT NEAR EACH REGISTER;
- INSTALL FIRE DAMPERS, SMOKE DAMPERS AND COMBINED DAMPERS IN ACCORDANCE WITH NFPA 90A STANDARD REQUIREMENTS AND ACCORDING TO ULC APPROVAL. DOING THE WORK WITHOUT REDUCING THE DEGREE OF FIRE RESISTANCE OF THE FIREPROOF CLOSURES IN WHICH THE DEVICES ARE MOUNTED. INSTALL AN ACCESS DOOR NEXT TO EACH ROOM AND DAMPER. MOUNT THE EQUIPMENT WHERE THE DOORS, FUSIBLE LINKS OR ACTUATORS ARE VISIBLE AND EASILY ACCESSIBLE. INSTALL APPROVED DESIGN BREAK JOINTS ON EITHER SIDES OF THE FIRE PROTECTION SEPARATIONS.

PLAN CLÉ:



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2019-11-05
INGÉNIEUR • ENGINEER
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CANADIAN SPACE AGENCY
AGENCE SPATIALE CANADIENNE

projet:
«FLATSAT-FACILITY»
INSTALLATION
PROJECT RCM
ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

dessin:
MECHANICAL - VENTILATION LEGEND, SPECIFICATIONS AND INSTRUCTIONS

échelle:	date:
AUCUNE	SEPTEMBER 2019
dessiné par:	#projet:
MARTIN DUVAL	19–008–A
préparé par:	#feuille:
MAX JR ROY, ing.	**H-03en**

CSA PROJECT NUMBER: P–00019

VENTILATION SPECIFICATION (SUITE)

OPERATING

THE SYSTEMS WILL BE OPERATED AFTER THE FOLLOWING VERIFICATIONS:
- ENSURE THAT ALL ELECTRICAL CONNECTIONS ARE PROPERLY MADE;
- VERIFY THE DIRECTION OF ROTATION OF THE FANS;
- ENSURE THAT ALL DUCTS ARE CLEAN AND FREE OF DEBRIS;
- MAKE ALL OTHER NECESSARY VERIFICATIONS REQUIRED, INCLUDING THOSE OF THE MANUFACTURER;
- ENSURE THAT ALL FILTERS ARE NEW AND FREE OF DUST;
- NO SYSTEM SHALL BE OPERATED BEFORE THE END OF THE CONSTRUCTION WORK WITHOUT THE PRESENCE OF A MANUFACTURER'S REPRESENTATIVE.

HUMIDIFIERS

INSTALLATION
- INSTALL HUMIDIFIERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS;
- AT THE TIME FOR RECEPTION OF WORK, THE HUMIDIFIERS INSTALLED AND THE EVAPORATION ELEMENTS SHOULD BE CLEAN;
- INSTALL HUMIDITY SENSORS ACCORDING TO INDICATIONS AND EASY ACCESS LOCATIONS;
- PROVIDE, FOR APPARATUSES, A DEVICE FOR EXHAUSTING THE SURPLUS OF WATER IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER;
- PROVIDE ACCESS DOOR IN AIR DUCT ADJACENT TO STEAM DISTRIBUTOR;
- PROVIDE SEALED DUCTING UPSTREAM AND DOWNSTREAM OF DUCT MOUNTED STEAM DISTRIBUTOR (HUMIDIFICATION VAPORS).

GETTING STARTED
- ENSURE THAT THE STEAM PIPES ARE INSTALLED INTO THE SLOPE, SO THAT THE CONDENSATES CAN RUN IN THE OPPOSITE DIRECTION TO THE HUMIDIFIER;
- ENSURE THAT THE RAMPS AND THE STEAM DISTRIBUTOR ARE INSTALLED INTO THE SLOPE SO THAT THE CONDENSATES CAN DRAW OUT TO THE OUTSIDE OF THE AIR DUCTS;
- VISUAL INSPECTION OF THE RAMPS AND STEAM DISTRIBUTOR TO ENSURE THAT THE STEAM IS UNIFORMLY SPRAYED AND THAT THE STEAM IS DISPATCHED WITHOUT WATER LEAKAGE.

QUALITY CONTROL ON SITE
- THE MANUFACTURER MUST MAKE A VISIT TO VERIFY WHETHER THE IMPLEMENTATION HAS BEEN CARRIED OUT ACCORDING TO HIS INSTRUCTIONS;
- PREDICT SITE VISITS AT THE NEXT STEPS;
  * ONCE THE WORK IS TOTALLY COMPLETED AND THE CLEANING IS COMPLETE, GET THE INSPECTION REPORTS WITHIN 3 (THREE) DAYS FOLLOWING THE SITE VISIT, AND IMMEDIATELY DELIVER THEM TO THE ENGINEER.

DEMONSTRATION OF THE OPERATION OF THE HUMIDIFIER
- TRAINING OF OPERATING AND MAINTENANCE PERSONNEL BY THE MANUFACTURER.

AC-1
& AC-2 MURAL TYPE AIR CONDITIONNING UNIT

TRADE MARK:	MITSUBISHI ELECTRIQUE SERIE P OR EQUIVALENT
MODEL:	PKA-A30KA7
COOLING CAPACITY:	30 MBH MAX, 9 MBH MIN
AIR FLOW:	VARIABLE, FROM 570 TO 775 PCM
VOLTAGE:	120/1/60, FAN 30A WITH ECM MOTOR
SEER:	19.8
EER:	9.8
DIMENSIONS:	355mm x 1170mm x 295mm THICK
WEIGHT:	21KG (46 LBS)
C/W:	– CENTRIFUGIAL FAN WITH MULTIPLE SPEEDS – AIR FLOW PATERN – DIRECT EXPANSION COIL, ALUMINIUM FINS AND COPPER TUBES – COMMANDS WITH INTEGRATED MICROPROCESSEUR – INTEGRAL DIAGNOSTICS FUNCTIONS – CONTROLER MELCO – BEMS – MINI COMPATIBLE WITH THE BUILDING MANAGING SYSTEM TO CONTROL THE INSIDE UNIT (SERIE E), WITH BACnet MSTP COMMUNICATION, C/W CABLE 1m LONG, DIMENSIONS OF 95mm x 51mm x 19mm. – CONDENSATION HOSE DN-5/8 AND 585mm LONG
NOTE:	THE CONTROLLER WILL BE INSTALLED AND CONNECTED TO THE INTERIOR UNIT AND TO A ROOM SENSOR BY THE SPECIALISED CONTROL CONTRACTOR

COND-1 &
COND-2 AIR CONDENSER - AIR CONDITIONNING SYSTEM

TRADE MARK:	MITSUBISHI ELECTRIQUE SERIE P OR EQUIVALENT
MODEL:	PUY-A30NHA7 (BS)
COOLING CAPACITY:	30 MBH
VOLTAGE:	208-230/1/60, 15 MCA, 26 MOCP
DIMENSIONS:	954mm x 950mm x 330mm THICK
WEIGHT:	18KG (151LBS)
C/W:	– VARIABLE SPEED COMPRESSOR "INVERTER DC- " OF MITSUBISHI ELECTRIC – PRE-CHARGED UNIT WITH R-410A REFRIGERANT FOR 70' LONG LINE, AMT 3.5KG – COIL WITH COPPER TIBES AND ALUMINIUM FINS – ELECTRONIC EXPANSION VALVE – DIRECT DRIVE ASSEMBLY, MOTOR AND FAN VARIABLE SPEED – INTÉGRATED MICROPROCESSOR – 2 YEARS OF WARANTY ON ALL COMPONENTS AND 7 YEARS FOR THE COMPRESSOR (LABOR NOT INCLUDED) – STARTUP TO BE DONE BY THE CONTRACTOR WITH THE MANUFACTURER TECHNICIAN – THE REFRIGERATION CONTRACTOR SHALL INCLUDE APPROX. 1KG OF ADDITIONNAL REFRIGERANT TO THE SYSTEM, BECAUSE THE LENGHT OF THE PIPING INSTALLATION IS APPROX. 200pi (62,5m)

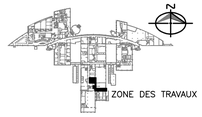
2-071-SE2 SERPENTIN DE CHAUFFAGE

MARQUE:	STELPRO OU ÉQUIVALENT APPROUVÉ AYANT LES MÊMES CARACTÉRISTIQUES
MODÈLE:	SDHI-24x18-12K600V3P-CIR047-GHJLP
CAPACITÉ:	12kW, VARIABLE DE 0 À 100%
VOLTAGE:	600/3Ø/60, 11,5 AMP
DIMENSIONS:	24"x18"
C/A:	– SONDE DE VÉLOCITÉ D'AIR ÉLECTRONIQUE POUR 100 PPM ET + – SECTIONNEUR D'ALIMENTATION PRINCIPALE CADENASSABLE – FUSIBLE DE PALIERS DE PUISSANCE – CONTRÔLES SCR 0-10V/24VAC OU 24VDC – TRANSFORMATEUR DE CONTRÔLE – CONTACTEURS MAGNÉTIQUES ET RELAIS – PROTECTION THERMIQUE AUTOMATIQUE – PROTECTION THERMIQUE MANUELLE – BORNIER D'ENTREBARRAGE
NOTES:	– LA SONDE DE VÉLOCITÉ SERA INSTALLÉE DANS LE CONDUIT D'AIR EN AMONT DU SERPENTIN PAR LE SOUSTRAITANT EN RÉGULATION AUTOMATIQUE. – LA MODULATION DU SERPENTIN SERA CONTRÔLÉE PAR UNE SONDE DE PIÈCE FOURNIE, INSTALLÉE ET RACCORDÉE PAR LE SOUSTRAITANT EN CONTÔLE

2-071-HU1 ELECTRIC HUMIDIFIER

TRADE MARK:	CONDAIR OR EQUIVALENT
MODEL:	RS 010/550-600/3
CAPACITY:	7 LBS/HR
VOLTAGE:	600/3ø/60, 15 AMP, 3.6 MCA, 3.8W
DIMENSIONS & WEIGHT:	26.40x16.50x14.60", 60LBS
C/W:	– MODULATING CONTROLS PROVIDED FOR AN EXTERNAL SIGNAL 0-10 VDC WITH BACnet BTL PROTOCOLE COMMUNICATION – STEAM DISTRIBUTOR FOR DUCT MODEL ASD 24, 20" LONG PERFORATED STAINLESS STELL TUBE FOR AN APPROPRIATE STEAM ABSORPTION OF 10", AIR AT 16.5°C AND 48% H.R. – HIGH HUMIDITY LIMIT AND AIR FLOW SWITCH – CONSTRUCTION HOMOLOGATION UL – FILLING RATE 3.70 GPM – DRAINAGE RATE 6.70 GPM – STEAM CONNECTION DN-1 3/4 (45mm) – CONDENSATION DRAIN CONNECTION DN-3/4 (8mm) – COLD WATER SUPPLY CONNECTION DN-1/2 NPT – DRAINAGE/PURGE CONNECTION DN-1 1/4 – 300mm LONG FLEXIBLE HOSE TO CONNECT WATER SUPPLY AND STEAM OUTLET – INTEGRATED STAINLESS STEEL CYLINDER WITH INCOLOY ELECTRIC ELEMENTS CONTROLED BY ELECTRONIC RELAYS – AUTOMATIC DRAINAGE SEQUENCE INTEGRATED TO THE PROGRAMMABLE CONTROLS – DRAINAGE COOLER INTEGRATED TO ENSURE THAT THE TEMPERATURE DO NOT EXCEEDS 60°C (140°F) MAXIMUM – TACTILE AUTO-DIAGNOSTIC DISPLAY INTEGRATED TO THE FRONT PANEL – USB INTERFACE FOR TRANSMISSION OF INFORMATIONS AT DISTANCE – 2 YEARS WARANTY OR 30 MONTHS AFTER THE SHIPPING DATE – "SCALE MANAGEMENT" TO BE NCLUDE – SUPPLY WITH THE HUMIDIFIER THE CATALYTIC FILTER REQUIRED FOR THE COLD WATER SUPPLY (F-1), MODEL HCS-2000 "EVOLUTECH" 2.7 L/MIN COMPOSED OF: -PREFILTER (5-10 AND FINAL FILTER DWC (CARTRIDGES) -1 CATALYSEUR EMC35 -2 UNION CONNECTIONS DN-3/8 NPT (BRASS) – COMPLETE ASSEMBLY FOR WALL INSTALLATION INCLUDING SUPPORT – THE FILTER F-1 WILL BE INSTALLED AND CONNECTED BY THE PLUMBING CONTRACTOR – THE HUMIDITY SENSOR TO CONTROL THE HUMIDIFIER, THE HIGH HUMIDITY LEVEL SENSOR AND THE AIR FLOW DETECTOR ARE CONNECTED BY THE SPECIALISED CONTROL CONTRACTOR

PLAN CLÉ:



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2019-11-05

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projet:
«FLATSAT-FACILITY» INSTALLATION
PROJECT RCM
ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

dessin:
MECHANICAL-VENTILATION SPECIFICATIONS AND INSTRUCTIONS (SUITE)

échelle: AUCUNE	date: SEPTEMBER 2019
dessiné par: MARTIN DUVAL	#projet: 19-008-A
préparé par: MAX JR ROY, ing.	#feuille: **H-04en**

CSA PROJECT NUMBER: P-00019

Format d'impression: Métrique ISO A1 (841 x 594mm)

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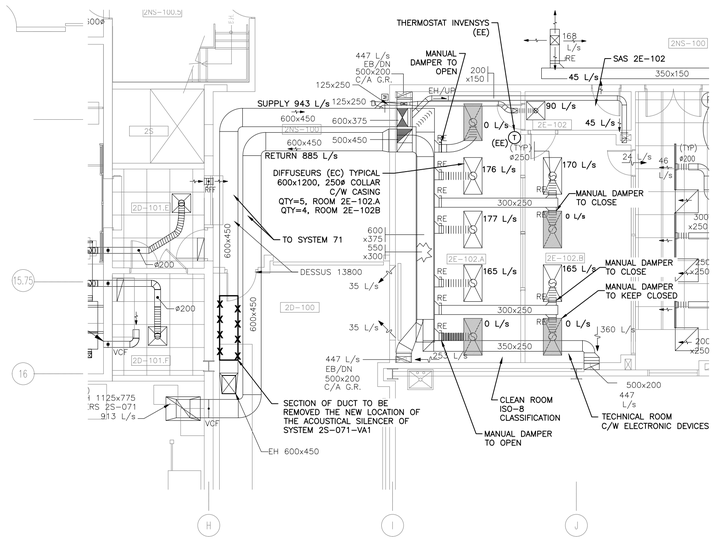
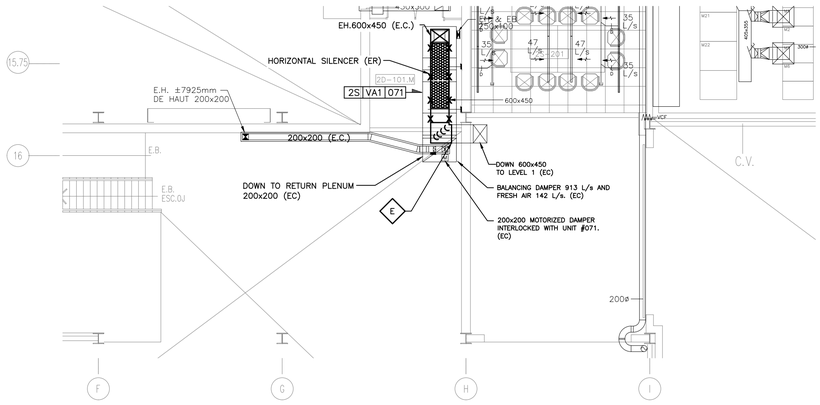
DATE D'IMPRESSION: 2019-11-04 - PAR: Lyès Bouzaz



LEVEL 1 EXTRACT - EXISTING / DEMOLITION
SCALE: 1=100



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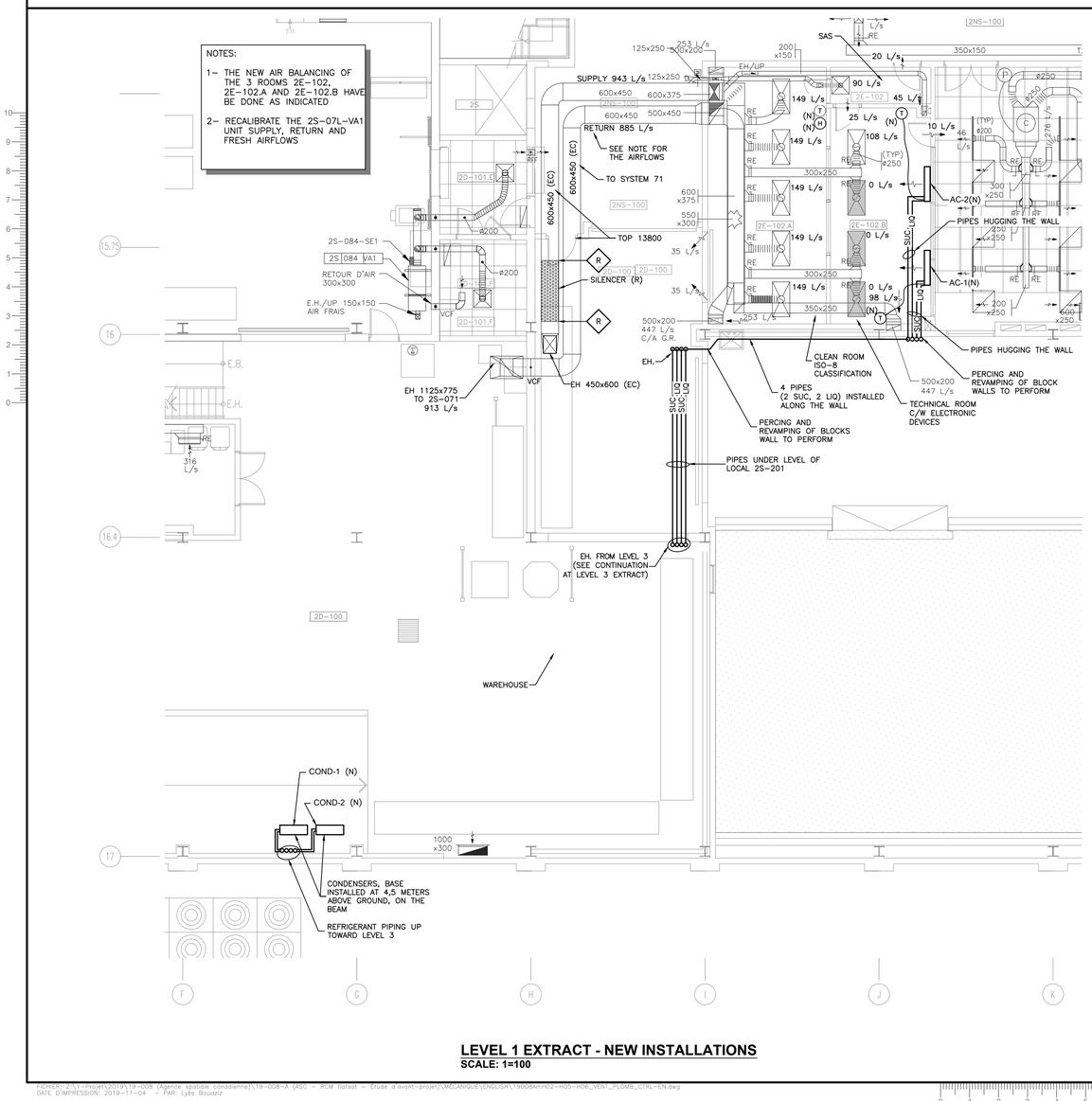

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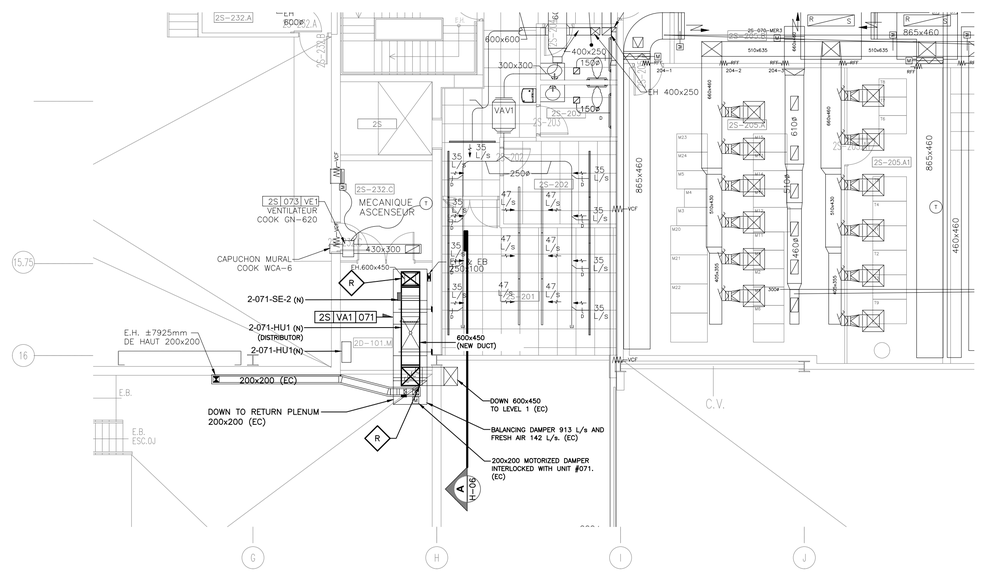
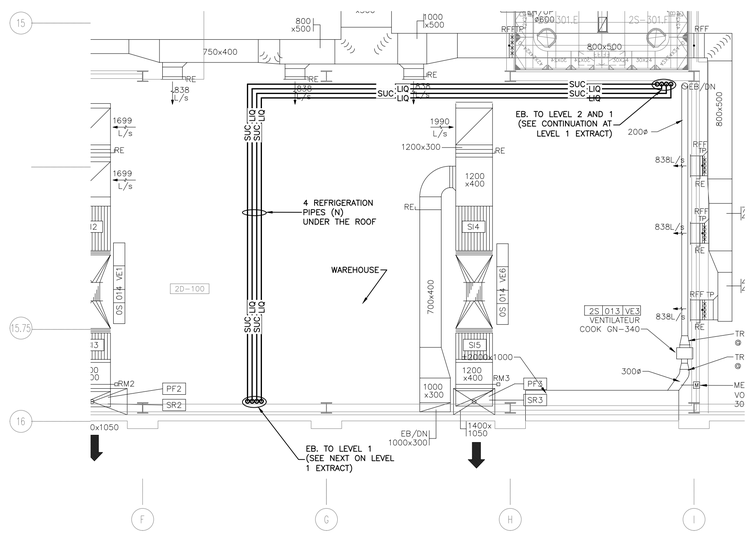


LEVEL 2 EXTRACT - NEW
SCALE: 1=100

NOTE CONCERNING THE WORK AT HIGH LEVEL

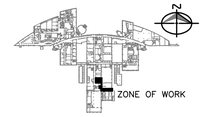
A DINGHY EQUIPPED LIFT WILL BE REQUIRED FOR THE WORKS TO BE DONE AT LEVEL 3 AT AROUND 12,2 METERS HIGH:

- INSTALLATION OF SUPPORTS FOR REFRIGERATION PIPING, ELECTRICAL CONDUITS AND CONTROLS IN ROOM 2D-100 FOR THE CONDENSERS (COND-1 AND COND-2) SHALL BE DONE BY THE MECHANICAL AND ELECTRICAL SUBCONTRACTORS.
- THE FEES FOR RENTING AND USE OF THAT LIFT WILL BE PAID BY THE PROJECT GENERAL CONTRACTOR.



LEVEL 3 EXTRACT - NEW INSTALLATIONS
SCALE: 1=100

CSA PROJECT NUMBER: P-00019



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2019-11-05

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client:
CANADIAN SPACE AGENCY
AGENCE SPATIALE CANADIENNE

project:
«FLATSAT-FACILITY» INSTALLATION PROJECT RCM ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

drawing:
MECHANICAL - VENTILATION AND REFRIGERATION LEVELS 1, 2 & 3 VIEWS

scale:	date:
INDICATED	SEPTEMBER 2019
drawn by:	#project:
MARTIN DUVAL	19-008-A
prepared by:	#sheet:
MAX JR ROY, ing.	H-05en

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DATE D'IMPRESSION: 2019-11-04 - PAR: Lyès Bouaziz

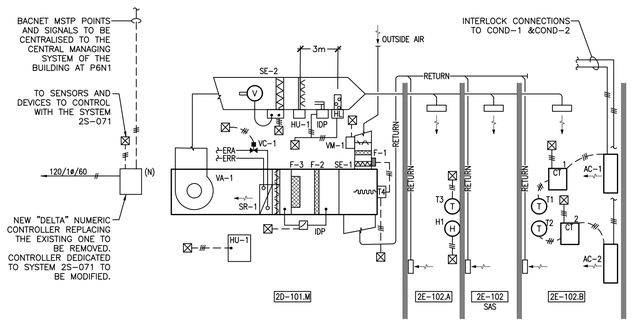


SCHÉMA DE CONTRÔLE - SYSTÈME #2S-071 / NOUVEAU
ÉCHELLE: AUCUNE

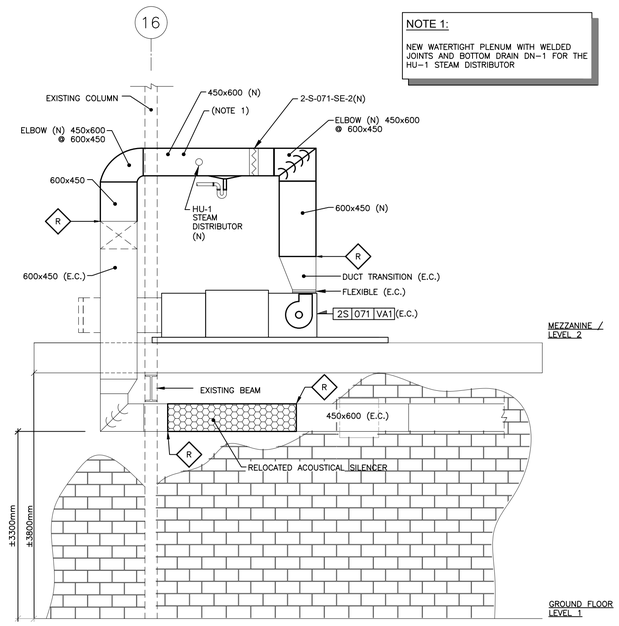
LEGEND AND SPECIFICATIONS

⊢ -#- →	CONTROL WIRING AND/OR CONDUITS BY SPECIALISED CONTROL CONTRACTOR
⊢ -#-⊠	SPECIFIC CONTROLLER CONNECTION AND/OU LOCAL CONTROLLER SENSOR CONNECTION TO HVAC SYSTEM
(T)	ROOM TEMPERATURE SENSOR
(H)	HUMIDITY SENSOR
HL	HIGH LEVEL HUMIDITY SENSOR
(V)	LOW VELOCITY AIR FLOW SENSOR FOR ELECTRICAL DUCT HEATER
⊢ERA→	CHILLED WATER SUPPLY
⊢ERR→	CHILLED WATER RETURN
IDP	PRESSURE DIFFERENTIAL SWITCH WITH SIGNAL

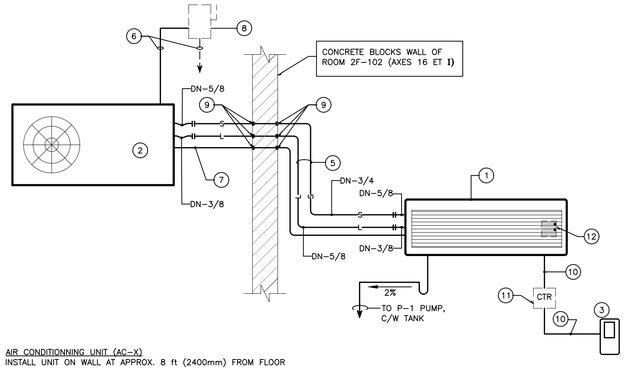
F-1 : EXISTING FILTER, C/W INDICATION LOCAL IDP
F-2 : EXISTING PRE-FILTER
F-3 : EXISTING HEPA FILTER
SE-1 : EXISTING ELECTRICAL DUCT HEATER (FRESH AIR HEATING)
SE-2 : NEW ELECTRICAL DUCT HEAUTER (SUPPLY AIR HEATING)
VC-1 : EXISTING VALVE – FLOW MODULATION OF CHILLED WATER TO COOLING COIL
VM-1 : EXISTING MOTORISED DAMPER – FRESH AIR CONTROL
SR-1 : EXISTING COOLING COIL – AIR SUPPLY COOLING
HU-1 : HUMIDIFIER C/W STEAM DISTRIBUTOR IN THE AIR SUPPLY DUCT (SEE SPECIFICATIONS ON DRAWING H-04) – (N)
H1 : ROOM HUMIDITY SENSOR IN ROOM 2E-102.A (N)
T1 : ROOM TEMPERATURE SENSOR IN ROOM 2E-102.B, ASSOCIATED TO CT-1 AND AC-1 (N)
T2 : ROOM TEMPERATURE SENSOR IN ROOM 2E-102.B, ASSOCIATED TO CT-2 AND AC-2 (N)
T3 : ROOM TEMPERATURE SENSOR IN ROOM 2E-102.A (N)
T4 : MIXNG PLENUM TEMPERATURE SENSOR (EXISTING)
CT-1 : AIR CONDITIONNING UNIT CONTROLLER AC-1, SUPPLIED BU THE VENTILATION CONTRACTOR (N)
CT-2 : AIR CONDITIONNING CONTROLLER AC-2, SUPPLIED BY THE VENTILATION CONTRACTOR (N)
AC-1 : WALL SPLIT SYSTEM UNIT ASSOCIATED WITH CONDENSER COND-1 (SEE SPECIFICATIONS ON DRAWING H-04) – (N)
AC-2 : WALL SPLIT SYSTEM UNIT ASSOCIATED WITH CONDENSER COND-2 (SEE SPECIFICATIONS ON DRAWING H-04) – (N)

OPERATION AND CONTROL SEQUENCE

1– THE VA-1 FAN IS RUNNING ON A ⌘ HOURS BASIS, EXCEPT IN CASE OF A PLANIFIED CONDITION
2– THE T1 AND T2 SENSORS SIGNAL ARE USED TO RESPECTIVELY MODULATE THE COMPRESSORS INTEGRATED TO CONDENSERS COND-1 AND COND-2, VIA THE CONTROLLER CT-1 AND CT-2 AND BY A SIGNAL COMMING FROM AC-1 AND AC-2 SYSTEMS RESPECTIVELY TO MAINTAIN THE ROOM TEMPERATURE AT 21°C ±1°C AT ALL TIME
3– THE T3 SENSOR SIGNAL IS USED AT THE LOCAL CONTROLEROF THE SYSTEM TO MODULATE THE VC-1 COOLING COIL CONTROL VALVE TO MAINTAIN THE ROOM TEMPERATURE AT 21,5°C ±0,5°C AT ALL TIME
4– THE H-1 SENSOR SIGNAL IS USED TO MODULATE THE CAPACITY OF THE HUMIDIFIER ELECTRICAL ELEMENT HU-1 TO MAINTAIN THE RELATIVE HUMIDITY RATIO OF THE CLEAN ROOM AT 40% MINIMUM. IF THE SENSOR DETECTS AN HIGH LEVEL REACHING 52%, THE DEHUMIDIFICATION SEQUENCE IS ACTIVATED, AND:
   - HU-1 STOPS
   - VC-1 COOLING VALVE OPENS TO 100%
   - SE-2 DUCT ELECTRICAL HEATER MODULATES
   - THE DEHUMIDIFICATION SEQUENCE IS STOPPED WHEN THE HUMIDITY RATION DECREASE TO 45% HR. AT ROOM SENSOR H-1. THE SYSTEM IS THEN RETURNING TO THE NORMAL COOLING MODE.
5– THE T4 SENSOR IS USED TO CONTROL THE MIXING AIR TEMPERATURE TO 13°C MINIMUM MODULATING THE CAPACITY OF THE ELECTRICAL DUCT HEATER SE-1 HEATING THE FRESH AIR INLET.
6– THE VELOCITY SENSOR (V) STOPPED THE HEATER SE-2 IF THE VELOCITY FALLS TO ITS ADJUSTMENT IN THE AIR DUCT.
7– THE IDP AND HL SENSORS (HUMIDIFER), STOPS HU-1 IN CASE OF LOW AIR FLOW DETECTION OR IF THE HUMIDITY RATIO IN THE AIR SUPPLY DUCT REACHES 85% OR MORE.
8– THE ROOM TEMPERATURE, HUMIDITY, FILTERS PRESSURE DROPS, COOLING VALVE VC-1 POSITION AND SUPERVISIONS (OPERATION) TO SE-2, AC-1, AC-2 AND HU-1, SHALL BE CENTRALISED.



A H05 **ELEVATION**
SCALE: NTS



1– AIR CONDITIONNING UNIT (AC-X)
INSTALL UNIT ON WALL AT APPROX. 8 ft (2400mm) FROM FLOOR

2– CONDENSING UNIT (COND-X)
INSTALL THE CONDENSING UNIT ON A STEEL PAINTED SUPPORT ATTACHED TO THE WALLAS PER SPECIFICATIONS AND PROPERLY ANCHORED. INSTALL UNIT AT APPROX. 15 ft (4500 mm) MINIMUM ABOVE GROUND/FLOOR LEVEL.

3– ROOM TEMPERATURE SENSOR (SEE CONTROLS SPECIFICATIONS):
INSTALL AT 1,5 m HIGH.

4– PVC CONDENSATION DRAIN BY PLUMBING CONTRACTOR. DIAMETER (SEE DRAWINGS).

5– REFRIGERATION PIPING (SUCCION AND LIQUID LINES) SUPPLIED, INSTALLED AND CONNECTED TO UNITS BY THE VENTILATION AND REFRIGERATION CONTRACTOR.

6– ELECTRICAL CONNECTIONS (CONDUITS AND CABLES) BY THE ELECTRICAL CONTRACTOR. (SEE ELECTRICAL DRAWINGS).

7– ELECTRICAL CONNECTION TO THE OUTSIDE UNIT (CONDENSER) BY THE ELECTRICAL CONTRACTOR, CABLE #14/3AWG C/W NEUTRAL WIRE. (SEE ELECTRICAL DRAWINGS).

8– ELECTRICAL DISCONNECT SWITCH SUPPLIED, INSTALLED AND CONNECTED BY ELECTRICAL CONTRACTOR (SEE ELECTRICAL DRAWINGS.

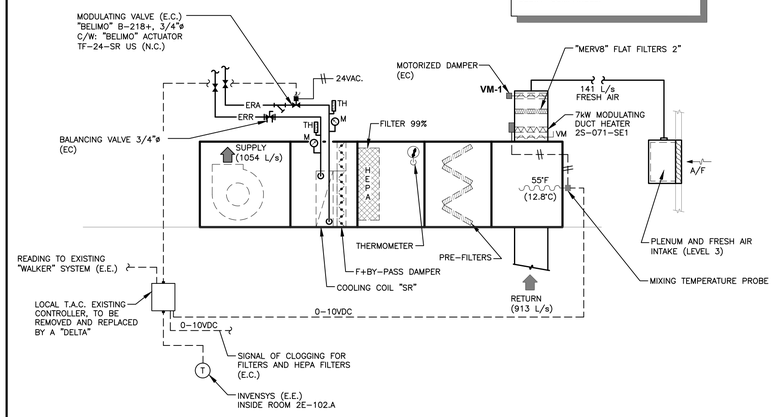
9– SEALING AROUND THE PIPING AND/OR ELECTRICAL CONDUITS TO BE DONE BY THE GENERAL CONTRACTOR WITH THE APPROPRIATE SEALING PRODUCTS (FIREPROOF OR OTHERS).

10– LOW VOLTAGE CONTROL WIRING BY THE SPECIALLISED CONTROL CONTRACTOR.

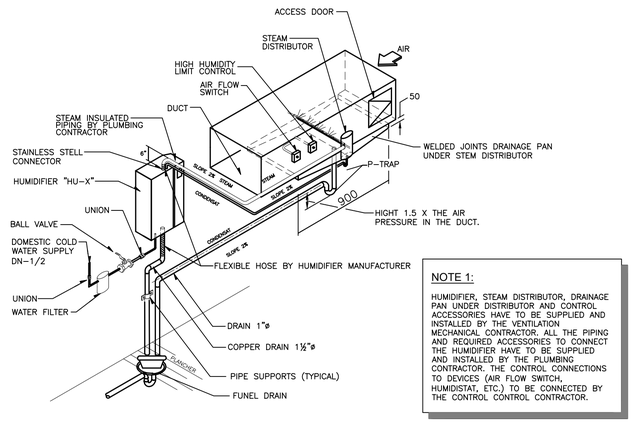
11– AIR CONDITIONNING UNIT CONTROLLER FOR BACNET MSTP SIGNAL SUPPLIED WITH THE SYSTEM. INSTALLATION AND CONNECTIONS BY THE SPECIALISED CONTROL CONTRACTOR.

12– CONNECTIONS POLES FOR LOW VOLTAGE CONTROLS.

INSTALLATION DETAIL FOR AIR CONDITIONNING UNITS AC-X / COND-X
SCALE: NTS

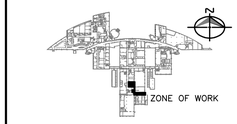


SYSTEM 2S-071-VA1 DETAIL / EXISTING CONDITION
SCALE: N.T.S.



NOTE 1:
HUMIDIFIER, STEAM DISTRIBUTOR, DRAINAGE PAN UNDER DISTRIBUTOR AND CONTROL ACCESSORIES HAVE TO BE SUPPLIED AND INSTALLED BY THE VENTILATION MECHANICAL CONTRACTOR. ALL THE PIPING AND REQUIRED ACCESSORIES TO CONNECT THE HUMIDIFIER HAVE TO BE SUPPLIED AND INSTALLED BY THE PLUMBING CONTRACTOR. THE CONTROL CONNECTIONS TO DEVICES (AIR FLOW SWITCH, HUMIDISTAT, ETC.) TO BE CONNECTED BY THE CONTROL CONTRACTOR.

TYPICAL INSTALLATION DETAIL FOR HUMIDIFIERM CONECTIONS
SCALE: NTS



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- THIS DRAWING CAN ONLY BE USED FOR CONSTRUCTION IF IT IS SEALED, SIGNED BY AN ENGINEER AND ISSUED FOR CONSTRUCTION.

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rev.	DD-MM-YEAR	ISSUED FOR

collaboration
CSA ASC
Agence spatiale canadienne | Canadian Space Agency

seal
2019-11-05
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6767, route de l'Aéroport, Saint-Hubert, QC

drawing:
MECHANICAL - VENTILATION CONTROLS & DETAILS

scale: INDICATED	date: SEPTEMBER 2019
drawn by: MARTIN DUVAL	project: 19-008-A
prepared by: MAX JR ROY, ing.	sheet: **H-06en**

CSA PROJECT NUMBER: P-00019

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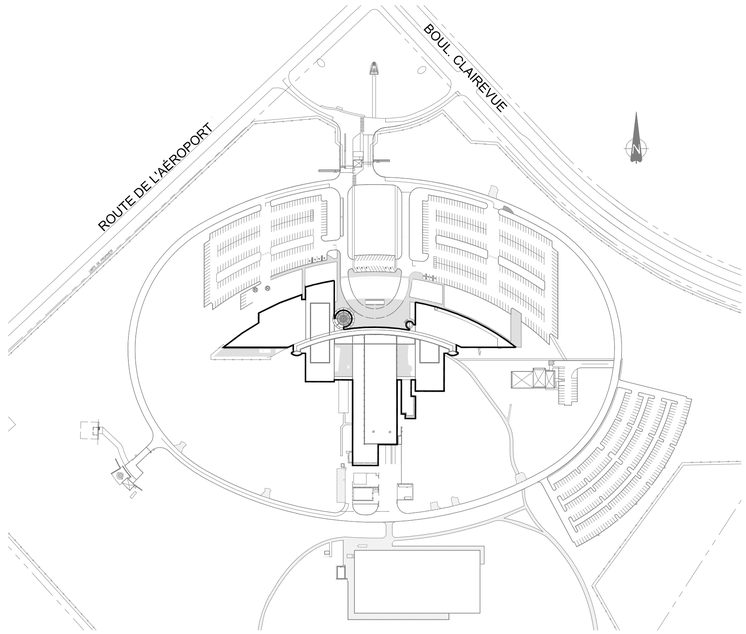

«FLATSAT-FACILITY» INSTALLATION
PROJECT RCM - ROOM 2E-102.A
PROJECT No: P-00019

ELECTRICAL

Rochon Experts-Conseils Reference Project # : 19-008-A

ISSUED FOR: TENDER
2019-11-04

ELECTRICAL DRAWING LIST

# PLAN	PAGE TITLE
E000	ELECTRICAL - PRESENTATION PAGE
E101	ELECTRICAL - SPECIFICATIONS
E102	ELECTRICAL - LEGEND SPECIFICATIONS AND LOCATION PLAN
E201	ELECTRICAL - DISTRIBUTION DIAGRAM
E202	ELECTRICAL - DISTRIBUTION - ELECTRICAL PANELS
E501	ELECTRICAL - NEW
E502	ELECTRICAL - LEVEL 1 - ROOMS 2E-102, 2E-102.A AND 2E-102.B

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ELECTRICAL SPECIFICATIONS

1.0 GENERAL INSTRUCTIONS

1.01 GENERAL

.1 THE ELECTRICAL WORK SHALL CONFORM TO THE DRAWINGS AND THE FOLLOWING GENERAL INSTRUCTIONS THAT FORM PART OF THE CONTRACT DOCUMENTS. THE SAME APPLIES TO CLARIFICATION DRAWINGS, CORRESPONDENCE AND ALL OTHER DOCUMENTS THAT ARE OR SHALL BE PROVIDED BY THE MINISTERIAL REPRESENTATIVE.

.2 THE TERMS "SUB–CONTRACTOR" AND "CONTRACTOR" USED IN THESE SPECIFICATIONS INDICATES THE CONTRACTOR RESPONSIBLE FOR ELECTRICAL WORK, UNLESS OTHERWISE NOTED.

1.02 OWNERSHIP AND INTERPRETATION OF DRAWINGS & SPECIFICATIONS

.1 THE ENGINEER HAVING PRODUCED THESE DRAWINGS AND SPECIFICATIONS IS THE ONLY PERSON THAT CAN INTERPRET THEIR EXACT MEANING AND HAS THE EXCLUSIVE OWNERSHIP. IN ADDITION THESE DOCUMENTS CANNOT BE USED IN WHOLE OR IN PART TO EXECUTE ANY OTHER PROJECT OTHER THAN ONE SPECIFIED HEREIN.

1.03 REVIEW OF DRAWINGS AND DOCUMENTS

.1 NOT WITHSTANDING ARTICLE 1.01 AND DURING THE BID PROCESS, THE CONTRACTOR SHALL ESTABLISH THE WORK TO BE DONE IN ACCORDANCE TO THE REFERENCES GIVEN ON THE DRAWINGS AND ADVISE THE MINISTERIAL REPRESENTATIVE OF ANY ERROR, OMISSION, LACK OF DATA, DIFFERENCE BETWEEN THE DRAWING/DOCUMENTS, AND THE EXISTING CONDITION.

.2 ANY DISCREPANCY SHALL BE BROUGHT TO THE ATTENTION OF THE MINISTERIAL REPRESENTATIVE IN WRITING (WHILE STILL UNDER TENDER), OTHERWISE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY/ALL REQUIRED CHANGES.

1.04 SCOPE OF WORK

THE SCOPE OF WORK SHALL INCLUDE:

.1 THE SUPPLY, INSTALLATION AND CONNECTION OF ALL ELECTRICAL EQUIPMENT THAT IS SHOWN ON THE DRAWINGS AND MENTIONED IN THE SPECIFICATIONS, INCLUDING ALL NECESSARY ACCESSORIES EVEN THOSE NOT ILLUSTRATED ON PLANS AND/OR SPECIFICATIONS BUT REQUIRED FOR PROPER & EFFICIENT OPERATION.

.2 THE FOLLOWING OBLIGATIONS:

a) TO DELIVER THE ENTIRE SYSTEM IN GOOD WORKING ORDER, ACCORDING TO RULES OF THE TRADE, STANDARD PRACTICES AND IN CLOSE COOPERATION WITH ALL OTHER IMPLICATED TRADES.
b) TO COMPLETE ALL WORK AND SUPPLY ALL THE NECESSARY MATERIALS, TOOLS, EQUIPMENT, LABOUR AND SUPERVISION REQUIRED FOR THE COMPLETE EXECUTION OF ALL WORK AS INDICATED, DESCRIBED OR REASONABLY IMPLIED ON THE DRAWINGS OR IN THE PRESENT GENERAL INSTRUCTIONS.
c) PROTECT THE WORK THROUGH THE PROJECT FROM BAD WEATHER EFFECTS, FIRE, THEFT AND VANDALISM.

.3 MATERIALS SHALL COME FROM THE PROVINCE OF QUEBEC AS MUCH AS POSSIBLE, RESPECTING ALL QUALITY AND COST.

.4 THE CONTRACTOR SHALL EXECUTE ALL ADDITIONAL WORK AS REQUESTED (IN WRITING), BY THE MINISTERIAL REPRESENTATIVE. THE MINISTERIAL REPRESENTATIVE WILL NOT ACCEPT ANY CLAIM FOR ADDITIONAL WORK IF THIS WORK HAS BEEN EXECUTED WITHOUT WRITTEN CONSENT FROM HIM. IN ADDITION, ALL SUPPLEMENTAL WORK REQUIRED BY THE MINISTERIAL REPRESENTATIVE MUST BE CARRIED OUT IN CONFORMITY WITH THE TECHNICAL INSTRUCTIONS DESCRIBED.

.5 THE CONTRACTOR SHALL, AT HIS OWN COST, PROTECT, SUPPORT, BRACE, DIVERT AND RESTORE TO THE COMPLETE SATISFACTION OF THE MINISTERIAL REPRESENTATIVE:

a) ALL COMMUNICATION AND/OR ELECTRICAL CONDUIT RUNS, ETC;
b) ALL ELECTRICAL EQUIPMENT AND DEVICES.

WHICH MAY BE MODIFIED OR DAMAGED DURING THE COURSE OF THIS CONTRACT. ALL DAMAGES CAUSED TO PROPERTY AND/OR EXISTING SERVICES BY THE CONTRACTOR SHALL IMMEDIATELY BE REPAIRED TO THE SATISFACTION OF THE MINISTERIAL REPRESENTATIVE, WITHOUT ANY ADDITIONAL COST.

.6 THE ELECTRICAL DRAWINGS DO NOT INDICATE ALL ARCHITECTURAL AND STRUCTURAL DETAILS. EXACT INFORMATION SHALL BE OBTAINED ON SITE. THE ELECTRICAL DRAWINGS INDICATE, IN A GENERAL MANNER, THE POSITION OF EQUIPMENT FOR INSTALLATION IS SHOWN ON A SCHEMATIC DIAGRAM. THE CONDUIT INSTALLATION SHALL CONFORM TO THE FOLLOWING.

a) TO BE RUN PARALLEL TO THE BUILDING STRUCTURE, WHEN EXPOSED;
b) NO CUTTING OR BORING THROUGH STRUCTURAL ELEMENTS WITHOUT WRITTEN PERMISSION;
c) SHALL BE INSTALLED TO FACILITATE THE REMOVAL OF EQUIPMENT OR PARTS THEREOF FOR REPAIRS, CLEANING & INSPECTION;
d) SHALL BE INSTALLED IN A MANNER TO FACILITATE FUTURE EQUIPMENT INSTALLATIONS;
e) TO RELOCATE, AT NO EXTRA COST, WITHIN 4.6 METERS (15 FEET) OF INDICATED LOCATION;
f) TO HIDE FROM SIGHT, ALL EQUIPMENT, AS MUCH AS POSSIBLE, DEVICES, CONDUITS & WIRING, FROM BEING EXPOSED;
g) TO RELOCATE, AT NO EXTRA COST, WHEN NOT IN ACCORDANCE WITH THE PRECEDING.

IF THE INSTALLATION OR EQUIPMENT CONNECTION IS DIFFERENT FROM THE ONE SHOWN ON THE DRAWINGS, THE ELECTRICAL CONDUITS SHALL BE MODIFIED ACCORDINGLY AND ACCORDING TO THE STANDARDS OUTLINED ABOVE.

.7 ALL MODIFICATIONS TO MATERIALS, EQUIPMENT OR FIXTURES AND ALL DEVIATIONS TO THE CONDUIT RUNS AND OTHER ITEMS SHALL BE FOLLOWING APPROVAL FROM THE MINISTERIAL REPRESENTATIVE. CHANGES SHALL BE INDICATED IN RED ON ONE CLEAN SET OF DRAWINGS THAT THE SUBCONTRACTOR WILL PREPARE AND SUBMIT TO THE MINISTERIAL REPRESENTATIVE FOR ISSUANCE OF AN "AS BUILT" DRAWING.

1.05 WARRANTY

.1 ALL WORK SHALL BE FREE OF MANUFACTURING, MATERIAL AND INSTALLATION DEFECTS. ALL SUPPLIED AND INSTALLED MATERIAL, FIXTURES AND EQUIPMENT SHALL BE NEW AND OF THE FIRST QUALITY. IF, DURING THE WARRANTY PERIOD, IT IS PROVEN THAT SUCH DEFECTS EXIST, THE CONTRACTOR SHALL REPAIR OR REPLACE THE DEFECTIVE EQUIPMENT OR WORK WITHOUT CLAIMING AN ADDITIONAL AMOUNT FROM THE MINISTERIAL REPRESENTATIVE. IN ADDITION, DURING THE WARRANTY PERIOD, HE SHALL ASSUME THE RESPONSIBILITY OF ALL DELAYS OR DAMAGES CAUSED BY THESE DEFECTS, AND, IF REQUIRED, CORRECT ALL DAMAGES CAUSED TO THE ADJACENT SURFACES BY THE REPAIR OR MODIFICATION WHILE EXECUTING THE WORK.

.2 A WRITTEN ONE (1) YEAR WARRANTY SHALL BE SUPPLIED BY THE SUB–CONTRACTOR FOR ALL EQUIPMENT AND FIXTURES, INCLUDING THEIR INSTALLATION AND OPERATION, THIS WARRANTY COMES INTO EFFECT FOLLOWING FINAL APPROVAL OF WORK BY THE MINISTERIAL REPRESENTATIVE.

1.06 SHOP DRAWINGS

.1 AS INDICATED, BEFORE ORDERING MATERIAL, EQUIPMENT AND FIXTURES, THE CONTRACTOR SHALL SUBMIT TO THE MINISTERIAL REPRESENTATIVE ONE (1) COPIE OF EACH SHOP DRAWING (ELECTRONIC FORMAT) OF MATERIALS TO BE USED FOR THE MINISTERIAL REPRESENTATIVE'S APPROVAL.

.2 SHOP DRAWINGS SUBMITTED BY THE CONTRACTOR SHALL BE VERIFIED AND ANNOTATED BY THE MINISTERIAL REPRESENTATIVE. THEY SHALL BE RETURNED BY EMAIL IN COLOUR, PDF FORMAT.

.3 THE STUDY AND THE APPROVAL OF THE DRAWINGS AND SAMPLES BY THE MINISTERIAL REPRESENTATIVE ARE APPLICABLE ONLY TO THE GENERAL LAYOUT. ERRORS IN SIZES AND QUANTITIES, INCLUDING THE OBSTACLES INCURRED DURING THE WORK TO BE DONE SHALL BE NOTED, BUT THIS WILL NOT FREE THE CONTRACTOR FROM HIS RESPONSIBILITY TO COMPLETE THE WORK IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.

.4 THE CHARACTERISTICS OF THE MATERIALS, THE RELEVANT DETAILS OF MANUFACTURING AND INSTALLATION INCLUDING ALL OTHER PARTICULAR FUNCTIONS AND STANDARDS TO WHICH THEY CORRESPOND SHALL BE CLEARLY INDICATED ON EACH OF THE SHOP DRAWINGS.

1.07 OPERATION AND MAINTENANCE

SUB–CONTRACTOR HAS THE OBLIGATION TO:

.1 ENERGIZE THE SYSTEM INTO OPERATION AND CHECK THE PERFORMANCE AND OPERATION CHARACTERISTICS DETAILED ON THE PLANS AND SPECIFICATIONS;

.2 CHECK EACH CONTROL DEVICE IN SIMULATED CONDITIONS, TAKE NOTES AND PREPARE A WRITTEN REPORT TO CONFIRM THAT ALL SYSTEMS ARE FUNCTIONING ACCORDING TO PLANS, SPECIFICATIONS AND MANUFACTURER'S RECOMMANDATIONS;

.3 SUPPLY TWO BINDERS CONTAINING SHOP DRAWINGS, BENCH–TEST RESULTS, OPERATION, INSTRUCTION AND SERVICE MANUALS.

1.08 CODES. LICENSES. STANDARDS. COSTS

.1 OBTAIN AND PAY THE REQUIRED PERMITS

.2 DO NOT CONCEAL WORK BEFORE INSPECTION BY THE MINISTERIAL REPRESENTATIVE AND OTHER AUTHORITIES HAVING JURISDICTION.

.3 OBTAIN ALL PERMITS FROM THE FOLLOWING REGULATED BODIES: MINISTRY OF LABOR, MUNICIPAL SERVICES, FIRE AUTHORITIES, BUILDING CODE AUTHORITIES, ETC.

.4 OBSERVE THE APPLICABLE CODES AND STANDARDS (FOLLOWING THE MOST RESTRICTIVE) OF THE FOLLOWING INSTITUTIONS: NBC, NFPC, MINISTRY OF LABOR, ENVIRONMENTAL PROTECTION AND ALL OTHERS PERTAINING TO THIS PROJECT.

1.09 RIGHTS AND PATENTS

.1 THE CONTRACTOR SHALL PAY ALL DUES FOR THE USAGE OF PATENTED PRODUCTS, IF ANY, AND PROTECT THE MINISTERIAL REPRESENTATIVE AGAINST ALL CLAIMS RELATED TO THE WORKS DUE TO THE PATENTS IN FORCE AT THE TIME OF THE SIGNING OF THE CONTRACT DOCUMENTS.

1.10 DISTRIBUTION OF WORK

EXCEPT WHERE OTHERWISE SPECIFIED IN THE ELECTRICAL DRAWINGS AND SPECIFICATIONS, THE FOLLOWING WORKS SHALL BE DISTRIBUTED AS FOLLOWS:

.1 PROTECTION: EVERY SUB–CONTRACTOR SHALL ENSURE PROTECTION AGAINST INTRUSION, THEFT, FIRE & VANDALISM OF ALL HIS EQUIPMENT AND MATERIALS UNTIL FINAL ACCEPTANCE BY THE OWNER AND SHALL ENSURE A SECURE INSTALLATION TO PREVENT THEFT, INTRUSION AND VANDALISM SUBSEQUENT TO THE DELIVERY OF THE BUILDING.

.2 CONNECTIONS: THE ELECTRICAL SUB–CONTRACTOR SHALL ELECTRICALLY CONNECT ALL EQUIPMENT & DEVICES AS INDICATED ON THE DRAWINGS, INCLUDING THOSE SUPPLIED BY OTHERS IN COMPLIANCE WITH DRAWING AND SPECIFICATIONS.

.3 IDENTIFICATION: ALL THE ELECTRICAL AND EQUIPMENT SHALL BE IDENTIFIED BY A LAMACOIDAL BLACK PLATE WITH ENGRAVED WHITE LETTERS, FIXED TO THE EQUIPMENT BY TWO AUTO THREAD–CUTTING SCREWS. THE IDENTIFICATION MUST INCLUDE, BUT SHALL NOT BE LIMITED TO: NOMENCLATURE OF THE EQUIPMENT, CONNECTION CIRCUIT, FEEDING AND LOAD VOLTAGE, FUSE SIZE ON THE FUSED SAFETY SWITCHES AND THE CONTROLLED APPARATUS, IF IT APPLIES.

.4 MISCELLANEOUS: THE SUB–CONTRACTOR SHALL CARRY OUT THE FOLLOWING WORK:

a) PAINTING (EXCEPT WHERE FACTORY PRE–PAINTED) AND TOUCH–UPS;
b) MAKE GOOD ALL EXISTING SURFACES THAT HAVE BEEN WORKED ON.

1.11 PRECAUTIONS

.1 ALL EQUIPMENT, CONDUITS, PIPING AND OTHERS ARE SHOWN SCHEMATICALLY AND THEIR LOCATION IS APPROXIMATIVE, THE EXACT LOCATION WILL BE COORDINATED AND BE DETERMINED ON SITE.

.2 UNLESS OTHERWISE NOTED, ALL ELECTRICAL EQUIPMENT THAT HAS TO BE REVOMED OR REPLACED STAYS THE PROPERTY OF THE MINISTERIAL REPRESENTATIVE AND SHALL BE GIVEN BACK TO HIM WHEN REMOVED. IF THE MINISTERIAL REPRESENTATIVE DECIDES TO GET RID OF THIS EQUIPMENT THE CONTRACTOR SHALL DISPOSE THE EQUIPMENT FROM THE SITE AT HIS OWN EXPENSE.

.3 DURING THE WORK AND IN COORDINATION WITH THE MINISTERIAL REPRESENTATIVE, IF CERTAIN FIXTURES AND/OR EQUIPMENT (EXISTING OR NEW) SHOULD BE KEPT FOR CONTINUATION OF AN ELECTRICAL OPERATION, THE CONTRACTOR SHALL RELOCATE, ON A TEMPORARY OR PERMANENT BASES, THE FIXTURE AND/OR EQUIPMENT AT AN ADEQUATE LOCATION AND CONNECT AS REQUIRED.

.4 FOR THE REMOVAL OF EQUIPMENT, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT, WIRING, CONDUITS & ACCESSORIES UP TO THE FEEDER LOCATION.

.5 THE CONTRACTOR SHALL PROTECT ALL EQUIPMENT & FINISHES PRIOR TO FINAL DELIVERY TO THE MINISTERIAL REPRESENTATIVE. ANY DIRTY OR DAMAGED EQUIPMENT SHALL BE CLEANED/REPLACED PRIOR TO FINAL DELIVERY, AND THIS TO THE ENTIRE SATISFACTION OF THE MINISTERIAL REPRESENTATIVE.

.6 TO PREVENT DELAYS, THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL ACTIVITIES WITH ALL OTHER SUB–TRADES. HE SHALL ALSO KEEP THE ENGINEER INFORMED OF ALL EQUIPMENT DELIVERY DELAYS OR NON–AVAILABILITY WHICH COULD AFFECT THE FINAL COMPLETION DATE. IN SUCH A CASE, THE ELECTRICAL CONTRACTOR SHALL PROPOSE, TO THE MINISTERIAL REPRESENTATIVE, A SUITABLE EQUIVALENT REPLACEMENT FOR APPROVAL BY THE MINISTERIAL REPRESENTATIVE AND APPLY ANY/ALL CREDITS.

1.12 DOCUMENTS TO BE SUPPLIED

.1 AT THE PROVISIONAL INSPECTION, THE SUB–CONTRACTOR SHALL SUPPLY, IN DUE TIME, ALL RESPECTIVE DOCUMENTS RELATED TO HIS TRADE, PERTINENT TO THE WORK EXECUTED:

a) LETTER OF WARRANTY FROM THE ELECTRICAL CONTRACTOR;
b) CERTIFICATE OF PARASISMIC CONFORMITY;
c) PROVIDE "AS–BUILT" DRAWINGS ANNOTED IN RED INCLUDING ALL MODIFICATIONS DONE ON SITE FOLLOWING DIRECTIVES AND DEMANDS ASKED BY THE MINISTERIAL REPRESENTATIVE;
d) PROVIDE INSTRUCTION AND MAINTENANCE MANUALS INCLUDING APPROVED SHOP DRAWINGS;
e) PROVIDE A WRITTEN AND SIGNED REPORT, ATTESTING THAT ALL SYSTEMS, EQUIPMENT & ACCESSORIES WERE STARTED UP AND WERE INSTALLED ACCORDING TO PLANS, SPECIFICATIONS AND THE MANUFACTURER'S RECOMMENDATIONS.

NOTE: ALL ABOVE MENTIONED DOCUMENTS SHALL BE SIGNED BY AN AUTHORIZED REPRESENTATIVE OF THE CONTRACTOR.

1.13 DELIVERY

.1 THE CONTRACTOR SHALL KEEP THE MINISTERIAL REPRESENTATIVE INFORMED OF ALL EQUIPMENT DELIVERY DELAYS OR NON–AVAILABILITY WHICH COULD AFFECT THE FINAL COMPLETION DATE.

1.14 SMALL WORKS

.1 THE SUB–CONTRACTOR SHALL EXECUTE ALL SMALL WORKS NOT INDICATED ON DRAWING(S) NECESSARY FOR A COMPLETE JOB. THE WORK, RELEVANT TO THE RULES OF THE TRADE OR PURSUANT TO THE MINISTERIAL REPRESENTATIVE'S REQUEST, SHALL BE CONSIDERED WHILE UNDER TENDER. ALL WORK, IN PART OR IN WHOLE, SHALL BE, AT ALL TIMES, EXECUTED TO THE SATISFACTION OF THE MINISTERIAL REPRESENTATIVE.

1.15 SERVICE INTERRUPTIONS (EXISTING BUILDING)

.1 THE CONTRACTOR MUST TAKE INTO ACCOUNT THAT THE WORK SECTORS ARE AREAS DEEMED FOR ESSENTIAL OPERATIONS AND AS SUCH ARE TO BE OCCUPIED BY OPERATIONS PERSONAL PERTAINING TO SPACE AND EARTH MISSIONS. THIS IMPLIES THAT THE MISSION SCHEDULES HAVE PRIORITY OVER WORK WHICH CAN BE DELAYED. THE CONTRACTOR MUST THEREFORE TAKE NOTE OF THESE MISSION SCHEDULES WHICH WILL BE GIVEN TO HIM BY THE MINISTERIAL REPRESENTATIVE.

.2 NO BUILDING SERVICES INTERRUPTION CAN BE CARRIED OUT WITHOUT THE WRITTEN APPROVAL BY THE MINISTERIAL REPRESENTATIVE.

.3 THE CONTRACTOR MUST SUBMIT 48 HOURS IN ADVANCE A WRITTEN REQUEST TO THE MINISTERIAL REPRESENTATIVE INDICATING:

a) AFFECTED SECTORS;
b) LENGTH OF TIME OF THE INTERRUPTION;
c) PLANNED MEASURES IN ORDER TO MINIMIZE THE IMPACT OF THE INTERRUPTION.

.4 FOLLOWING THE TRANSMITTAL OF THE REQUEST. THE MINISTERIAL REPRESENTATIVE SHALL SUBMIT A TIME LINE INDICATING THE POSSIBLE TIME FRAME TO CARRY OUT THE WORK. THE CONTRACTOR MUST FOLLOW THIS TIME LINE. IN THE CASE WHERE IT WOULD BE IMPOSSIBLE FOR HIM TO FOLLOW IT, HE MUST ADVISE THE MINISTERIAL REPRESENTATIVE AND FIND A NEW TIME LINE BEST SUITED TO DO THE WORK.

.5 ALL WORK TO BE PERFORMED IN AN OCCUPIED WORK SPACE SHALL BE CONDUCTED SO AS TO NOT INCONVENIENCE PERSONNEL. THE CONTRACTOR SHALL REQUEST PERMISSION FROM THE MINISTERIAL REPRESENTATIVE TO WORK IN OCCUPIED SPACES DURING NORMAL WORKING HOURS, IF NOT, A WORK PERIOD SHALL BE NEGOTIATED BETWEEN THE MINISTERIAL REPRESENTATIVE & CONTRACTOR. ALL OCCUPIED WORK AREAS SHALL BE RETURNED TO THEIR ORIGINAL STATE (CLEAN & SAFE) AT THE END OF EACH DAY. FAILURE TO MAKE CLEAN AND/OR SAFE SHALL ARISE IN THE MINISTERIAL REPRESENTATIVE CHARGING THE CONTRACTOR FOR ANY/ALL INCONVENIENCE.

1.16 COORDINATION

.1 THE FINAL LOCATION OF CEILING MOUNTED DEVICES MUST BE COORDINATED ON SITE TAKING INTO ACCOUNT THE VENTILATION DUCTS AND DIFFUSERS.

1.17 EQUIVALENCE AND MATERIAL SUBSTITUTIONS

.1 SPECIALIZED PRODUCT – NO EQUIVALENCE
IF IT IS REQUIRED THAT THE PRODUCT MUST RESPECT THE SPECIFICATION IN ITS ENTIRETY, IT IS THEN MENTIONED "NO EQUIVALENCE" IN THE DOCUMENTS. IN THIS CASE, SUBSTITUTIONS ARE NOT ACCEPTED.

.2 NO SPECIFIED PRODUCT OR MANUFACTURER
IF NO PRODUCT OR MANUFACTURER IS SPECIFIED, THE CONTRACTOR IS FREE TO CHOOSE A MANUFACTURER FROM WHOM THE PRODUCT MEETS THE TECHNICAL REQUIREMENTS MENTIONED IN THE SPECIFICATIONS.

1.18 FINAL INSPECTION

.1 FINAL INSPECTION SUBJECT TO APPROVAL BY THE MINISTERIAL REPRESENTATIVE.

.2 REQUEST FINAL INSPECTION AFTER:

a) DEFICIENCIES NOTED IN SITE VERIFICATION REPORTS ARE COMPLETED;
b) SYSTEMS HAVE BEEN TESTED AND ARE FULLY OPERATIONAL;
c) CERTIFICATES HAVE BEEN SUBMITTED;
d) AS–BUILT DRAWINGS ARE COMPLETE;
e) ALL FINAL VERIFICATION REPORTS OF DEFICIENCIES HAVE BEEN CORRECTED AND VERIFIED.

1.19 TRAINING

.1 THE CONTRACTOR MUST ALLOW A CERTAIN PERIOD FOR THE MINISTERIAL REPRESENTATIVE TRAINING IN ORDER TO BE ABLE TO UNDERSTAND AND OPERATE CERTAIN SYSTEMS. THE LENGTH OF THIS TRAINING IS AT THE BIDDER'S DISCRETION, ALTHOUGH IT DOES NOT RELEASE THE BIDDER FROM HIS RESPONSABILITY TO PROPERLY TRAIN THE MINISTERIAL REPRESENTATIVE IN ORDER FOR HIM TO PROPERLY OPERATE ALL SYSTEMS.

2.0 TECHNICAL INSTRUCTIONS

2.01 GENERAL REQUIREMENTS

.1 PROVIDE ALL LABOUR, NEW MATERIALS AND ALL THE NECESSARY EQUIPMENT FOR A COMPLETE INSTALLATION OF ALL ELECTRICAL WORK. ALL ELECTRICAL EQUIPMENT MUST BE LISTED (CSA, ULC). ANY MODIFICATION TO AN EXISTING EQUIPMENT MUST IN NO WAY MODIFY IT'S LISTING. IF SAID MODIFICATION REQUIRES A NEW CERTIFICATION, THE CONTRACTOR MUST MANDATE A CSA (OR ULC) TECHNICAL TEAM AND OBTAIN A NEW LISTING. THIS WORK IS AT THE CONTRACTOR'S EXPENSE.

.2 PERFORM ALL WORK IN ACCORDANCE WITH QUEBEC ELECTRICAL SAFETY CODE AND AS PER "RÉGIE DU BÂTIMENT" STANDARDS.

.3 ALL ELECTRICAL WORK AND EQUIPMENT SHALL BE COVERED BY A WARRANTY OF A MINIMUM OF ONE (1) YEAR, MATERIAL AND LABOUR INCLUDED, STARTING FROM THE DATE OF FINAL ACCEPTANCE.

.4 THE ELECTRICAL CONTRACTOR SHALL VERIFY ON SITE THE SPACE NECESSARY TO EXECUTE ALL CONNECTIONS REQUIRED IN THIS CONTRACT.

.5 ALL EQUIPMENT SHOWN IN DOTTED LINES ARE EITHER EXISTING, PROVIDED BY OTHERS, UNDERGROUND OR IN A STRUCTURAL SLAB, ALL ACCORDING TO THE INTENT ON THE DRAWINGS OR INDICATED NOTES.

.6 SUPPLY AND INSTALL ALL APPROPRIATE "U" SHAPE GALVANIZED STEEL SUPPORT CHANNELS 1½" x 1½" TO SUPPORT ELECTRICAL EQUIPMENT. ALL CUTS MADE TO CHANNELS SHALL BE COATED WITH A GALVANIZED PROTECTIVE PAINT.

2.02 GROUNDING

.1 INSTALL A COMPLETE, PERMANENT AND CONTINUOUS GROUNDING NETWORK ACCORDING TO QUÉBEC ELECTRICAL SAFETY CODE.

2.03 WIRING

.1 ALL CONDUCTORS SHALL BE MADE OF COPPER.

.2 NEUTRAL WIRE SHARED WITH TWO 120V CIRCUITS IS NOT PERMITTED; INSTALL A SEPERATE NEUTRAL WIRE PER CIRCUIT.

2.04 OUTLET BOXES

.1 ALL OUTLET AND JUNCTIONS BOXES SHALL BE SUPPORTED INDEPENDENTLY FROM THE CONDUITS CONNECTED TO THEM.

.2 THE CONTRACTOR MUST INSTALL A PULL BOX FOR ANY RUN EXCEEDING 100 FEET OR AFTER TWO 90° ELBOWS.

.3 THESE BOXES SHALL BE OF GALVANIZED STEEL AND EQUIPED WITH A PLASTER RING, AS REQUIRED BY THE INSTALLATION OR THE APPLICATION. UNLESS OTHERWISE NOTED, THE ELECTRICAL CONTRACTOR SHALL BE UNDER THE OBLIGATION TO PROVIDE ALL REQUIRED COVERPLATES.

2.05 CONDUITS

.1 UNLESS OTHERWISE NOTED, ALL WIRING IS TO BE INSTALLED IN CONDUITS.

.2 UNLESS OTHERWISE NOTED, ALL CONDUITS MUST BE EMT CONDUITS.

.3 ALL CONDUITS WILL BE SOLIDLY ATTACHED WITH APPROPRIATE COLLARS, STEEL FITTINGS OR ANCHORS AND WILL HAVE TO GO AROUND BEAMS AND BE INSTALLED PARALLEL TO THE GRID LINES OF THE BUILDING.

.4 ALL THE EMT CONDUITS SHALL BE PROVIDED WITH CONNECTORS AND SET SCREW COUPLINGS; THE COUPLINGS SHALL BE OF ZINC ALLOY AND THE CONNECTORS SHALL BE OF ZINC ALLOY WITH NYLON BUSHING.

2.06 DRY TYPE TRANSFORMERS (PRIMARY UP TO 600V)

.1 TRANSFORMERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

a) THREE ALUMINIUM WINDINGS, INDUSTRIAL DUTY;
b) PRIMARY VOLTAGE OF 600V AND 120/208V SECONDARY VOLTAGE, 60Hz OR AS INDICATED;
c) FOUR (4) ADJUSTABLE TAPS OF 2½%, AT FULL LOAD. TWO (2) ABOVE THE RATED VOLTAGE AND TWO (2) BELOW THE RATED VOLTAGE;
d) CONNECTION LUGS LOCATED AT THE FRONT OF THE TRANSFORMER;
e) CLASS H INSULATION @ 150°C TEMPERATURE RISE;
f) STANDARD VOLTAGE REGULATION;
g) STANDARD AVERAGE NOISE LEVEL;
h) CSA TYPE 2 ENCLOSURE WITH A REMOVABLE FRONT PANEL AND SPRINKLERPROOF;
i) WALL OR FLOOR MOUNT CAPABILITIES, AS SPECIFIED;
j) ANTI–VIBRATION PADS;
k) CSA C802.2. STANDARD.

3ø TRANSFORMER	IMPEDANCE (%) AT 150°C ±5%
15 kVA	5.96
30 kVA	4.83
45 kVA	5.95
50 kVA	5.99
75 kVA	4.69
112.5 kVA	5.86
150 kVA	5.07
225 kVA	6.11
300 kVA	6.70

.2 ACCEPTABLE MANUFACTURERS: DELTA, BEMAG OR HAMMOND.

2.07 SAFETY DISCONNECT SWITCH

.1 ALL SAFETY DISCONNECT SWITCHES (INDOOR OR OUTDOOR USE) ARE TO BE FOR HEAVY DUTY SERVICE AND SHALL ACCEPT HRC, FORM 1, CLASS J FUSES WHEN INDICATED ON DRAWINGS.

.2 DISCONNECT SWITCHES FOR OUTSIDE USE SHALL BE OF TYPE CSA 3R. DISCONNECT SWITCHES SHALL BE EQUIPPED WITH PROVISION FOR PADLOCKING IN AN "ON–OFF" POSITION AND MECHANICALLY INTERLOCKED DOOR TO PREVENT OPENING WHEN HANDLE IS IN THE "ON" POSITION. DISCONNECT SWITCHES SHALL BE SECURELY FASTENED TO THE EQUIPMENT IT IS FEEDING, IF APPROVED BY EQUIP–MENT MANUFACTURER, OR ELSE IT SHALL BE INSTALLED ON AN INDEPENDENT CHANNEL SUPPORT.

.3 ACCEPTABLE MANUFACTURERS: SIEMENS, EATON, SCHNEIDER OR G.E.

2.08 FIRE ALARM SYSTEM

.1 IN CASE OF UNEXPECTED MODIFICATIONS OCCURING DURING WORK, WHICH SHOULD AFFECT THE FIRE ALARM SYSTEM, THE CONTRACTOR MUST DO THE VERIFICATION AND THE TEST OF THE EXISTING SYSTEM WITH AN ACCREDITED SPECIALIST REPRESENTING THE COMPANY OF THE EXISTING PANEL. THESE WORKS INCLUDE WITHOUT LIMITATIONS:

– REPLACEMENT OF A DAMAGED COMPONENT;
– ADDITION OR REMOVAL OF COMPONENTS;
– MODIFICATION, PROGRAMMING AND/OR SUPERVISING;
– SUPPLY OF A CERTIFICATE OF COMPLIANCE AND OF A VERIFICATION REPORT ACCORDING TO STANDARD ULC S–537 AND OTHERS IN EFFECT.

END OF SPECIFICATIONS

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seal: Mohamed-Amine Boukhriss 147019 — 2019-11-05

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project: «FLATSAT-FACILITY» INSTALLATION PROJECT RCM ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

drawing: ELECTRICAL SPECIFICATIONS

scale: N.T.S.	date: SEPTEMBER 2019
drawn by: CARL BLANCHARD	#project: 19–008–A
prepared by: AMINE BOUKHRISS, Eng.	#sheet: E101

CSA PROJECT NUMBER: P–00019

Format d'impression: Métrique ISO A1 (841 x 594mm)

ELECTRICAL LEGEND

LIGHTING

- B,2c — B,2c A — TYPE "A" LIGHTING FIXTURE CONNECTED TO CIRCUIT #2 OF PANEL "B" AND CONTROLLED BY SWITCH "c".
- C — C — WALL MOUNTED LIGHTING FIXTURE.
- E — A — LIGHTING FIXTURE CONNECTED TO EMERGENCY CIRCUIT.
- C,1 UA — SINGLE FACE EXIT SIGN. THE BLACKENED PORTION SHOWS THE LIGHTED FACE. "C,1" INDICATES THE A.C. CIRCUIT AND "UA" THE BATTERY.
- C,1 UA — DOUBLE FACE EXIT SIGN. THE BLACKENED PORTIONS SHOW THE LIGHTED FACES. "C,1" INDICATES THE A.C. CIRCUIT AND "UA" THE BATTERY.
- "UA" — EMERGENCY LIGHTING BATTERY "UA".
- UA — WALL MOUNTED REMOTE EMERGENCY LIGHTING FIXTURE TO BE CONNECTED TO EMERGENCY LIGHTING BATTERY "UA".
- UA — CEILING MOUNTED REMOTE EMERGENCY LIGHTING FIXTURE TO BE CONNECTED TO EMERGENCY LIGHTING BATTERY "UA".
- $ — SINGLE POLE 15A, 120V SWITCH.
- $3 — 15A, 120V 3–WAY SWITCH.
- $4 — 15A, 120V 4–WAY SWITCH.
- [$] — SINGLE POLE 15A, 347V SWITCH.
- [$]3 — 15A, 347V 3–WAY SWITCH.
- [$]4 — 15A, 347V 4–WAY SWITCH.
- $ — DIMER.
- [M] — TIMER.

SERVICES
RECEPTACLES

- — 15A, 125V DUPLEX RECEPTACLE.
- — 15A, 125V DUPLEX RECEPTACLE INSTALLED ABOVE COUNTER.
- — 15A, 125V SIMPLE RECEPTACLE FOR EMERGENCY LIGHTING BATTERY.
- — 15A, 125V DUPLEX RECEPTACLE C/W CLASS "A" GROUND FAULT BREAKER.
- — 15A, 125V DUPLEX RECEPTACLE C/W CLASS "A" GROUND FAULT BREAKER INSTALLED ABOVE COUNTER.
- P — CEILING MOUNTED 15A, 125V DUPLEX RECEPTACLE.
- WP — WEATHER–PROOF 15A, 125V DUPLEX RECEPTACLE.
- — ELECTRICAL EQUIPMENT TO CONNECT.

SERVICES
COMMUNICATIONS

- — DATA/TELEPHONE OUTLET COMBINATION C/W 3/4" (21) CONDUIT TO END IN ACCESSIBLE CEILING SPACE.
- — DATA/TELEPHONE OUTLET COMBINATION INSTALLED ABOVE COUNTER C/W 3/4" (21) CONDUIT TO END IN ACCESSIBLE CEILING SPACE.
- P — DATA/TELEPHONE OUTLET COMBINATION INSTALLED IN CEILING SPACE.

SERVICES
HEATING

- — BASEBOARD HEATER.
- T — BASEBOARD HEATER C/W INTEGRATED THERMOSTAT.
- — FORCE–FLOW HEATER C/W INTEGRATED THERMOSTAT.
- — UNIT HEATER.
- SC–1 — COIL HEATER SUPPLIED AND INSTALLED BY OTHERS, CONNECTED BY THE ELECTRICAL CONTRACTOR.
- — HEATING CABLE.
- T — THERMOSTAT.
- t — THERMOSTAT SUPPLIED AND INSTALLED BY OTHERS, CONNECTED BY THE ELECTRICAL CONTRACTOR.
- R — HEATER RELAY (24V CONTROL) SUPPLIED BY OTHERS, INSTALLED AND CONNECTED BY THE ELECTRICAL CONTRACTOR.

SERVICES
DISTRIBUTION AND POWER

- — WALL OR CEILING MOUNTED JUNCTION BOX.
- — SAFETY SWITCH.
- 2D — 2–WAY TRANSFER SWITCH.
- — MANUAL STARTER C/W OVERLOAD AND PILOT LIGHT.
- — MAGNETIC STARTER.
- TX — TRANSFORMER.
- VE–1 — "VE–1" SINGLE–PHASE MOTOR SUPPLIED AND INSTALLED BY THE VENTILATION CONTRACTOR, CONNECTED BY THE ELECTRICAL CONTRACTOR.
- VE–2 — "VE–2" THREE–PHASE MOTOR SUPPLIED AND INSTALLED BY THE VENTILATION CONTRACTOR, CONNECTED BY THE ELECTRICAL CONTRACTOR.
- "A" — SERVICE PANEL "A" 347/600V–3ø–4W.
- "B" — SERVICE PANEL "B" 120/208V–3ø–4W.
- "C" — SERVICE PANEL "C" 120/240V–1ø–3W.
- RP–1 — RELAY PANEL "RP–1".
- WH–1 — "WH–1" WATER–HEATER SUPPLIED AND INSTALLED BY THE PLUMBING CONTRACTOR, CONNECTED BY THE ELECTRICAL CONTRACTOR.
- C — CONTACTOR.

AUXILIARY SERVICES
FIRE ALARM

- F — MANUAL PULL–STATION.
- F — FIRE ALARM BELL.
- F — FIRE ALARM HORN.
- F — FIRE ALARM STROBE HORN.
- D — SMOKE DETECTOR.
- FAP — FIRE ALARM PANEL.

CABLING

- 2#12 AWG–RW90.
- 2#10 AWG–RW90.
- 2#8 AWG–RW90.

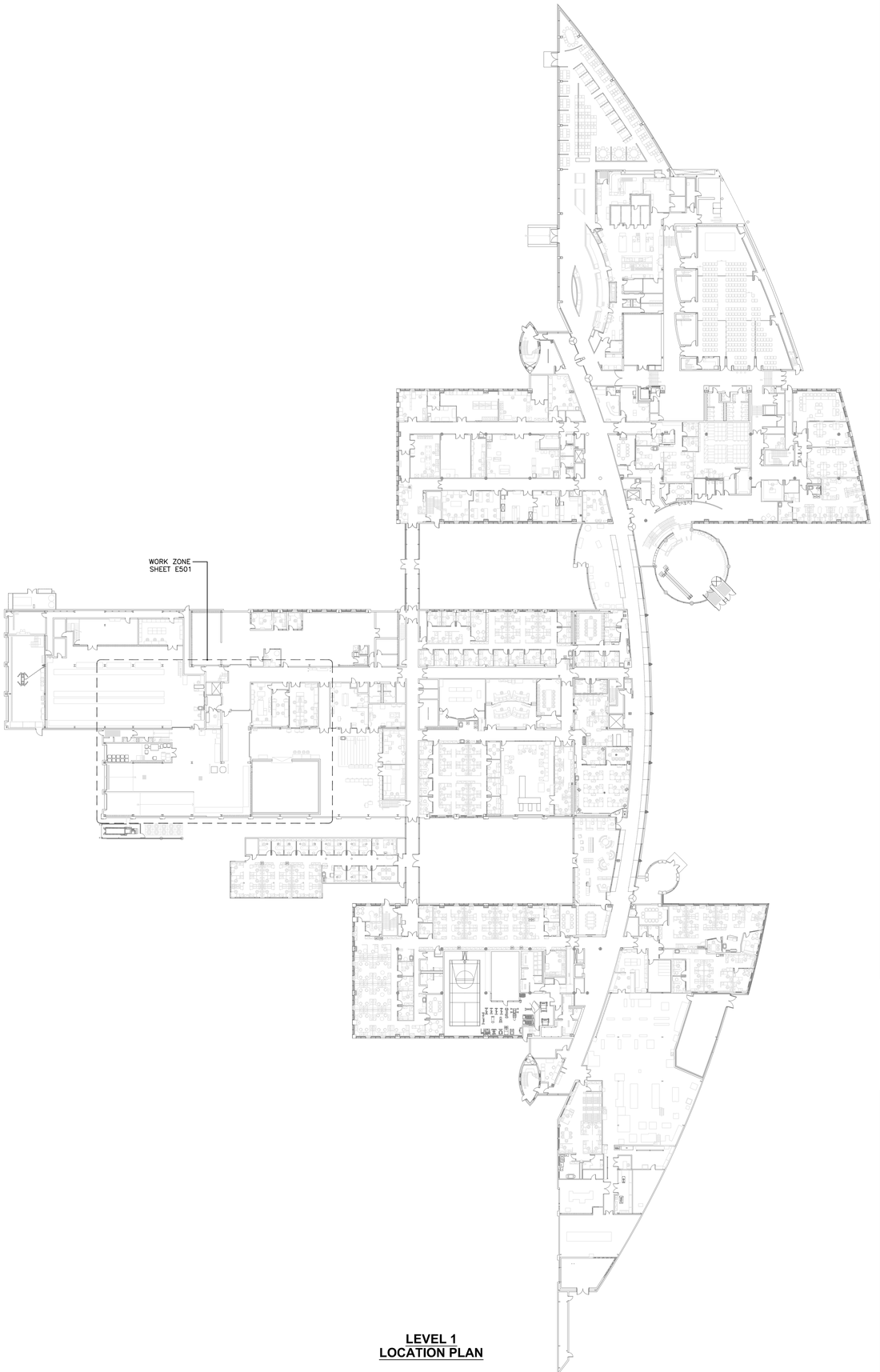
ABBREVIATIONS

MH	MOUNTING HEIGHT.
UP	GOING UP.
DN	GOING DOWN.
WP	WEATHER–PROOF.
UF	UNFUSED.
G	TEMPER–PROOF GUARD.
M.A.L.T.	GROUND.
M.A.L.T.I.	ISOLATED GROUND.
ETK	EXISTING TO KEEP.
ETD	EXISTING TO DEMOLISH/REMOVE.
ETR	EXISTING TO RELOCATE.
ETM	EXISTING TO MODIFY.
RE	RELOCATED EQUIPMENT.
ME	MODIFIED EQUIPMENT.
EX	CONNECT TO EXISTING CIRCUIT.
	EXISTING EQUIPEMENT OR BY OTHERS.

ELECTRICAL EQUIPMENT INSTALLATION HEIGHTS

	(mm)	
LIGHTING SWITCH.	(1400)	55" CENTER.
WALL MOUNTED LIGHTING FIXTURE INSTALLED IN RESTROOM.	(2440)	96" CENTER.
WALL MOUNTED EMERGENCY LIGHTING FIXTURE.	(150)	6" UNDER CEILING.
CABLE DISTRIBUTION OUTLET.	(305)	12" CENTER.
TELEPHONE / DATA / COMMUNICATION OUTLET.	(305)	12" CENTER.
WALL MOUNTED TELEPHONE OUTLET.	(1400)	55" CENTER.
WALL MOUNTED INTERCOM OUTLET.	(1425)	56" CENTER.
SINGLE OR DUPLEX RECEPTACLE.	(305)	12" CENTER.
EXTERIOR RECEPTACLE.	(765)	30" CENTER.
RECEPTACLE INSTALLED IN ELECTRICAL ROOM	(915)	36" CENTER.
RECEPTACLE INSTALLED ABOVE COUNTER.	(1220)	48" CENTER.
RECEPTACLE FOR A STOVE.	(105)	4" CENTER.
RECEPTACLE FOR EMERGENCY LIGHTING BATTERY.	(2440)	96" CENTER.
ELECTRICAL PANEL.	(1830)	72" TOP.
THERMOSTAT.	(1525)	60" CENTER.
MANUAL PULL–STATION.	(1400)	55" CENTER.
FIRE ALARM HORN OR BELL.	(150)	6" UNDER CEILING.

THE MOUNTING HEIGHTS INDICATED ABOVE ARE RELEVANT, IF NOT INDICATED OTHERWISE, FOR THE INSTALLATION OF ALL THE ELECTRICAL EQUIPMENT. IF NOT REFERING TO THE CEILING, THE VALUES REFER TO THE DISTANCE ABOVE THE FINISHED FLOOR. HOWEVER, IF MOUNTING HEIGHTS ARE INDICATED ON PLAN, THE INDICATIONS ON PLAN HAVE PRIORITY OVER THIS LIST AND MUST BE APPLIED.



LEVEL 1
LOCATION PLAN

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AGENCE SPATIALE CANADIENNE

project:
«FLATSAT-FACILITY» INSTALLATION PROJECT RCM ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

drawing:
ELECTRICAL LEGEND SPECIFICATIONS AND LOCATION PLAN

scale: 1:500	date: SEPTEMBER 2019
drawn by: CARL BLANCHARD	#project: 19–008–A
prepared by: AMINE BOUKHRISS, Eng.	#sheet: **E102**

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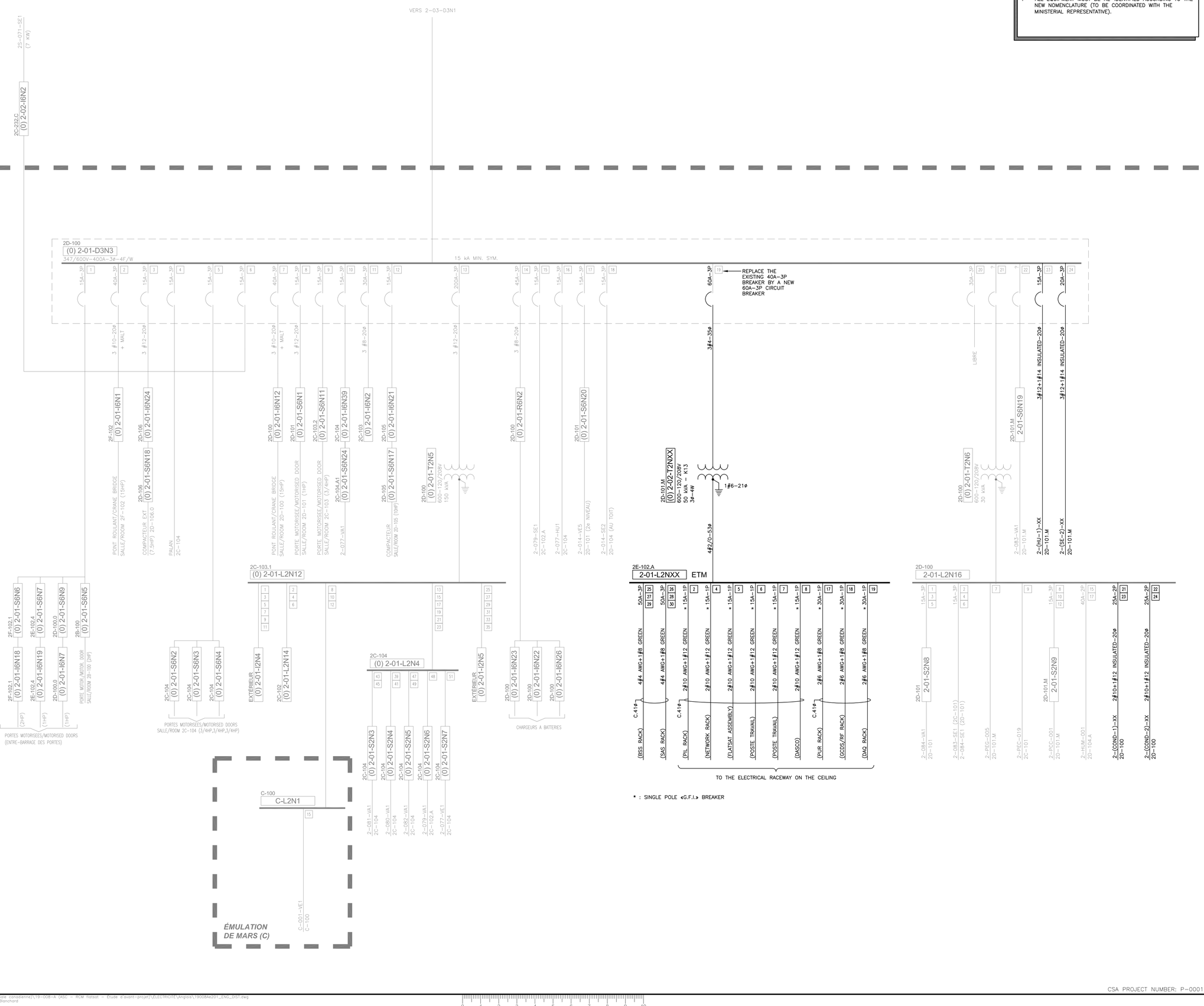
DATE D'IMPRESSION: 2019-11-05 - PAR: Carl Blanchard

NORMAL

NOTES:

1- ALL EQUIPMENT MUST BE RE-IDENTIFIED ACCORDING TO THE NEW NOMENCLATURE (TO BE COORDINATED WITH THE MINISTERIAL REPRESENTATIVE).

DISTR. PAV. 2, NIV. 2
(ANC. PAV. 0)



* : SINGLE POLE «G.F.I.» BREAKER

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AGENCE SPATIALE CANADIENNE

project:
«FLATSAT-FACILITY» INSTALLATION
PROJECT RCM
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drawing:
ELECTRICAL DISTRIBUTION DIAGRAM

scale: N.T.S.	date: SEPTEMBER 2019
drawn by: CARL BLANCHARD	project: 19-008-A
prepared by: AMINE BOUKHRISS, Eng.	sheet: **E201**

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Format d'Impression: Métrique ISO A1 (841 x 594mm)

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LOCAL 2D-100 — ETM

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	Description	Disj	Cir #	Cir #	Disj	Description	
	2-01-S2N8 2S-084-VA1 2D-101	15 3P	1	2	15 3P	2-083-SE1 (2C-101) 2-084-SE1 (2D-101)	
			3	4			
			5	6			
	2-PEG-005 (2D-101.M)		7	8	15 3P	2-01-S2N9 2-PCC-001 2D-101.M	
	2-PEC-019 (2C-101)		9	10			
	DOOR OPERATOR (2D-101.E2)		11	12			
	ELECTROMAGNET (2D-101.0)		13	14		VENTILATION SHUTDOWN (2D-101)	
	2-HUM-001 2D-104.A	40 2P	15	16		SPARE	
			17	18		SPARE	
	SPARE		19	20		SPARE	
(1)	2–(COND–1)–XX 2D–100	25 2P	21	22	25 2P	2–(COND–2)–XX 2D–100	(1)
			23	24			
	SPACE		25	26		SPACE	
	SPACE		27	28		SPACE	
	SPACE		29	30		SPACE	
	SPACE		31	32		SPACE	
	SPACE		33	34		SPACE	
	SPACE		35	36		SPACE	
	SPACE		37	38		SPACE	
	SPACE		39	40		SPACE	
	SPACE		41	42		SPACE	

ALL BREAKERS ARE 15A-1P (OTHERWISE EXCEPTIONS NOTED)

(1): SUPPLY AND INSTALL A NEW BREAKER FOR THE NEW LOADS.

LOCAL 2D-100 — ETM

(0) 2-01-D3N3 — NORMAL

	Description	Disj	Cir #	Cir #	Disj	Description	
	(0)2-01-S6N5 (2B-100.2) (0)2-01-S6N6/I6N18 (2F-102.1) (0)2-01-S6N7/I6N19 (2E-102.4) (0)2-01-S6N9/I6N7 (2D-100.0) MOTORIZED DOOR	15 3P	1	2	40 3P	(0)2-01-I6N1 OVERHEAD CRANE 2F-102	
	(0)2-01-I6N24 /2-01-S6N18 COMPACTOR 2D-106	15 3P	3	4	15 3P	PALAN (ELECTRIC CHAINBLOCK) 2C-104	
	(O) 2-01-S6N2/3/4 MOTORIZED DOOR 2C-104	15 3P	5	6	15 3P	2-02-I6N2 2-071-SE1 (2D-100)	
	(0) 2-01-I6N12 OVERHEAD CRANE 2D-100	40 3P	7	8	15 3P	(0) 2-01-S6N1 MOTORIZED DOOR 2D-101	
	(0) 2-01-S6N11 MOTORIZED DOOR 2C-103.2	15 3P	9	10	15 3P	2-077-VA1 2-01-S6N24, 2-01-I6N39 2C-104.A1	
	(0) 2-01-I6N2 2C-103.1	30 3P	11	12	15 3P	2-01-S6N17 (2D-105) (0) 2-01-I6N21 COMPACTOR 2D-105	
	(0) 2-01-T2N5 (2D-100) (0) 2-01-L2N12 (2C-103.1)	200 3P	13	14	45 3P	(0) 2-01-R6N2/I6N22,23,26 BATTERY CHARGER 2D-100	
	2-079-SE1 2C-102.A	15 3P	15	16	15 3P	2-077-HU1 2C-104	
	2-01-S6N20 2S-014-VE5 2D-101 (LEV. 2)	15 3P	17	18	15 3P	2-014-SE2 (3kW) 2D-104 ROOF	
(1)	2–02–T2NXX (50kVA) 2–01–L2NXX 2D–101.M	60 3P	19	20	30 3P	SPARE	
	2-01-T2N6 (30kVA) 2-01-L2N16 2D-100		21	22		2-01-S6N19 2-083-VA1 2D-101.M	
(1)	2–(HU–1)–XX 2D–101.M	15 3P	23	24	20 3P	2–(SE–2)–XX 2D–101.M	(1)

ALL BREAKERS ARE 15A-1P (OTHERWISE EXCEPTIONS NOTED)

(1): SUPPLY AND INSTALL A NEW BREAKER FOR THE NEW LOADS.

LOCAL 2E-101 — ETM

(0)2-01-L2T3 — UPS

	Description	Disj	Cir #	Cir #	Disj	Description
	2E-101	30 3P	1	2		2E-101
			3	4		2E-101
			5	6		2E-101
	2E-101		7	8		2E-101
	2E-101		9	10		2E-101
	2E-101		11	12		2E-101
	2E-101		13	14		2E-101
	2E-101		15	16		2E-101
	2E-101		17	18		2E-101
	SPARE		19	20		2E-101
	SPARE		21	22		2E-101
	SPARE		23	24		2E-101
(1)	SPARE	100 3P	25	26		2E-101
			27	28		2E-101
			29	30		2E-101
	CONTROL (2E-101)		31	32		2E-101
	CONTROL (2E-101)		33	34		SPACE
	CONTROL (2E-101)		35	36		SPACE
	SPACE		37	38		SPACE
	SPACE		39	40		SPACE
	SPACE		41	42		SPACE

ALL BREAKERS ARE 15A-1P (OTHERWISE EXCEPTIONS NOTED)

(1): EXISTING BREAKER NOW SPARE (UNLOADED).

EXISTING IDENTIFICATION

LOCAL 2E-102.A — ETM

(0)2-01-L2T5 — UPS

	Description	Disj	Cir #	Cir #	Disj	Description	
(1)	2E-102.B,2E-102.A		1	2		2E-102. ???	(3)
(1)	2E-102.B,2E-102.A		3	4		2E-102. ???	(3)
(3)	2E-102.B		5	6		2E-102.B	(3)
(3)	2E-102.B		7	8		2E-102.B	(3)
(2)	2E-102.B		9	10		2E-102.A	(1)
(2)	2E-102.B		11	12		2E-102.A	(1)
(2)	2E-102.A		13	14		2E-102.A	(2)
(1)	2E-102.A		15	16		2E-102.A	(1)
(3)	???		17	18		???	(3)
(3)	???		19	20		2E-102.B	(2)
(1)	2E-102.B		21	22		2E-102.B	(1)
(2)	2E-102.B		23	24		2E-102.B	(2)
(3)	2E-102.B		25	26		2E-102.B ??? (20A) 2E-102.B ??? (20A) 2E-102.B ??? (20A)	(3)
	SPACE		27	28			
	SPACE		29	30			
	SPACE		31	32		SPACE	
	SPACE		33	34		SPACE	
	SPACE		35	36		SPACE	
	SPACE		37	38		SPACE	
	SPACE		39	40		SPACE	
	SPACE		41	42		SPACE	

ALL BREAKERS ARE 15A-1P (OTHERWISE EXCEPTIONS NOTED)

(1): EXISTING BREAKER TO KEEP.
(2): EXISTING BREAKER NOW SPARE (UNLOADED).
(3): EXISTING BREAKER TO REMOVE.

NEW IDENTIFICATION

LOCAL 2E-102.A — ME

(0)2-01-L2NXX — NORMAL

	Description	Disj	Cir #	Cir #	Disj	Description	
	2E-102.B,2E-102.A		1	2		PIL RACK (2E-102.B)	(1) (2)
	2E-102.B,2E-102.A		3	4		NETWORK RACK (2E-102.B)	(1) (2)
(2) (1)	FLATSAT ASSEMBLY (2E-102.B)		5	6		WORKPLACE (2E-102.B)	(1) (2)
(2) (1)	WORKPLACE (2E-102.B)		7	8		DASCO (2E-102.B)	(1) (2)
	SPARE		9	10		2E-102.A	
	SPARE		11	12		2E-102.A	
	SPARE		13	14		SPARE	
	2E-102.A		15	16		2E-102.A	
(2) (1)	PUR RACK (2E-102.B)	30	17	18	30	GCDS/RF RACK (2E-102.B)	(1) (2)
(2) (1)	DAQ RACK (2E-102.B)	30	19	20		SPARE	
	2E-102.B		21	22		2E-102.B	
	SPARE		23	24		SPARE	
(1)	BSS RACK (2E-102.B)	50 3P	25	26	50 3P	SAS RACK (2E-102.B)	(1)
			27	28			
			29	30			
	SPACE		31	32		SPACE	
	SPACE		33	34		SPACE	
	SPACE		35	36		SPACE	
	SPACE		37	38		SPACE	
	SPACE		39	40		SPACE	
	SPACE		41	42		SPACE	

ALL BREAKERS ARE 15A-1P (OTHERWISE EXCEPTIONS NOTED)

(1): SUPPLY AND INSTALL A NEW BREAKER OF TYPE AND CALIBER AS INDICATED (SEE SHEETS E201 AND E502).
(2): SINGLE–POLE "G.F.I." BREAKER.

- THIS DRAWING CAN ONLY BE USED FOR ESTIMATION PURPOSES IF IT IS SEALED, SIGNED BY AN ENGINEER AND ISSUED FOR TENDER.
- THIS DRAWING CAN ONLY BE USED FOR CONSTRUCTION IF IT IS SEALED, SIGNED BY AN ENGINEER AND ISSUED FOR CONSTRUCTION.

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seal | seal

INGÉNIEUR • ENGINEER Mohamed-Amine Boukhriss 147019 QUÉBEC

2019-11-05

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Courriel: info@rochonexperts.com

client:
CANADIAN SPACE AGENCY
AGENCE SPATIALE CANADIENNE

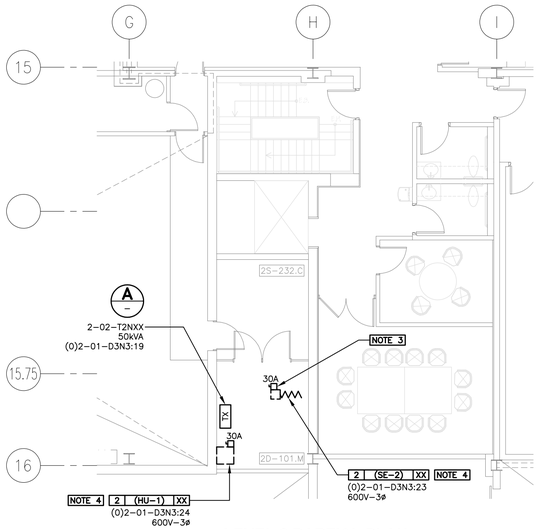
project:
«FLATSAT-FACILITY» INSTALLATION
PROJECT RCM
ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

drawing:
ELECTRICAL DISTRIBUTION
ELECTRICAL PANELS

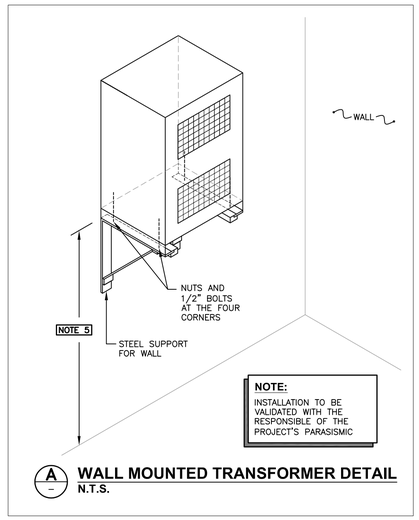
scale: N.T.S.	date: SEPTEMBER 2019
drawn by: CARL BLANCHARD	#project: 19–008–A
prepared by: AMINE BOUKHRISS, Eng.	#sheet: E202

CSA PROJECT NUMBER: P–00019

Format d'impression: Métrique ISO A1 (841 x 594mm)



LEVEL 2 PARTIAL PLAN



A – **WALL MOUNTED TRANSFORMER DETAIL**
N.T.S.

NOTES:

1– UNLESS OTHERWISE INDICATED, ALL THE INDICATED WIRING IS COPPER.

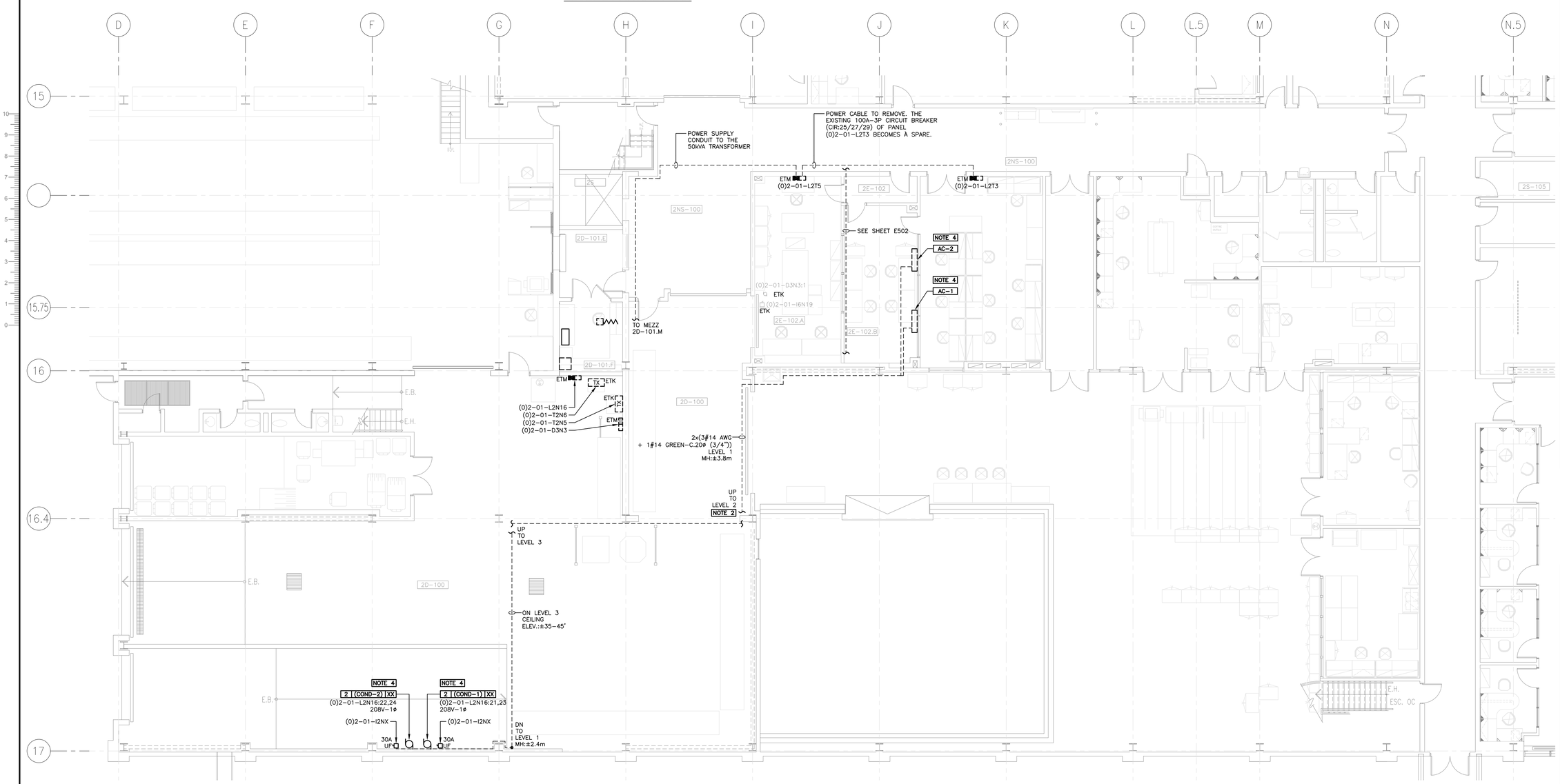
2– THE ELECTRICAL CONTRACTOR MUST COORDINATE WITH THE MECHANICAL CONTRACTOR THE FOLLOWING:
- CONDUITS AND WIRING MUST FOLLOW THE SAME PATH THAN THE REFRIGERATION PIPES (REFER TO MECHANICAL DRAWINGS);
- APPROXIMATE LENGTH OF 63m (205').

3– THE DISCONNECT IS SUPPLIED BY THE MECHANICAL CONTRACTOR; INSTALLED AND CONNECTED BY THE ELECTRICAL CONTRACTOR.

4– THE EXACT LOCATION IS TO BE COORDINATED WITH THE MECHANICAL DRAWINGS.

5– THE HEIGHT IS TO BE COORDINATED ON SITE IN ACCORDANCE WITH THE EXISTING LAYOUT OF THE OTHER EQUIPMENTS (MIN.84"/2150).

6– ALL EQUIPMENT MUST BE RE-IDENTIFIED ACCORDING TO THE NEW NOMENCLATURE (TO BE COORDINATED WITH THE MINISTERIAL REPRESENTATIVE).



LEVEL 1 PARTIAL PLAN

CSA PROJECT NUMBER: P-00019

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Agence spatiale canadienne / Canadian Space Agency

seal

seal
Mohamed-Amine Boukhriss
147019
2019-11-05

ROCHON EXPERTS-CONSEILS INC.
INGENIERIE MÉCANIQUE & ÉLECTRICITÉ
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client:
CANADIAN SPACE AGENCY
AGENCE SPATIALE CANADIENNE

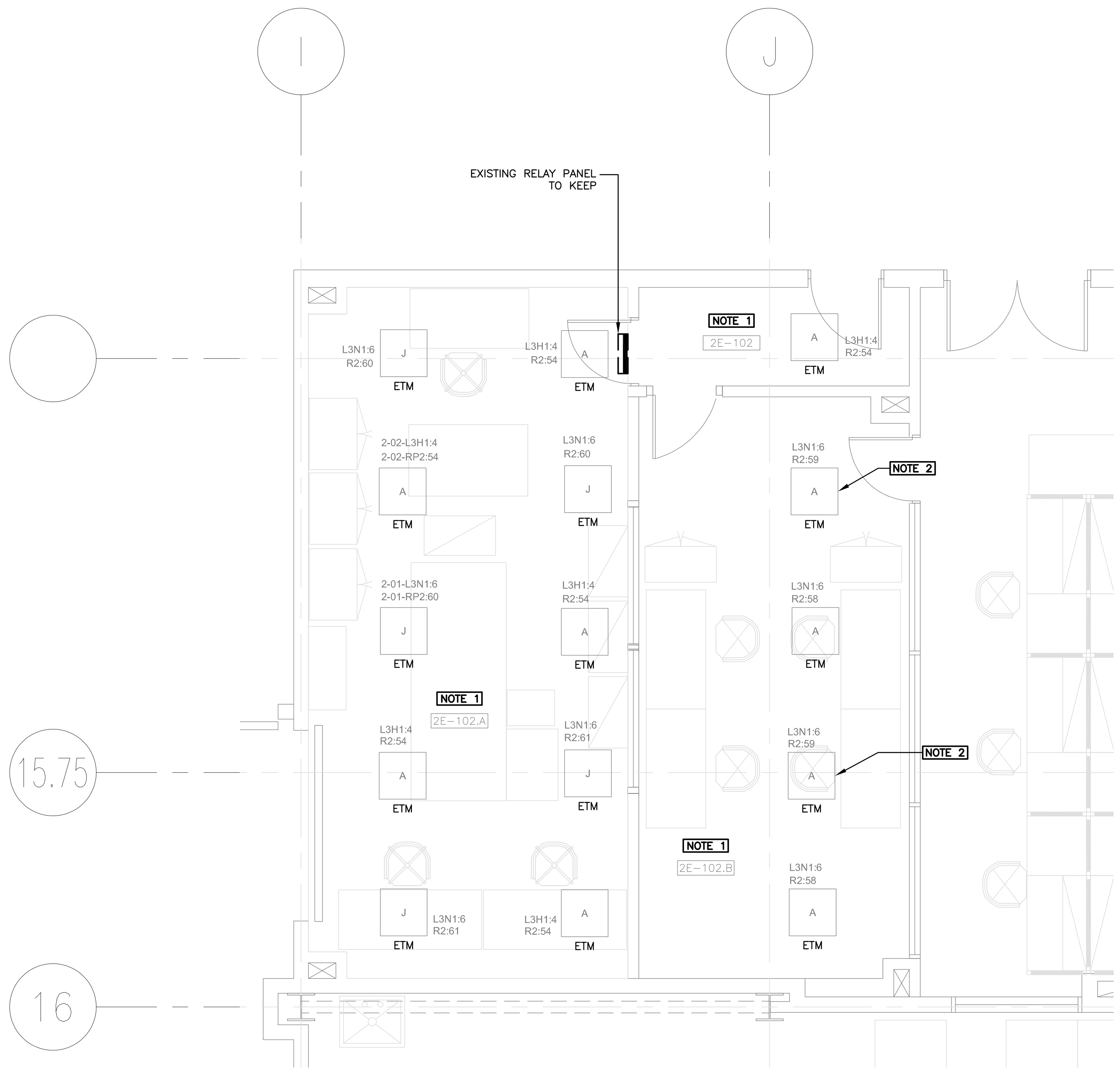
project:
«FLATSAT-FACILITY» INSTALLATION
PROJECT RCM
ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

drawing:
ELECTRICAL
NEW

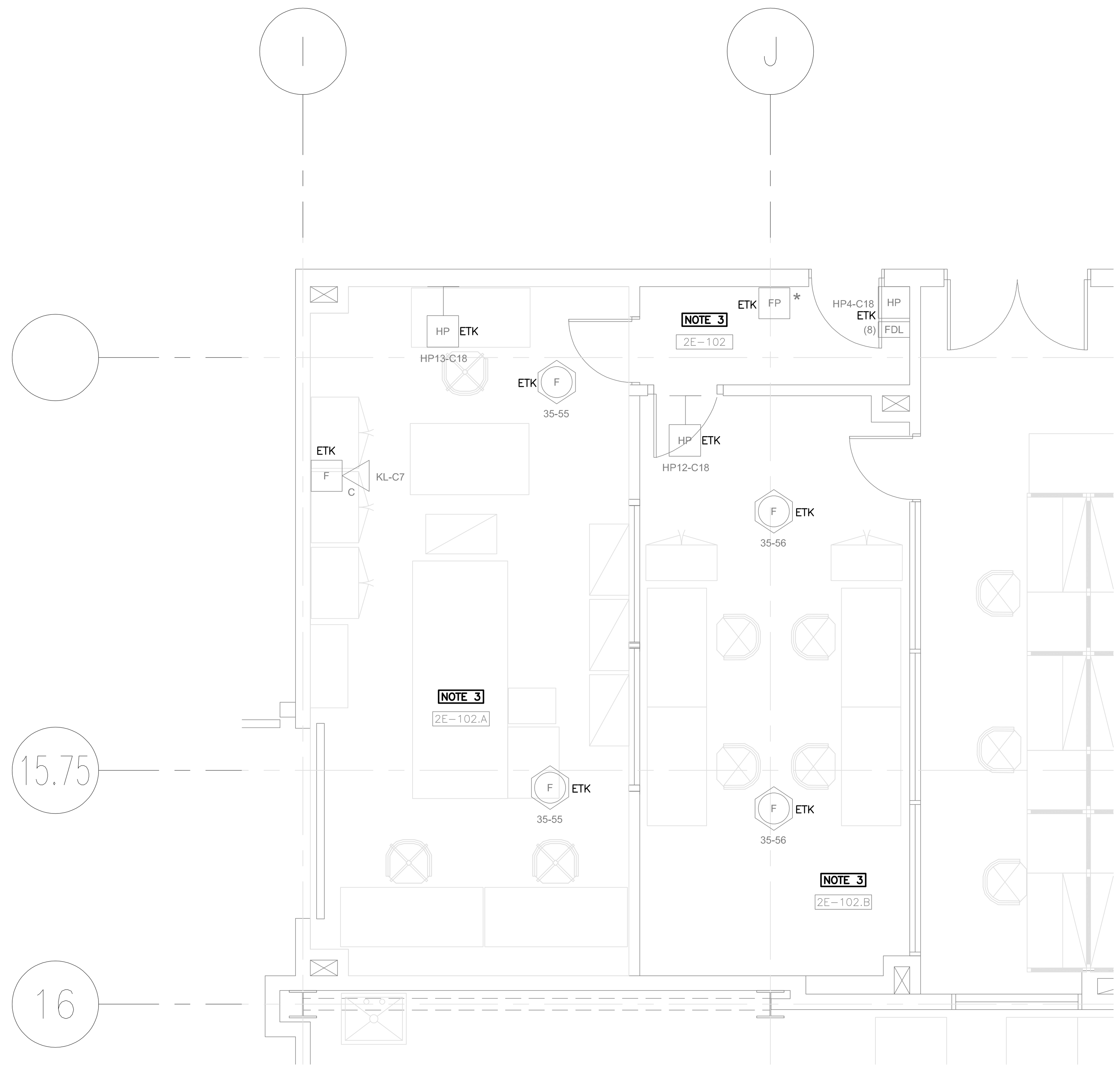
scale: 1:100	date: SEPTEMBER 2019
drawn by: CARL BLANCHARD	project: 19-008-A
prepared by: AMINE BOUKHRISS, Eng.	sheet: **E501**

FICHIER: Z:\1-Projet\2019\19-008 (Agence spatiale canadienne)\1-19-008-A (ASC - RCM flatsat - Étude d'avant-projet)\ELECTRICITÉ\Anglais\19008A501_ENG_ELEC.dwg
DATE D'IMPRESSION: 2019-11-05 - PAR: Carl Blanchard

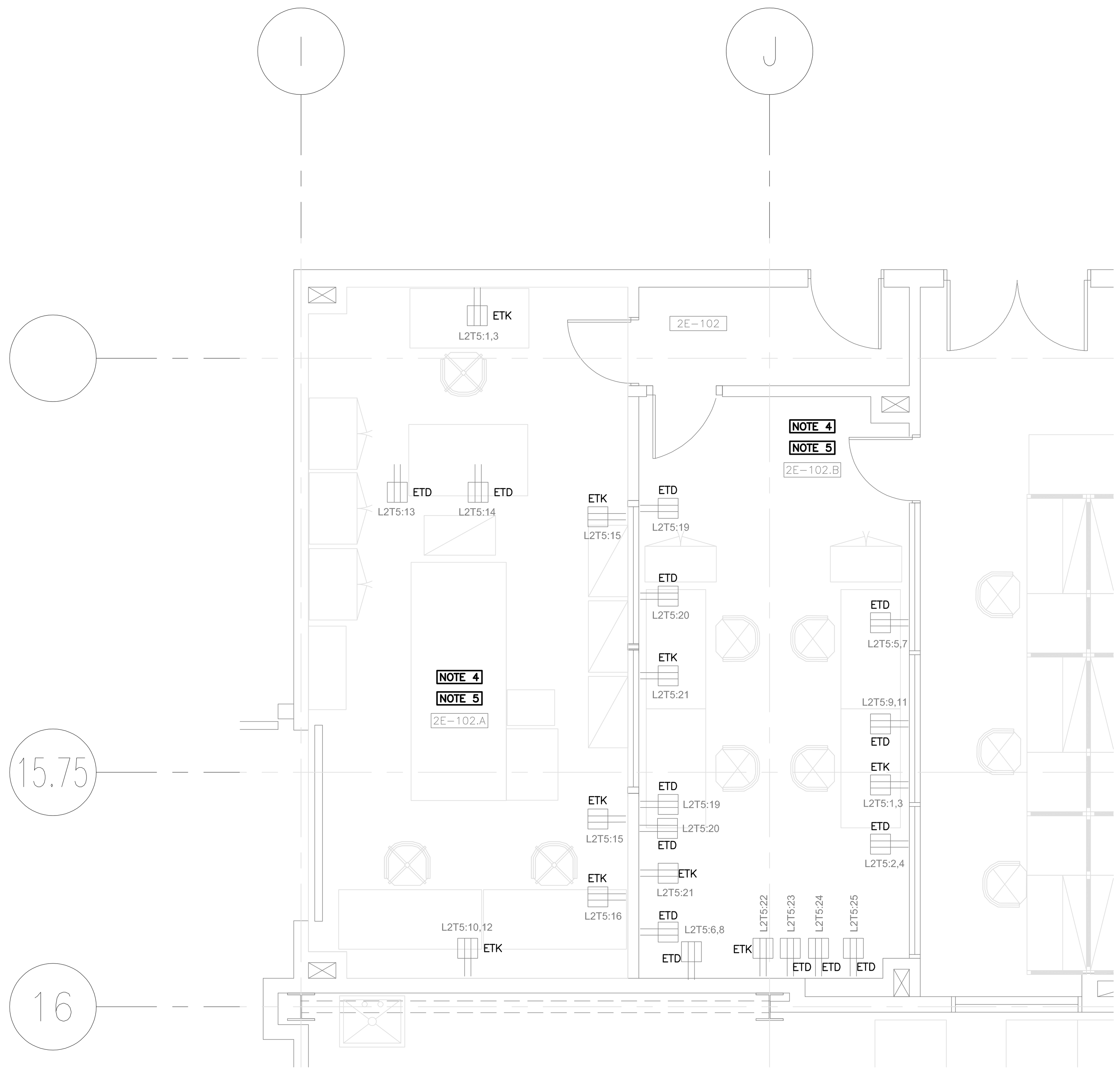
Format d'impression: Métrique ISO A1 (841 x 594mm)



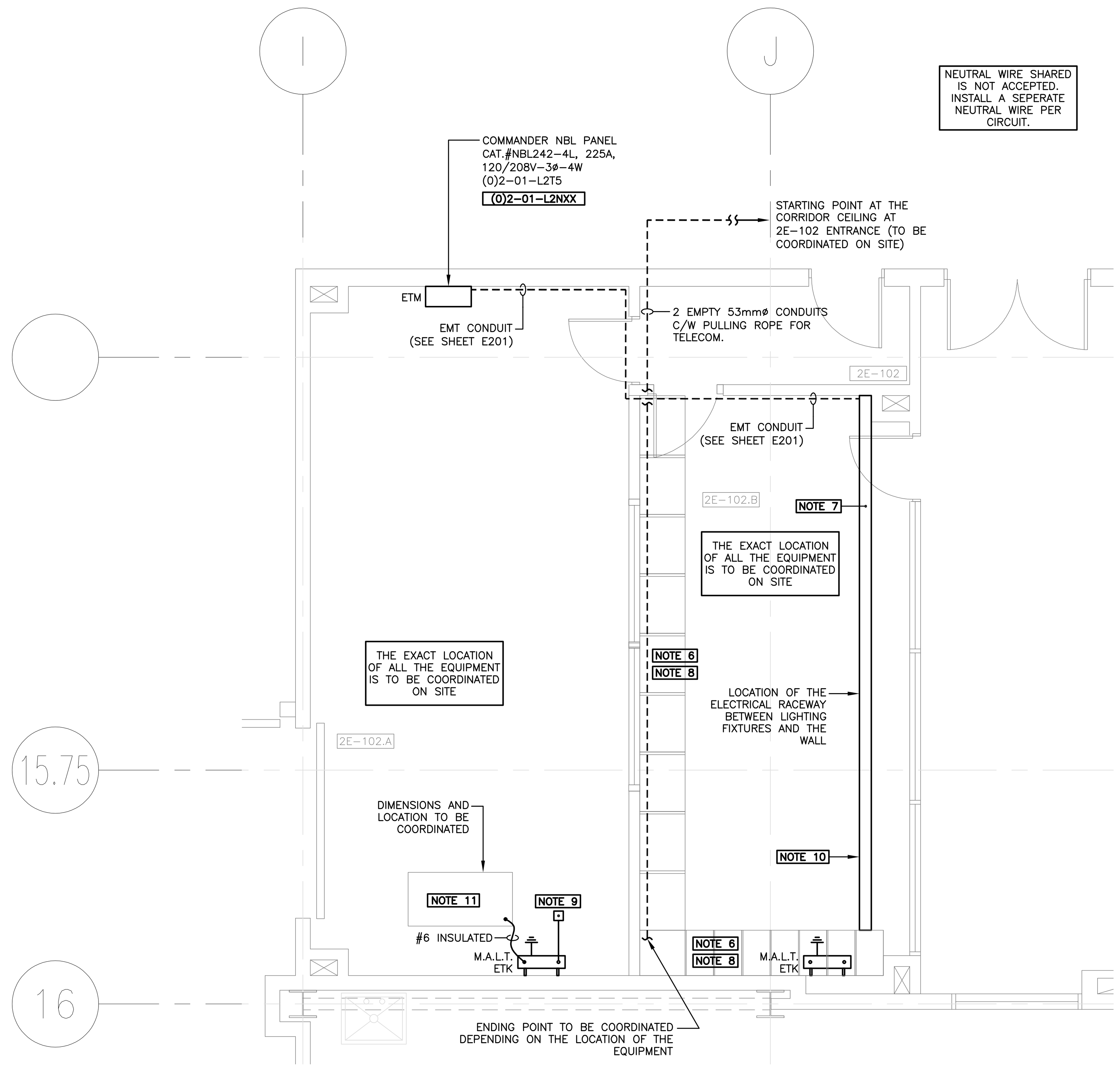
LIGHTING



FIRE ALARM



SERVICES



DISTRIBUTION

NOTES:

1– IN THIS ROOM, EXISTING LIGHTING FIXTURES ARE TO BE REPLACED BY NEW DIMMABLE 2x2 LED FIXTURES (DAY–BRITE/CFI LED KTR 100 #K12260L835F6AP3–347V). THE CONTROL SWITCHES ARE TO KEEP.

2– LIGHTING FIXTURE TO CONNECT TO THE EMERGENCY (2–02–L3H1)/(2–02–RP2). THE CONNECTION OF THE OTHER EXISTING FIXTURES IS TO BE KEPT AS IT IS.

3– IN THIS ROOM, ALL EXISTING FIRE ALARM DEVICES ARE TO KEEP.

4– IN THIS ROOM, THE OUTLETS/RECEPTACLES TO BE MODIFIED MUST BE RE–IDENTIFIED. THE CONTRACTOR MUST DISMANTLE THE WIRING AND RECEPTACLES SHOWN TO BE REMOVED. SEAL THE OPENINGS WITH STAINLESS STEEL WALL PLATES.

5– IN THIS ROOM, THE EXISTING DATA/TELEPHONE OUTLETS ARE TO KEEP.

6– EXISTING CABLE TRAY TO BE WIRED TO THE GROUNDING BAR OF THE SAME ROOM (#6–INSULATED).

7– RACEWAY (WIREMOLD), SUCH AS "LEGRAND" SERIES G6000, TO INSTALL AT THE ROOM'S CEILING TO BRING THE POWER CABLES TO THE EQUIPMENTS, C/W THE SPECIFIED OUTLETS (SEE THE TABLE OF COMPONENTS):
– 6 x 15A (CSA 5–15R);
– 3 x 30A (CSA L5–30R);
– 2 x 60A–3ø "PIN & SLEEVE" TYPE, #HBL560R9W/#HBL560P9W.

8– EXISTING CABLE TRAY TO KEEP.

9– THE ANTISTATIC FLOOR GROUND IS TO BE CONNECTED TO THE EXISTING GROUNDING BAR.

10– THE DISPOSITION OF THE OUTLETS INSTALLED ON THE RACEWAY IS TO BE COORDINATED WITH THE MINISTERIAL REPRESENTATIVE ON SITE ACCORDING TO THE ROOM'S FINAL LAYOUT.

11– TABLE TO BE EQUIPPED WITH A "ESD" GROUNDING PROTECTION SYSTEM C/W:
– BARS ET CONNECTORS;
– #6 INSULATED WIRES;
– OPERATOR BRACELET "WRIST STRAP";
– SUPERVISION MONITOR;
– CONNECTION CABLE AND POWER ADAPTOR.

SUCH AS DESCO "SCS 773" OR EQUIVALENT C/W ACCESSORIES. THESE EQUIPMENTS MUST BE CSA/ULC CERTIFIED (REFER TO SPECIFICATIONS).

12– ALL EQUIPMENT MUST BE RE–IDENTIFIED ACCORDING TO THE NEW NOMENCLATURE (TO BE COORDINATED WITH THE MINISTERIAL REPRESENTATIVE).

13– THE ELECTRICAL CONTRACTOR MUST INSTALL THE GROUNDING FOR ALL THE COMPONENTS (RACK).

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0	04–11–2019	TENDER

collaboration

Agence spatiale canadienne — Canadian Space Agency

seal — seal: Mohamed-Amine Boukhriss 147019 QUÉBEC 2019-11-05

TABLE 2 POWER CHARACTERISTICS OF FLATSAT COMPONENTS

EQUIPEMENT	INPUT VOLTAGE	PHASE	FREQUENCY	CURRENT	RECEPTACLE	GROUND POINTS	RECEPTACLE TO INSTALL ON RACEWAY
FLATSAT ASSEMBLY	120 VAC	SINGLE	60 Hz	15A	NEMA 5–15P	EARTH /TABLE	CSA 5–15R
BSS RACK	208 VAC	3–PHASE	50/60 Hz	35A	IEC60309 560P9W INLET: 999–6359 (MATE 999–3188)	RACK	HBL560R9W HBL560P9W
SAS RACK	208 VAC	3–PHASE	50/60 Hz	50A SERVICE. NOMINAL 34A (MAX 40A) CURRENT DRAW PER PHASE	IEC60309 560P9W INLET: 999–6359 (MATE 999–3188)	RACK	HBL560R9W HBL560P9W
PIL RACK	100–240 VAC	SINGLE	50/60 Hz	10A/5A	NEMA 5–15P	RACK	CSA 5–15R
PUR RACK	120 VAC	SINGLE	50/60 Hz	30A	NEMA L5–30P	EARTH /RACK	CSA L5–30R
GCDS/RF RACK	120 VAC	SINGLE	50/60 Hz	30A	NEMA L5–30P	RACK	CSA L5–30R
DAQ RACK	125 VAC	SINGLE	50/60 Hz	30A	NEMA L5–30P	RACK	CSA L5–30R
POSTES TRAVAIL (x2)	120 VAC	SINGLE	50/60 Hz	15A	NEMA 5–15P	TBD	CSA 5–15R
DASCO	120 VAC	SINGLE	50/60 Hz	15A	NEMA 5–15P	RACK	CSA 5–15R
NETWORK RACK	120 VAC	SINGLE	50/60 Hz	TBD	NEMA 5–15P	TO PROVIDE	CSA 5–15R

CSA PROJECT NUMBER: P–00019

ROCHON EXPERTS-CONSEILS INC.
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client:
CANADIAN SPACE AGENCY
AGENCE SPATIALE CANADIENNE

project:
«FLATSAT-FACILITY» INSTALLATION PROJECT RCM ROOM 2E-102.A
6767, route de l'Aéroport, Saint-Hubert, QC

drawing:
ELECTRICAL LEVEL 1 ROOMS 2E-102, 2E-102.A AND 2E-102.B

scale:	date:
1:50	SEPTEMBER 2019
drawn by: CARL BLANCHARD	#project: 19–008–A
prepared by: AMINE BOUKHRISS, Eng.	#sheet: E502

Format d'impression: Métrique ISO A1 (841 x 594mm)

APPENDIX “E”

Performance Evaluation Report

PERFORMANCE EVALUATION REPORT
Upon fulfillment of a contract, this questionnaire must be completed by the responsible project authority/ technical authority for all service contracts (excluding temporary help service contracts), construction contracts and engineering consulting contracts with **CSA** and sent to the contract agent responsible.

Name of contractor:	Contract completion date:
Name of project authority/technical authority:	Branch:
Contract no.:	Project name:

***Supplier**			
Rating scale:	10 – 9: Excellent 8 – 7: Very Good	6 – 5: Satisfactory 4 – 3: Poor	2 – 1: Unsatisfactory

1. Did the supplier provide consultants with the education, accreditation and experience indicated in the contract?	10 9 8 7 6 5 4 3 2 1 Comments:
2. Please rate the overall quality of the services provided by this supplier.	10 9 8 7 6 5 4 3 2 1 Comments:
3. Please rate the responsiveness of the supplier with regard to information requests or problems that may have arisen in the course of the contract, and the supplier's ability to meet deadlines.	10 9 8 7 6 5 4 3 2 1 Comments:
4. Was the work performed in accordance with the requirements specified in the statement of work?	10 9 8 7 6 5 4 3 2 1 Comments:

5. Please rate the quality of communication between the department and the supplier.	10 9 8 7 6 5 4 3 2 1 Comments:
6. Were all administrative documents received in accordance with the requirements of the contract? Administrative documents can include but are not limited to: a. Invoices b. Progress reports c. Reports on use or business volume d. Meeting agendas and minutes e. Documentation and quality of work	10 9 8 7 6 5 4 3 2 1 Comments:
TOTAL	**/60**

Overall Rating

Excellent: 54 and over
Very Good: 42 to 53
Satisfactory: 30 to 41
Poor: 18 to 29
Unsatisfactory: 18 or less

APPENDIX F

INTEGRITY FORM

To be included with certifications
(Section III : Certifications):

Dénomination complète de l'entreprise / Complete Legal Name of Company	
Adresse de l'entreprise / Company's address	
NEA de l'entreprise / Company's PBN number	
Numéro de l'appel d'offre / Request for proposal's number	
Membres du conseil d'administration (Utilisez le format – Prénom, Nom **Board of Directors** (Use format – First name, Last name	
1. Membre / Director	
2. Membre / Director	
3. Membre / Director	
4. Membre / Director	
5. Membre / Director	
6. Membre / Director	
7. Membre / Director	
8. Membre / Director	
9. Membre / Director	
10. Membre / Director	
Autres Membres / Other members:	
Commentaires / Comments	