



Halifax
Regional Centre for Education

Purchasing Division

RFT #4070

Fine Arts Lab-Cole Harbour District High

Addendum #2

July 24th, 2020
01:00 P.M.

To: Bidders

From: Nancy Rideout, Manager,
Accounting and Purchasing

Pages: 4 including cover

Phone: 464-2000(ext. 2222)

The bid documents shall be amended and new drawings and clauses added, and shall become part of the contract documents as follows:

1. GENERAL:

- 1. New tender closing date to be Tuesday, July 28th, 2020**

2. Specification:

1. Reference section 01 35 13 APPENDIX A – SPECIAL PROJECT PROCEDURES

1. Reference sub section 10 “Contaminate Controls:

- i. This project requires Contaminant Controls 1 as described in item 10.1

2. Reference section 02 41 16 Demolition

Delete all reference to Hazardous Materials Report

3. Reference section 09 13 00 Paragraph 2.1.1

Item 1

Add

CGC-DX/DXL Intermediate Duty Fire-Rate

Item 2

Reference section 09 51 10 Paragraph 2.1.9

Delete- Radar- CIRBUS

Add

CGC Radar #2210- 2"x2' Fire Code

Armstrong Fissured #896 – 2'x2' Fire Guard

4. Reference section 21 13 13 Sprinkler Systems:

1. Reference sentence 3.1.9
 - i. Rm 3 "future mechanical room" shown on drawing A101 is not to be included as a "mechanical room" in this sentence.

3. DRAWINGS:

1. Reference Drawing A101:

1. Coat hooks noted in Room 4 "Laundry and Storage" are to be provided in this contract. Provide 10 hooks as well as 5' long shelf. See 1/A130 for shelf detail.
 2. Washer/dryer, Trolleys, and teaching station are provided by owner and not part of this contract. Washer and dryer to be installed by this contract.
2. Delete Drawing MC-601
 3. Add Drawing MC601-R1 (see attached)

4. Reference Drawing EP601, Detail 2:

1. Structured wiring cabling shall be Category 6, FT-6 rated. Acceptable manufacturers shall be:
 1. Commscope with a **25 year warranty on parts and labour.**
 2. Panduit Pan-Net with a **25 year warranty on parts and labour.**
 3. Hubbell Premise Wiring with a **25 year warranty on parts and labour.**
 4. Leviton with a **25 year warranty on parts and labour.**

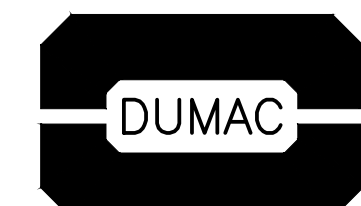
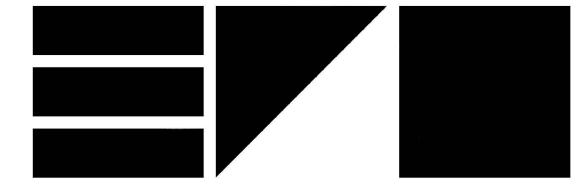
Attachments: Drawing MC601-R1

End of Addendum #2

PLEASE SIGN BELOW AND RETURN WITH BID DOCUMENTS:

Signature

Company Name



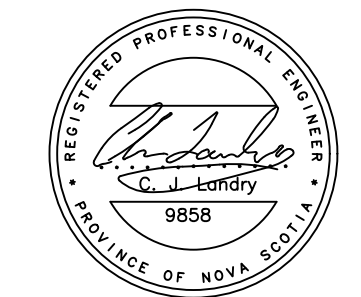
DUMAC ENERGY LTD.
 CONSULTING ENGINEERS
 752 BEDFORD HIGHWAY
 HALIFAX, N.S.

GENERAL NOTES

THIS DRAWING IS THE PROPERTY OF SP DUMARESQ ARCHITECT LTD. AND MAY NOT BE USED OR REPRODUCED WITHOUT EXPRESSED WRITTEN APPROVAL. THE CONTRACTOR SHALL VERIFY ALL LEVELS AND DIMENSIONS ON SITE AND REPORT ALL DISCREPANCIES TO THE ARCHITECT BEFORE BEGINNING WORK. DO NOT SCALE DRAWING. USE FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CHANGES MADE TO THE DRAWINGS WITHOUT THE ARCHITECT'S APPROVAL. READ THIS DRAWING IN CONJUNCTION WITH CONTRACT DRAWINGS AND SPECIFICATIONS.

IF DIMENSION DOES NOT MEASURE 1" DRAWINGS IS NOTE PRINTED TO SCALE

DATE	#	ISSUE
2020.07.23	2	ISSUED FOR ADDENDUM
2020.06.08	1	ISSUED FOR TENDER



SCALE: AS INDICATED

DRAWN BY: STAFF

REVIEWED BY: STAFF

DATE: 2020.06.08

PROJECT TITLE

COLE HARBOUR ARTS LAB

Project Number

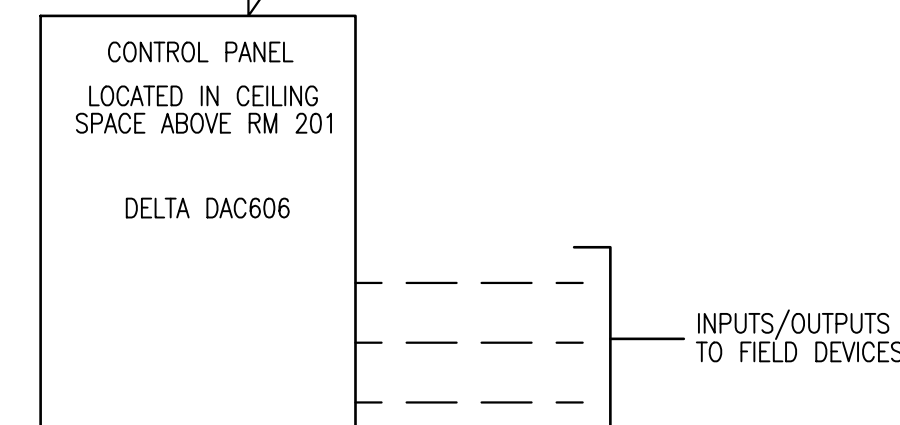
SHEET TITLE

MECHANICAL CONTROLS

MC601-R1

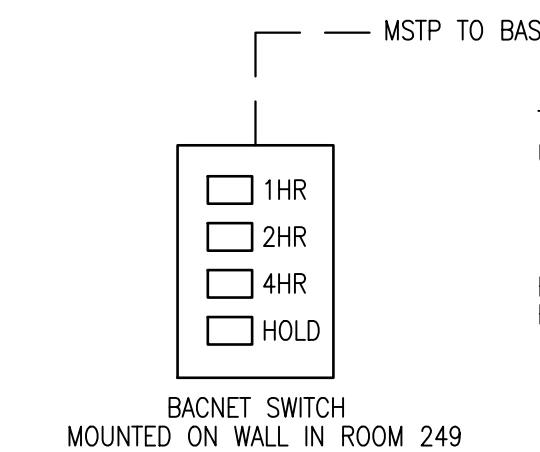
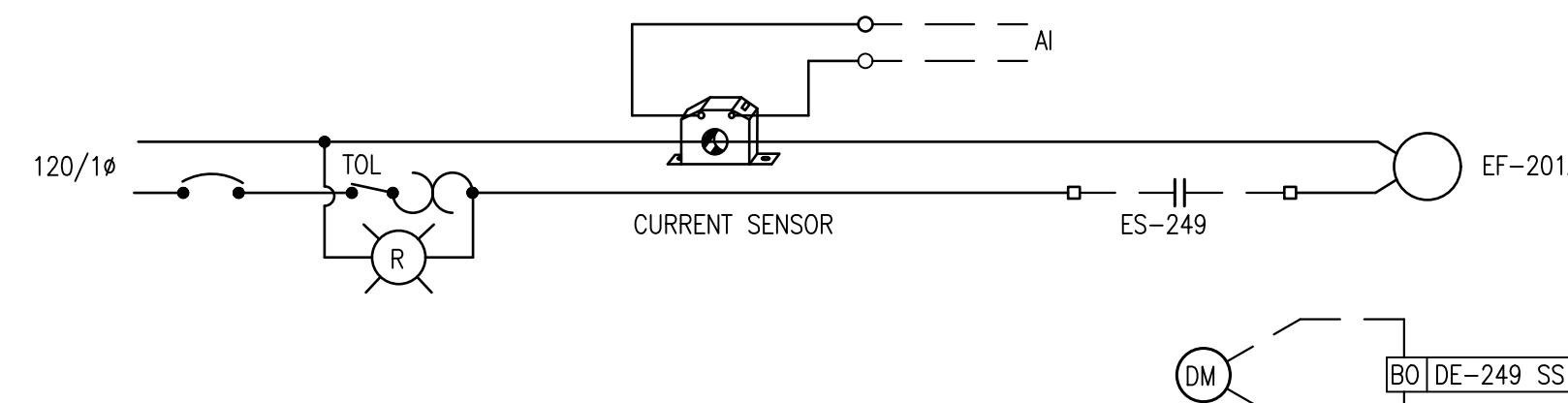
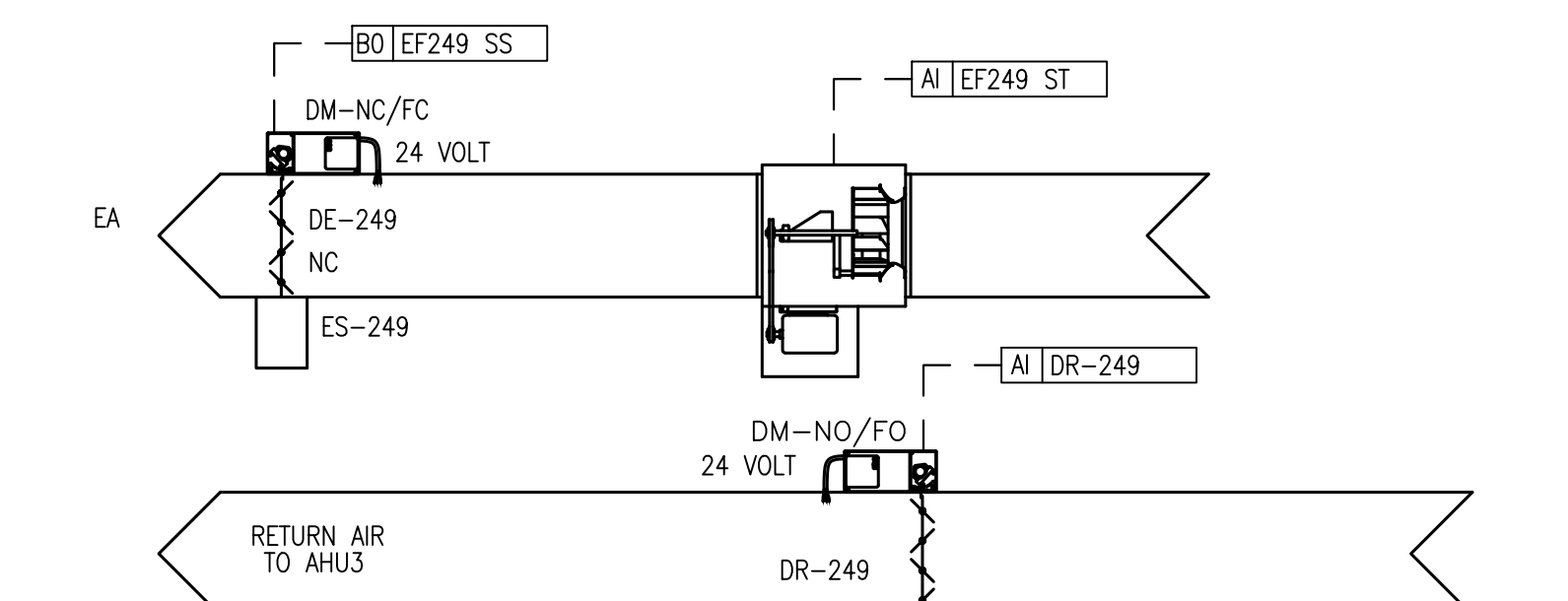
CONTROLS ARE AN EXPANSION OF THE EXISTING DELTA BACNET BUILDING AUTOMATION SYSTEM
 WIRING METHODS, LABELING AND SYSTEM GRAPHICS TO BE AS PER THE STANDARD OF THE EXISTING SYSTEM
 ACCEPTABLE INSTALLER: CONTROLS AND EQUIPMENT LTD.

BACNET MSTP FROM OTHER DEVICES ——— BACNET MSTP TO OTHER DEVICES



3 ART ROOM 249 VENTILATION CONTROLS

MC601 NTS



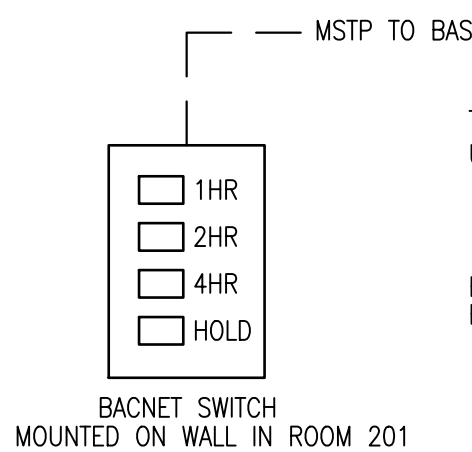
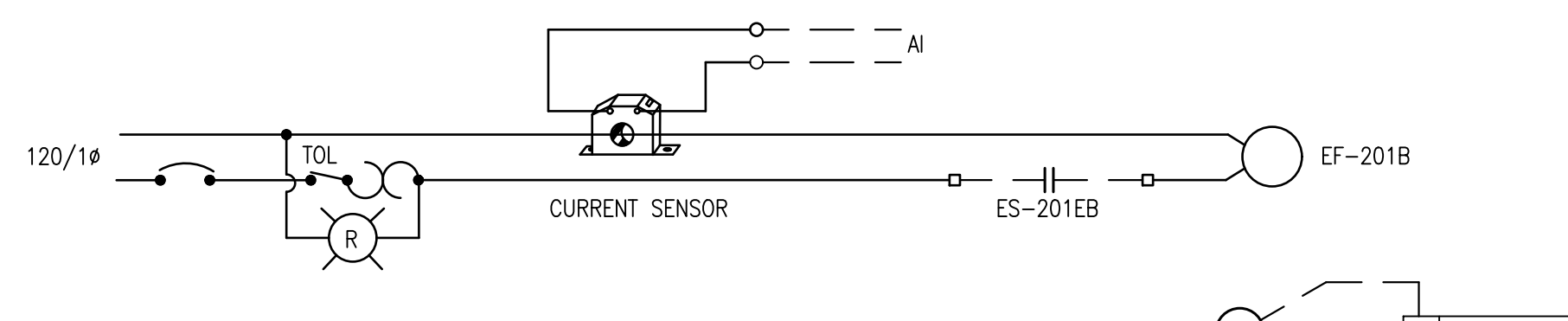
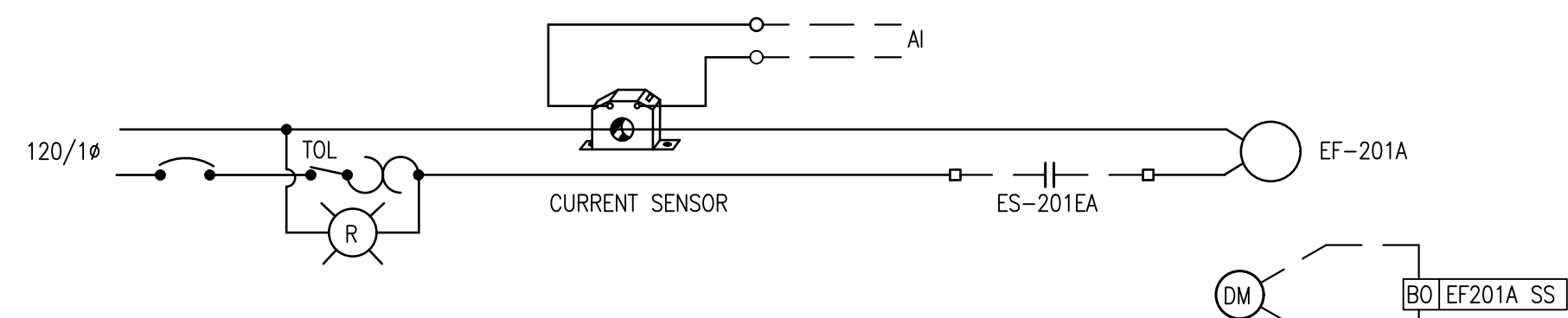
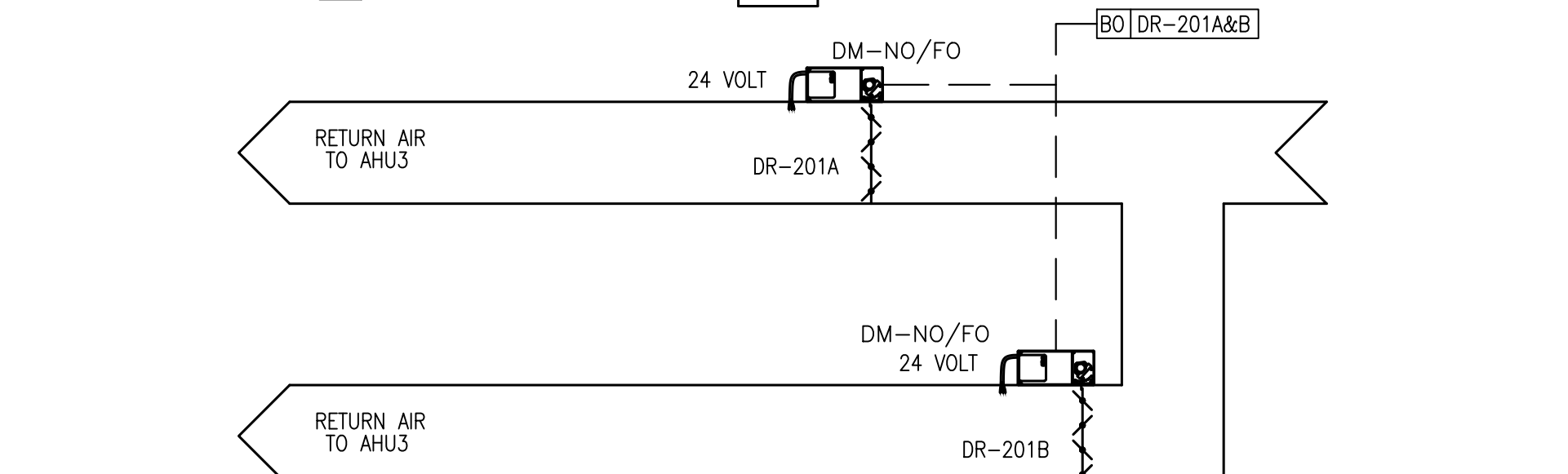
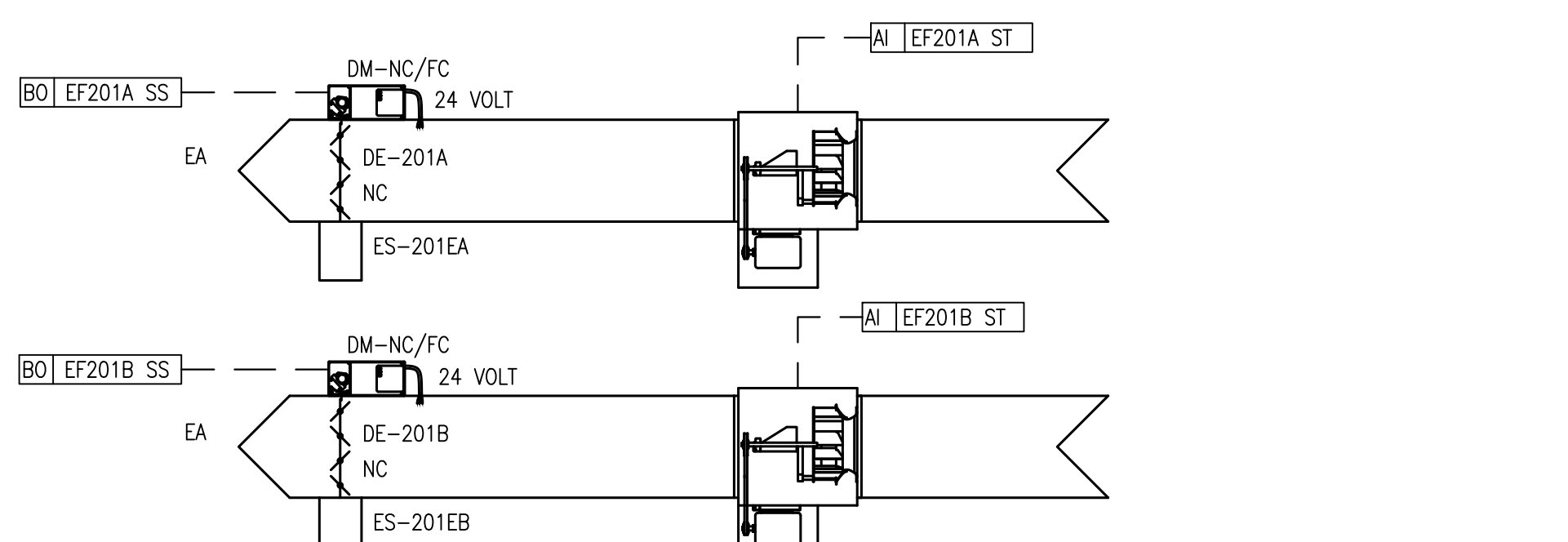
SEQUENCE OF OPERATION

UPON A CALL FOR EXHAUST MODE FROM BACNET SWITCH
 EXHAUST FAN DAMPER MOTOR IS POWERED OPEN
 RETURN DUCT DAMPER MOTOR IS POWERED CLOSED
 WHEN EXHAUST FAN END SWITCH MAKES, EXHAUST FANS START
 BAS ALARM IS GENERATED IF FANS DO NOT START OR CURRENT IS ABNORMAL
 BAS ALARM IS GENERATED IF FANS RUN FOR MORE THAN 2HRS AFTER HOURS.

2 ART ROOM 249 VENTILATION CONTROLS

MC601 NTS

————— WIRING BY ELECTRICAL CONTRACTOR
 - - - - - WIRING BY MECHANICAL CONTRACTOR



SEQUENCE OF OPERATION

UPON A CALL FOR EXHAUST MODE FROM BACNET SWITCH
 EXHAUST FAN DAMPER MOTORS ARE POWERED OPEN
 RETURN DUCT DAMPER MOTORS ARE POWERED CLOSED
 WHEN EXHAUST FAN END SWITCHES MAKE, EXHAUST FANS START
 BAS ALARM IS GENERATED IF FANS DO NOT START OR CURRENT IS ABNORMAL
 BAS ALARM IS GENERATED IF FANS RUN FOR MORE THAN 2HRS AFTER HOURS.

1 ART ROOM 201 VENTILATION CONTROLS

MC601 NTS



Halifax
Regional Centre for Education

Purchasing Division

RFT #4070

Fine Arts Lab-Cole Harbour District High

Addendum #1

July 22nd, 2020
06:30 P.M.

To: Bidders

From: Nancy Rideout, Manager,
Accounting and Purchasing

Pages: 1 including cover

Phone: 464-2000(ext. 2222)

The bid documents shall be amended and new drawings and clauses added, and shall become part of the contract documents as follows:

1. DRAWINGS:

1. Reference drawing A101

1. Whiteboards to be facings of steel sheet. Porcelain enamel finish for dry, erasable markers and chalk. Suitable for use as a projection screen. Unaffected by solvents and reagents, white in colour. C/w trim. Equal to delta series, no. 20 with map rail, map hooks, and chalk rail complete with end castings. Standard of acceptance: vit-rite "rite on wipeoff", delta duro, canadian blackboard 2000 series.
2. Half wall to be of stainless-steel construction with 5/8" Type X abuse resistant gypsum wall board on both sides. Cap with Baltic birch plywood as detailed on 2/A130.
3. Provide two 4"x4"x3/8" steel lintels to support concrete block concrete block is removed.
 - i. On exterior walls all lintels to be galvanized. Provide 3rd lintel to support brick and provide through wall flashing with Blueskin waterproof self adhering membrane.

2. Reference Drawing M-101

1. Provide firestop flaps and blankets for all new ceiling mounted diffusers and grilles.
2. Sprinkler contractor to replace sprinkler heads in zones on level 1 where ceilings are being modified. Allow for 15 heads.

2. CLARIFICATION

1. Reference drawing A100

1. Core drilling, cutting and patching is noted in demolition note #4.

Hatch patterns shown for core drilling, cutting and patching, etc are diagrammatic only. The actual sizes of holes and cuts are to be coordinated with the services that required the penetration.

End of Addendum #1

PLEASE SIGN BELOW AND RETURN WITH BID DOCUMENTS:

Signature

Company Name



Halifax
Regional Centre for Education

TENDER #4070

Fine Arts Lab Cole Harbour District High

Closing Date: MONDAY, JULY 27TH, 2020
Closing/Opening Time: 2:00 P.M. (Atlantic Daylight Time)

Closing Location: Halifax Regional Centre for Education
Substantial Performance Date: September 3rd, 2020
Submissions via Email Only

HRCE Contact: Don Walpola, Buyer
Tel: (902) 464-2000 #2223
Fax: (902) 464-0161
Email: dwalpola@hrce.ca

School Location: Cole Harbour District High
2 Chameau Cres
Dartmouth
B2W 4X4

Operations Contact: Mark Cottell, Supervisor, Maintenance
Tel: (902) 464-2000 #2195
Email: mcottell@hrce.ca

A mandatory tenderers' site meeting is scheduled for **THURSDAY JULY 16th 2020 at 09:00 a.m., COLE HARBOUR DISTRICT HIGH** – Please meet at the front entrance of the school. Social distancing guidelines will be followed.

Proposals Submissions to be made Electronically to: dwalpola@hrce.ca

To obtain documents:
Download tender documents in .pdf format from the HRCE's Website:
<http://www.hrce.ca/about-hrce/financial-services/purchasing/tenders/tender-listing>

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SECTION 00 00 15 - DESCRIPTION OF WORK & LIST OF DRAWINGS

1. General

- 1.1 The work of this contract includes the provision of all materials, labour and equipment necessary to complete the **Fine Arts Lab at Cole Harbour District High**, as noted on the drawings and specifications prepared by **S.P. Dumaresq Architect Limited**. HRCE reserves the right to award the contract to one or more contractors who bid on this tender. HRCE reserves the right to accept bids on any or all of the phases of this work.
- 1.2 It is the HRCE's intent to have all work completed, to point of Substantial Performance, prior to **September 3rd, 2020**. It is expected that an early award of this contract will enable the Contractor to facilitate shop drawing review and ordering of materials to allow commencement of work immediately following award of tender.
- 1.3 The whole of the work shall agree in all particulars with the levels, measurements and details contained in the drawings accompanying this specification and with such other drawings or information as may from time to time be supplied by the HRCE, or may be supplied by the Contractor and reviewed by the HRCE.

2. List Of Drawings

<u>Drawing NO.</u>	<u>Drawing Title</u>
A100	EXISTING & DEMOLITION PLANS
A101	PROPOSED PLANS
A110	ELEVATIONS
A120	SECTIONS
A130	DETAILS
P- 101	FLOOR PLAN PLUMBING
M-101	FLOOR PLAN AIR DISTRIBUTION AND SPRINKLERS
MV601	SCHEDULES & DETAILS AIR DISTRIBUTION
MC601	MECHANICAL CONTROLS
ED101	EXISTING FLOOR PLAN ELECTRICAL DEMOLITION
E- 101	ELECTRICAL KEY PLAN AND LEGEND
EL101	FLOOR PLAN LIGHTING
EP101	FLOOR PLAN POWER AND SYSTEMS
EP601	PANEL SCHEDULE AND RISER DIAGRAMS

END OF SECTION 00 00 15

SECTION 00 05 00 - LIST OF CONSULTANTS

Owner: HALIFAX REGIONAL CENTRE FOR EDUCATION
33 SPECTACLE LAKE DRIVE, DARTMOUTH NS

Consultant: Dean Dumaresq
S.P. Dumaresq Architect Limited
Phone: 902-421-1685
Email: dean@spda.ca

END OF SECTION 00 05 00

SECTION 00 21 13 – INFORMATION FOR TENDERERS

Invitation:

1. Bid Call

- 1.1.** The HALIFAX REGIONAL CENTRE FOR EDUCATION (HRCE) will receive offers in the form of a bid from Contractors which is signed and received on or before the date and time specified on the cover sheet of this document. The HRCE deems the correct time to be the time indicated on the email receipt date and time. The email address to submit submissions and amendments is dwalpola@hrce.ca. If the electronic submission is larger than 10mb, proponents have the option of sharing files from google drive to dwalpola@gnspecs.ca. If you encounter difficulties kindly contact the HRCE purchasing team for further clarification. Files should be submitted in Adobe (.pdf) format.
- 1.2.** Offers submitted after the closing time/date will not be considered.
- 1.3.** Proponents are to submit completed Bid documents via electronic mail. The electronic file should be named “**4070 Fine Arts Lab_Proponent Name**”.
- 1.4.** Bids will be opened at the time indicated on the cover sheet of this document. As of April 1, 2014 Public tender openings are no longer held for any tenders relating to goods, services or construction for HRCE. A list of tenderers and bid amounts will be posted on the Procurement Services website (<http://novascotia.ca/tenders/tenders/ns-tenders.aspx>) shortly following the closing of the tender. All bid submissions are subject to evaluation after opening and before award of contract. The winning tenderer and award amount will be posted on the Procurement Services website (<http://novascotia.ca/tenders/tenders/ns-tenders.aspx>) after award.
- 1.5.** In the light of COVID-19 and future pandemics, all vendors are required to follow the guidelines set in place by Nova Scotia Health Authority. Potential risks such as restricted accessibility to schools and buildings of the Halifax Regional Centre for Education (HRCE) , inability to complete work on a timely manner due to social distancing , disabled supply chains which will result in delivery delays of raw materials and finished goods, labour shortages and additional storage costs should be clearly communicated with the HRCE Personnel on a timely manner to ensure an amicable solution can be agreed between the HRCE and the vendor/contractor. The HRCE will not be liable for any direct or indirect loss incurred due to the pandemic.

- 1.6. Amendments to the submitted offer will be permitted if received via electronic mail in writing prior to bid closing and if endorsed by the same party or parties who signed and executed the offer.

- 1.7. Faxed Bid Submissions **will not** be accepted, nor will regular mail or hand delivery submissions since our physical offices are closed as of the date of this tender.

2. Intent

- 2.1.** The intent of this bid call is to obtain an offer to perform all work associated with **TENDER #4070, Fine Arts Lab**, at **Cole Harbour District High** for a Stipulated Price Contract in accordance with the Contract Documents.

3. Scope of work

- 3.1.** Refer to Section 00 00 15 – Description of Work and List of Drawings.

4. Availability

- 4.1.** Bid Documents can be obtained as per the directions on the cover sheet of this document.
- 4.2.** Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not confer a license or grant for other purposes.
- 4.3.** The HALIFAX REGIONAL CENTRE FOR EDUCATION is not responsible for accuracy of documents and project postings obtained from any other source.

5. Examination

- 5.1.** Bid Documents are on display at the offices of the Nova Scotia Construction Association (CANS), Halifax, NS.
- 5.2.** Upon receipt of Bid Documents verify that documents are complete; notify the HRCE's Buyer by email to dwalpola@hrce.ca, should the documents be incomplete, or upon finding discrepancies or omissions in the Bid Documents.
- 5.3.** Tenderers shall become fully aware of the content of all tender documents for the preparation of the Tenderer's offer.
- 5.4.** Tenderers will be deemed to have familiarized themselves with the existing site and working conditions and all other conditions which may affect the performance of the work. No plea of ignorance of such conditions as a result of failure to make all necessary examinations will be accepted as a basis for any claims for extra compensation or an extension of time.

6. Clarification and Addenda

- 6.1.** Notify Don Walpola, Buyer, by email to dwalpola@hrce.ca no less than **five (5)** working days before Tender Closing regarding any questions, omissions, errors or ambiguities found in Contract Documents. If HRCE considers that correction, explanation or interpretation is necessary, a reply will be in the form of an addendum, a copy of which will be posted on the novascotia.ca/tenders and/or HRCE website as applicable, and it is the responsibility of the Tenderer to ensure all addenda are received and acknowledged.
- 6.2.** Addenda will be issued no less than three (3) business days before tender closing date and time, and will form part of the Contract Documents.

- 6.3.** Verbal answers to queries are not binding. Information must be confirmed by written addenda. The HRCE and its representatives shall not be bound by or be liable for any representation or information provided verbally. Information obtained by any other source is not official and will not bind the HALIFAX REGIONAL CENTRE FOR EDUCATION.
- 6.4.** Complete tender form (section 00 41 13) acknowledging that addenda have been received.

7. Product/System Options

- 7.1.** Alternatives to specified products and systems will only be considered during the bidding period in the manner prescribed below.
- 7.1.1.** Where the Bid Documents stipulate a particular product, alternatives may be considered by the Consultant up to five (5) working days before tender closing date and time. Tenderers must forward their written requests by email to: dwalpola@hrce.ca. The Buyer will relay the requests to the appropriate person(s) for review.
- 7.2.** The submission must provide sufficient information to enable the Consultant to determine acceptability of such products. Request for an alternate must be accompanied with:
- 7.2.1.** information about how the request affects other work in order to accommodate each alternate;
- 7.2.2.** the dollar amount of additions to or reductions from the Bid Price, including revisions to other Work.
- A later claim by the tenderer for an addition to the contract price because of changes in work necessitated by use of alternates shall not be considered.
- 7.3.** When a request to substitute a product is made and pursuant to consultation with the Consultant, HRCE may approve or disapprove the substitution. The tenderer making the request will be notified of the HRCE's decision and if the alternate is approved, the HRCE will issue an Addendum.
- 7.4.** Alternates must be submitted in above manner; otherwise, they will not be accepted.

8. Mandatory Tenderers' Site Meeting (Site Assessment)

8.1. Tenderers will be deemed to have familiarized themselves with existing project site and working conditions and all other conditions, which may affect performance of the Contract. No plea of ignorance of such conditions as a result of failure to make all necessary examinations will be accepted as a basis for any claims for extra compensation or an extension of time.

8.1.1.A Mandatory Tenderers' Site Meeting has been scheduled as per the information on the cover sheet of this document. All Tenderers are required to attend. Representatives of HRCE and the Consultant will be in attendance;

9. Tenderers Registration

9.1. The successful Contractor and Sub-contractors must comply with the Nova Scotia Corporations Registration Act or Partnerships and Business Name Registration Act, or equivalent, before a contract is awarded.

10. Qualifications

10.1. Sub-Contractors

10.1.1. HRCE reserves the right to reject a proposed sub-contractor for a reasonable cause.

10.1.2. Refer to Article GC 3.7.3 of CCDC-2 2008.

11. Bid Submission

11.1. Submissions

11.1.1. Tenderers shall be solely responsible for the delivery of their bids in the manner and time prescribed.

11.1.2. Bids must be submitted on the **Bid Form** provided by the HRCE (Section 00 41 13 – Bid Form). These forms are to be completely filled out in ink, with the signature in longhand, and corporate sealed as applicable, and the completed form shall be without interlineations, alterations or erasures. Bid submissions sent by facsimile transmission, regular mail or hand delivery will not be accepted.

11.1.3. Fully complete the Tender Bid Form and enter the contract price in both written words and numerals. Where this bid is requested in both words and numbers, and if the two (2) do not represent the identical amount, words shall prevail.

11.1.4. Submit the executed offer on the Bid Forms together with the required bid security, clearly identified with tenderer's name, project name and tender number via email.

11.1.5. Improperly completed information, irregularities in the bid security, may be cause to declare the bid informal.

12. Accuracy of Referencing

12.1. Indexing and cross-referencing are for convenience only.

13. Conditions of Tendering

13.1. Take full cognizance of content of all Contract Documents in preparation of Tender. Refer to Section 00 41 13 – Tender Form, Subsection 5.0 for a complete list of Contract Documents.

14. Preparation of Tender

14.1. Complete Tender Bid Form (section 00 41 13) provided with Contract Documents in ink. Tender all items and fill in all blanks. Have corrections initialed by person signing Tender. Tenderers' are required to provide all information as detailed.

15. Amendment or Withdrawal of Tender

15.1. Bids may be amended or withdrawn by email only, prior to date and time of closing.

15.2. A Tender Price Amendment Form is provided immediately following the Bid Form (section 00 41 73).

15.2.1.1. The Tender Price Amendment Form provided is the standard Master form for submission of all tender price amendments for this project.

15.2.1.2. Copy and complete form, as directed, for all tender price amendments submitted.

15.3. Amendments shall not disclose either original or revised total price.

15.4. Sign, execute and submit via email prior to time of Tender Closing.

16. Bid Ineligibility (reason for rejection)

16.1. HRCE may reject a bid which has been received prior to the closing time where:

16.1.1. The bid is not submitted on the required bid form (Section 00 41 13) included herein.

16.1.2. The bid is not submitted in the required format - electronically

16.1.3. There are omissions of information that HRCE in its sole discretion deems to be significant.

16.1.4. The bid is not signed as required.

16.1.5. The bid has conditions attached which are not authorized by the invitation to bid.

16.1.6. The bid fails to meet one or more standards specified in the invitation to bid.

16.1.7. All addenda have not been acknowledged.

16.1.8. Any other defect which, in the opinion of the HRCE brings the meaning of the bid into question.

16.1.9. A major irregularity is a deviation from the bid request which affects the price,

quality, quantity, or delivery of the project and is material to the award, and is a reason for rejection.

16.1.10. A minor irregularity is a deviation from the bid request which affects form, rather than substance. The effect on price, quality, quantity or delivery is not material to the award, and may be waived by the HRCE.

16.1.11. The required bid security in the required form is not provided.

16.1.12. Tenderer failed to attend Tenderers' Mandatory Site Meeting.

17. Communications Affecting Bids

17.1. Transmissions, including, but not limited to facsimile transmission:

17.1.1. The bid forms submitted by facsimile or mail delivery or hand delivery are not acceptable and will be rejected.

18. Right to Accept or Reject any Tender

18.1. The HRCE reserves the right to reject any bid in its sole and absolute discretion for any reason whatsoever.

18.2. The HRCE specifically reserves the right to reject all bids if none is considered to be satisfactory in the HRCE's sole and absolute discretion and, in that event, at its option, to call for additional bids.

18.3. Without limiting the generality of any other provision herein, the HRCE reserves the right to accept or reject any bid in accordance with bullet #16 above. (Bid Ineligibility)

18.4. Notwithstanding the above, the HRCE shall be entitled, in its sole and absolute discretion, to waive any irregularity, informality or non-conformance with these instructions in any proposal received by the HRCE. HRCE reserves the right to reject any or all tenders, or to accept any tender, or portion thereof, deemed in its best interest.

18.5. In the event that a number of Tenderers submit bids in substantially the same amount, the HRCE may, at its discretion, call upon those Tenderers to submit further bids or take into consideration any value added services being provide in determination of award.

18.6. No term or condition shall be implied, based upon any industry or trade practice or custom or in a practice or policy of the HRCE or otherwise, which is inconsistent or conflicts with the provisions contained in these Instructions.

19. Construction Contract Guidelines

19.1. The printed policies of the Nova Scotia Construction Guidelines, dated May 18, 2006 (or latest revisions) are applicable to these bid documents.

20. Bid and Security Forms – Signatures

- 20.1.** All bid forms, bid security forms and performance assurance forms **must** bear the Tenderer's original signature and name HRCE as insured.

21. Bid Security

- 21.1.** Submit with Bid one of the following: Bid security in the form of a Certified Cheque, Irrevocable Letter of Credit, or Bid Bond on CCDC Form 220, in the amount of ten percent (10%) of the Bid Price made payable to, or naming HRCE (as obligee), must accompany the tender.
- 21.2.** Where bid bond is provided as bid security:
- 21.2.1.** Provide bond on the standard CCDC Bid Bond Form, latest version, in the amount of not less than ten percent (10%) of the Bid Price.
- 21.2.2.** Bid Bonds, submitted by the general contractor tenderer, signed and sealed by the principal (Contractor) and Surety and shall be with an established Surety Company satisfactory to and approved by HRCE.
- 21.2.3.** Where Bid Bond is used as Bid Security, include the cost of providing the Bid Bond in the Bid Price.
- 21.3.** Where certified cheque or bank draft is provided as bid security:
- 21.3.1.** Provide a certified cheque or bank draft, endorsed in the name of HRCE, for a sum not less than ten percent (10%) of the amount of the Bid Price.
- 21.3.2.** Where certified cheque or bank draft is used as Bid Security, include the cost in the Bid Price.
- 21.4.** Where the Irrevocable Standby Letter of Credit is used as bid security:
- 21.4.1.** Provide an Irrevocable Standby Letter, endorsed in the name of HRCE, for a sum not less than ten percent (10%) of the Bid Price
- 21.4.2.** The Irrevocable Standby Letter of Credit shall be issued by a certified financial institution subject to the Uniform Custom and Practices for Documentary Credit (1993 revision or latest revision) International Chamber of Commerce (Publication No. 500).
- 21.4.3.** Where Irrevocable Standby Letter of Credit is used as bid security, include the cost in the Bid Price.
- 21.5.** Return of Bid Security:
- 21.5.1.** The bid security of the unsuccessful tenderers will be returned to them after the contract has been signed, or previous to such time, at the discretion of HRCE.

21.5.2. The above shall apply provided a contract is awarded within ninety (90) days from the closing date of the bid.

21.5.3. If no contract is awarded, all bid security will be returned.

22. Contract Security (Performance Assurance)

22.1. All bid forms, bid security forms and performance assurance forms must bear the tenderer's original signature and name HRCE as insured.

22.2. Tenderer shall maintain performance assurance in force for a period of not less than twelve (12) months after the issue of the substantial performance certificate certified by HRCE and until completion of the contract.

22.3. Endorse Performance Assurance as specified for bid security.

22.4. Should it become apparent that the final cost of the project will exceed the total amount payable by more than 20%, the tenderer shall arrange to have their bonds reissued based on the projected final cost.

22.5. Refer to Section 00 72 13 – General Conditions GC11.2 and Section 00 73 00 – Supplementary General Conditions for form of Contract Security. Refer to project documents for amount of Contract Security and alternate type of Contract Security if applicable.

22.6. Submit as Performance Assurance one of the following:

22.6.1. Where a Bid Bond was used as bid security:

22.6.1.1. Within ten (10) days after notification of award of the Contract, provide a Performance Bond and a Labour & Material Payment Bond, each in an amount equal to fifty percent (50%) of the amount of the Contract, naming HRCE.

22.6.1.2. Performance Bond and Labour and Material Payment Bonds, submitted by the tenderers, shall be provided at the expense of the tenderer and shall be with an established Surety Company satisfactory to and approved by HRCE.

22.6.1.3. Include the cost of providing the Performance Bond and Labour and Material bond in the Contract price.

22.6.2. Where a Certified Cheque or Bank Draft is used as Contract Security:

22.6.2.1. The Certified Cheque or Bank Draft submitted during the bid period will be cashed and the amount retained by HRCE shall serve as Performance Assurance, including the payment of all obligations arising under the Contract.

22.6.2.2. The Certified Cheque or Bank Draft will be held in lieu of the Performance Bond and Labour and Material Bonds, providing that, at Contract award, the successful Tenderer shall supplement their

- Certified Cheque or Bank Draft to maintain an amount of ten (10%) of the total amount payable (Contract Price plus HST) under the contract.
- 22.6.2.3.** The amount remaining will be returned without interest after a period of not less than twelve (12) months after the issue of the substantial performance certificate certified by HRCE and shall serve as performance assurance and not until completion of the contract.
- 22.6.2.4.** Where certified cheque or bank draft is used as Performance Assurance, include the cost of providing the certified cheque in the Contract price.
- 22.6.3.** Where an Irrevocable Standby Letter or Credit is used as Contract Security:
- 22.6.3.1.** The Irrevocable Standby Letter of Credit submitted during the bid period will be retained by HRCE and shall serve as performance assurance, including the payment of all obligations arising under the contract. The irrevocable standby letter of credit shall be issued by a certified financial institution subject to the Uniform Customs and Practices for Documentary Credit (1993 revision) International Chamber of Commerce (Publication No. 500).
- 22.6.3.2.** Where irrevocable standby letter of credit is used as Performance Assurance, include the cost of providing and Irrevocable Standby Letter of Credit in the Contract Price. The contractor shall provide to HRCE documentation throughout the duration of the contract that the irrevocable standby letter of credit remains in full effect at all times as specified,
- 22.6.3.3.** Upon expiry of the Irrevocable Standby Letter of Credit, a separate Irrevocable Standby Letter of Credit shall be provided for work requiring extended warranties for such amounts as are required by the contract.
- 22.6.3.4.** The Irrevocable Standby Letter of Credit is to be in effect for a period of not less than twelve (12) months after the issue of the substantial performance certificate certified by HRCE and shall serve as performance assurance and not until completion of the contract.

23. Insurance

- 23.1.** Refer to Section 00 72 13 -General Conditions of Contract, GC 11.1 – Insurance and Section 00 73 00 – Supplementary General Conditions for form of Insurance. Refer to project documents for amount of insurance, duration of coverage and alternate type of Insurance if applicable.
- 23.2.** General Contractor shall secure and maintain at its expense during the term of the Insurance:
- 23.2.1.** Workers’ Compensation to meet Statuary requirements and/or Employers Liability.
 - 23.2.2.** Wrap Up liability Insurance must insure the general contractor(s) and all sub-contractors on this project:
 - 23.2.2.1.** including but not limited to, products liability and completed operations, contractual liability, owners and contractors liability, attached machinery extension endorsement, independent contractor, for a combined single limit of no less than \$5,000,000.00 per occurrence.
 - 23.2.3.** Commercial Auto Liability insurance covering all owned, non-owned and hired vehicles for a minimum combined single coverage of \$2,000,000.00 per occurrence.
 - 23.2.4.** Builders Risk – all risks – in the amount of the project contract stipulated bid price.
 - 23.2.5.** Deliver a certificate of insurance evidencing the above prior to work being performed. It is also agreed that the above insurance coverage is primary and must be kept in force during the term of this agreement. Furthermore, HRCE must receive, in writing, at least thirty (30) days’ notice of cancellation or modification of the above insurances. All insurance policies or certification documents shall specify coverage being applicable to this contract. The Contractor shall not do or omit to do or suffer anything to be done or omitted to be done which will in any way impair or invalidate such policy or policies of insurance.
- 23.3.** Primary Insurance- Supplier agrees that the insurance as required above shall be primary and non-contributory.
- 23.4.** No limitation- Supplier is responsible for determining whether the above minimum insurance coverage’s are adequate to protect its interests. The above minimum coverage’s do not constitute limitations upon Supplier’s Liability.
- 23.5.** Endorsements – For the policies in para 23 above, there shall contain an endorsement naming HRCE and its Affiliates as an Additional Insureds, and eliminating and removing any exclusion of liability for:
- 23.5.1.** injury, including bodily injury and death to an employee of the insured or of HRCE, or

23.5.2. any obligation of the insured to indemnify, hold harmless, defend, or otherwise make contribution to the HRCE because of damage arising out of injury, including bodily injury and death, to an employee of HRCE.

24. Proof of Competency of Tenderer

24.1. Any tenderer may be required to furnish evidence satisfactory to the owner that he and his proposed sub-contractors have sufficient means and experience in the types of work called for to assure completion of the contract in a satisfactory manner.

24.1.1. The successful tenderer **must** be a member in good standing with CRCA, RCANS; and
– N/A

24.1.2. Nova Scotia Construction Safety Association or approved recognized association or program.

25. Bid Form Requirements

25.1. Bid Submission

25.1.1.1. Tenderers shall be solely responsible for the delivery of their bids in the manner and time prescribed.

25.1.1.2. Bids must be submitted on forms provided by the HRCE. These forms are to be completely filled out in ink or by typewriter, with the signature in longhand, and the completed form shall be without interlineations, alterations or erasures.

25.1.1.3. Submit the executed bid on the bid forms provided, signed and corporate sealed as applicable together with the required security via email clearly identified with Tenderers name, project name.

25.1.1.4. Improperly completed information, irregularities, in required enclosures may be cause to declare the bid informal.

25.2. Bid Signing

25.2.1. The bid form **Must** be signed and under seal (as applicable) by a duly authorized signing officer(s) in their normal signatures.

25.3. Contract Time

25.3.1. The tenderer, in submitting an offer, agrees to achieve Substantial performance of the work by the date indicated in the contract documents. The Substantial Performance date in the agreement shall be as indicated on the cover sheet.

26. Offer Acceptance / Rejection

26.1. Duration of offer

26.1.1. Bids shall remain open to acceptance and shall be irrevocable for a period of ninety (90) days after the bid closing date.

26.2. Award/Selection/Acceptance of Offer

26.2.1. In the evaluation of a bid, HRCE will consider, but not be limited to, the following criteria:

26.2.1.1. Compliance with Bid requirements.

26.2.1.2. Bid price submitted.

26.2.1.3. The qualifications and experience of the tenderer with similar projects in size and scope.

26.2.1.4. References.

26.2.1.5. Gantt chart (schedule of proposed scope of work for various disciplines).

26.2.1.6. Completion date.

26.2.2. The Owner's evaluation of any and all bid submission(s) will be final.

26.3. HRCE reserves the right to accept or reject any or all offers or to accept any offer deemed most satisfactory, HRCE reserves the right to waive any informality in any or all bids.

26.4. After acceptance HRCE will issue to the successful tenderer, a written bid acceptance.

26.5. After acceptance by HRCE, the successful tenderer shall be notified in writing of acceptance of the bid and will be issued an official purchase order.

27. Agreement

27.1. After acceptance by HRCE and the successful tenderer will enter into a CCDC-2 –2008, standard form of contract for the execution of the work.

28. Post Bid Submissions

28.1. Provide after closing of bid period, but before award of Contract, when requested by HRCE, a copy of the following documents:

28.1.1. Current Certificate of Recognition or Letter of Good Standing:

28.1.1.1. Certificate of Recognition issued jointly by the Nova Scotia Department of Labour and an occupational health and safety organization approved by Nova Scotia Department of Labour, or a valid letter of Good Standing from an occupational health and safety organization approved by HRCE indicating the Contractor is in the process of qualifying for the Certificate of Recognition. Contractor shall remain in good standing for the duration of the contract. In the event that any such certification during

the term of the contract expires, the obligation remains with the contractor to provide the updated required certificates.

28.1.1.2. Worker's Compensation Coverage

28.1.1.2.1. Evidence of an account with the Workers' Compensation Board, coverage under the Workers Compensation Act, R.S.N.S. and a clearance certificate indicating the tenderer is in good standing and shall remain so for the duration of the contract. In the event that any such certification during the term of the contract expires, the obligation remains with the contractor to provide the updated required certificates.

28.1.1.3. Certificates of good standing with CRCA (Canadian Roofing Contractors Association) and RCANS (Roofing Contractors Association of Nova Scotia), - **N/A**

28.1.2. Submit Post-Bid Submissions requested by HRCE within forty-eight (48) hours of request in order to be eligible to receive award of contract.

28.1.3. Submit the following post award documents within ten (10) working days of notice of award:

28.1.3.1. Provide all required contract security and insurance documentation,

28.1.3.2. Schedule of Values,

28.1.3.3. Copy of safety plan,

28.1.3.4. Copy of Hot Work Permit system and procedures,

28.1.3.5. Shop drawings, as applicable, and

28.1.3.6. Applicable documentation as required by the Tender Documents.

28.1.4. All post bid submissions must be received by HRCE in the manner prescribed above, or prior to commencement of work and delivery of materials on-site, whichever occurs first.

29. Taxes

29.1. The General Conditions of the Contract state that the Contractor as of April 1, 1997 and thereafter, the Contractor is to pay all Harmonized Sales Tax.

29.2. HRCE is not exempt for Harmonized Sales Tax (HST) purposes. As a result, the aggregate amount of the bid for contracts is subject to HST, however, **prices submitted shall not include HST.**

29.3. The HST payable by the HRCE will be added as a separate item during the processing of progress payments and therefore **HST will not appear as a cost in the aggregate amount of the tender.**

- 29.4.** Tenderers are advised that they may be eligible to claim an Input Tax Credit (ITC) for a portion of the HST paid in relation to the Contract requirement of the Government of Canada.
- 29.5.** Tenderers are to note that prices indicated on the Bid Form and the appendices to the Bid Form shall not include Provincial Sales Taxes, the Federal Goods and Services Tax or the Harmonized Sales Tax.
- 29.6.** Exclude Harmonized Sales Tax in Tender Contract Price, unless requested to do otherwise.
- 29.7.** Refer to CCDC-2 - 2008 (Section 00 72 13) and Supplementary General Conditions (Section 00 73 00).

END OF SECTION 00 21 13

SECTION 00 41 13 - TENDER FORM

1. Salutation:

To: HALIFAX REGIONAL CENTRE FOR EDUCATION
33 SPECTACLE LAKE DRIVE, DARTMOUTH NS
Attn: DON WALPOLA, BUYER

For: #4070 Fine Arts Lab – Cole Harbour District High

From:

Address:

E-Mail:

Phone:

Fax:

Person Signing for Firm:

Position:

2. Tenderer Declares:

- 2.1. That this tender was made without collusion or fraud.
- 2.2. That the proposed work was carefully examined.
- 2.3. That the Tenderer was familiar with local conditions.
- 2.4. That Contract Documents and Addenda were carefully examined.
- 2.5. That all the above were taken into consideration in preparation of this Tender.

3. Tenderer Agrees:

- 3.1. To provide all necessary equipment, tools, labour, incidentals and other means of construction to do all the Work and furnish all the materials of the specified requirements which are necessary to complete the Work in accordance with the Contract and agrees to accept, therefore, as payment in full the Lump Sum Price stated in Subsection 6 hereunder.
- 3.2. Carefully examined the site of the work described herein; become familiar with local conditions and the character and the extent of the work; carefully examined every part of the proposed Contract and thoroughly understands its stipulations, requirements and provisions.
- 3.3. Determined the quality and quantity of materials required; investigated the location and determined the source of supply of the materials required; investigated labour conditions; and has arranged for the continuous prosecution of the work herein described
- 3.4. To be bound by the award of the contract and if awarded the contract on this bid to execute the required contract within ten (10) days after notice of award.
- 3.5. Noted that the Harmonized Sales Tax is excluded from his "Contract Price".

- 3.6.** School/Work site access control: Contractor's employees shall always report to the main office of a school, indicate who they are and state their purpose on site prior to starting any work in the school. Contractor is not permitted to work on the school site without the HRCE's assigned representative on site unless authorized by the HRCE Operations representative. Typical hours of work are daylight hours. Working in occupied schools will be determined by the Operations representative. No work shall be conducted on weekends or holidays without specific approval of the Operations Representative. Work in an occupied school will be limited to work that is not disruptive to the school. IE: No mechanical removals, no drilling, screwing or torch work during occupied hours without approval from HRCE.
- 3.7.** Hours of work – All work shall be carried out during hours when schools are unoccupied, unless otherwise indicated below or in writing by the Manager of Operations or designate. No work shall be conducted on weekends, or statutory holidays without specific written approval from the Operations Manager or designate. Hours of work shall comply with local ordinances and bylaws for each site.

4. Owner Agrees

- 4.1.** To examine this bid and in consideration, therefore, the tenderer hereby agrees not to revoke this bid:
- 4.1.1.** until some other tenderer has entered into the contract with The HRCE for the performance of the work and the supply of the materials specified in the notice inviting bids; or in the Information to Tenderers, or
 - 4.1.2.** until ninety (90) days after the time fixed in the Information to Tenderers for receiving bids has expired,
 - 4.1.3.** Whichever first occurs; provided, however, that the tenderer may revoke this bid at any time before the time fixed in the Information to Tenderers for receiving bids has expired upon receipt by the HRCE from the tenderer of written notice of such revocation before said time has expired.
 - 4.1.4.** The Tenderer declares that he has obtained from the Subcontractors all Bid Security required to be provided by Subcontractors pursuant to the "Instructions to Tenderers".

5. Contract Documents include:

- 5.1.1. Cover Page
- 5.1.2. Table of Contents – Section 00 00 01
- 5.1.3. Description of Work & List of Drawings – Section 00 00 15
- 5.1.4. List of Consultants – Section 00 05 00
- 5.1.5. Information for Tenderers – Section 00 21 13
- 5.1.6. Tender Form – Section 00 41 13
- 5.1.7. Tender Price Amendment Form (if applicable) – Section 00 41 73
- 5.1.8. Agreement Between Owner and Contractor (CCDC 2 – 2008) – Section 00 52 00
- 5.1.9. Definitions (CCDC 2 – 2008) – Section 00 52 13
- 5.1.10. General Conditions of the Stipulated Contract Price (CCDC 2 -2008) – Section 00 72 13
- 5.1.11. Supplementary General Conditions – Section 00 73 00
- 5.1.12. HRCE General Terms & Conditions – Section 00 73 10
- 5.1.13. Specifications of Work (all applicable sections)
- 5.1.14. Drawing(s) – as applicable
- 5.1.15. Addendum/Addenda issued by HRCE.
- 5.1.16. Contract Sets (2)

6. Fee Submission - Contract Price:

- 6.1. The undersigned Tenderer, having carefully read and examined the aforementioned Contract Documents prepared by the Consultant, for the Halifax Regional Centre for Education, hereby accepts the same as part and parcel of the Contract herein referred to, and having carefully examined the locality and Site of Works and having full knowledge of the work required and of the materials to be furnished and used, does hereby Tender and offer to enter into a contract to perform and complete, the whole of the said works and provide all necessary labour, plant, tools, materials and equipment and pay all applicable taxes, as set forth and in strict accordance with the Specifications, Drawings and other Contract Documents and to do all therein called for on the terms and conditions and under the provisions therein set forth for the following:

6.2 LUMP SUM PRICE – FINE ARTS LAB - COLE HARBOUR DISTRICT HIGH

_____ /100 Dollars (\$_____) (HST Excluded)

****HRCE reserves the right to award the contract to one or more contractors who bid on this tender. HRCE reserves the right to accept bids on any or all of the phases of this work. ****

Contract Price to be completed in written form on the lines provided above, with cents expressed as numerical fraction of a dollar. Contract price to be completed in numerical form on the line bounded by parenthesis above, with cents expressed as a decimal of a dollar. WHERE THERE IS A CONFLICT, WRITTEN WORD WILL GOVERN.

6.3 Breakout Prices: Breakout prices requested in the Tender Document, as detailed below, **SHALL BE INCLUDED IN THE LUMP SUM TENDER PRICE** above (6.1 - Contract Price) and deleted only on the instruction at the sole discretion of the Owner, for which a credit will be offered by the Contractor, equal to the breakout pricing detailed below (price excludes HST):

Item No.	Description	Unit of Measurement	Credit Amount
1.	_____ N/A _____	_____	\$ _____
2.	_____	_____	\$ _____
3.	_____	_____	\$ _____
4.	_____	_____	\$ _____
5.	_____	_____	\$ _____

Total Credit Amount for ALL Breakout Items:

_____ /100 Dollars (\$_____) (HST Excluded)

6.4 Separate Prices: Separate prices requested in the Tender Document, as detailed below **SHALL NOT BE INCLUDED IN THE LUMP SUM TENDER PRICE** above (6.1 - Contract Price) and added only on the instruction and at the sole discretion of the Owner, for which the contract will be adjusted, equal to the separate pricing detailed below (price excludes HST):

Listing of Separate Price Details Requested by HRCE:

Item No.	Description	Unit of Measurement	Unit Price
6.	N/A		\$
7.			\$
8.			\$
9.			\$
10.			\$

7. Completion Time:

7.1. Tenderer agrees to be substantially complete as follows:

7.1.1.1. **September 3rd, 2020**

7.1.1.2. The undersigned Tenderer agrees if awarded the Contract on this Bid to achieve the Substantial Completion Date providing the contract is awarded within ten (10) business days of tender closing time.

7.2. Detailed breakdown of overall project specific phases (schedule of proposed scope of work for various disciplines) written and/or Gantt Chart to be provided with bid documents or within five (5) business days of tender award.

8. Addenda Acknowledgement

I/We have received and noted the following addenda **for Tender #4070 Fine Arts Lab – Cole Harbour District High**

Addendum #	Dated	# of Pages
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

9. Supporting Information

9.1. References: (Minimum of three)

Tenderer to furnish particulars of at least three (3) similar contracts successfully completed or currently being carried to completion. The projects quoted should preferably be approximate in nature to the work now tendered for and be of comparable or greater size. References are to be submitted with the bid prior to closing date and time.

Contact Name & Phone #	Date	Contract Value
_____	From _____ to _____	\$ _____
_____	From _____ to _____	\$ _____
_____	From _____ to _____	\$ _____
_____	From _____ to _____	\$ _____

9.2. Bid submission to include a minimum of two letters of endorsement from clients commenting upon the contractor’s ability to deliver quality projects, similar in scope and size, which met schedule and budget.

10. Proof Of Competency Of Tenderer

10.1. Any tenderer may be required to furnish evidence satisfactory to the Owner that he and his proposed sub-contractors have sufficient means and experience in the types of work called for to assure completion of the Contract in a satisfactory manner.

10.1.1. The Tenderer acknowledges, as part of their bid submission, their responsibility and contract obligations to ensure that the proposed sub-contractors will fully perform the project requirements and meet the timings as detailed in this tender call.

10.2. Sub-Contractors: The Tenderer to provide the name and address of each major sub-contractor used in making up this tender. This list of sub-contractors is to be submitted with the bid prior to closing date and time. Only one sub-contractor shall be named for each part of the work to be sublet.

<u>Subcontractor/Suppliers/Manufacturers</u>	<u>Service/Material</u>
Site Works	
Electrical	
Mechanical	
Roof	

10.2.1. Project Personnel: The Tenderer to include below, the names, qualifications and previous experience of those people who will be directly involved with the project. The names shall, for example, include foremen, superintendent, project engineer and/or project manager, labourers and trade staff. This list of personnel is to be submitted with the bid prior to closing date and time.

Name	Position	Qualifications/Experience

Signature * The undersigned Tenderer declares that this bid is made without connection with any other person(s) submitting bids for the same work and is in all respects fair and without collusion or fraud.

SIGNATURE:

SIGNED AND DELIVERED
in the presence of:

Witness

CONTRACTOR

Company name

Signature of Signing Officer

Name and Title (printed)

Date

HRCE is directly responsible for the safety of its students and staff. Should contractors be required to work in or on school property while children are present, it is a MANDATORY HRCE REQUIREMENT that contractors assign the work to employees and/or sub-contractors who DO NOT have a CRIMINAL RECORD and who ARE NOT LISTED ON THE CHILD ABUSE REGISTRY. Failure to comply with this requirement may result in immediate contract termination.

By checking the "Agreed" box you are confirming that you understand and will abide by this mandatory HRCE requirement.

Agreed

****Note: Bids submitted **Must** be signed by a duly authorized officer or agent.***

END OF SECTION 00 41 13

SECTION 00 41 73 - TENDER AMENDMENT FORM

**#4070 Fine Arts Lab
- Cole Harbour District High**

Note: to be completed and forwarded for each Bid Price adjustment prior to bid closing time and date as detailed on the Cover Sheet of the tender document and related Addendum.

Lump Sum Price Adjustment – Section 00 41 13 Tender form, Article 6.1.1 Contract Price

Increase Bid by		Decrease Bid By	
Amount (excluding HST)	\$	Amount (excluding HST)	\$
HST	\$	HST	\$
Total Amount (including HST)	\$	Total Amount (including HST)	\$

It is the Tenderer’s responsibility to ensure the table above is legible

Attachments included: no yes (✓ one)

If **yes** above, check ✓ and complete information regarding attachments

Revised Bid Form: Dated _____ # of pages _____

Other, Specify _____

Dated _____ # of pages _____

Total number of pages (including this form) _____

Submitted by:

Company Name (please print as it appears on original tender envelope)

Authorized Tenderer’s Name (please print as it appears on Bid Form)

Authorized Tenderer’s Signature

END OF SECTION 00 41 73

SECTION 00 52 00 - AGREEMENT BETWEEN OWNER AND CONTRACTOR
CCDC 2 – 2008

(a copy of Section 00 52 00, Standard Construction Contract CCDC 2 – 2008 (5 pages) is available upon request, otherwise, will form part of the contract sets to the successful tenderer)

END OF SECTION 00 52 00

SECTION 00 52 13 - DEFINITIONS
CCDC 2 - 2008

(A copy of section 00 52 13, Standard Construction Contract CCDC 2 – 2008 (2 pages) is available upon request, otherwise, will form part of the contract sets to the successful tenderer)

END OF SECTION 00 52 13

**SECTION 00 72 13 - GENERAL CONDITIONS
OF THE STIPULATED PRICE CONTRACT
CCDC 2 - 2008**

(A copy of section 00 72 13, Standard Construction Contract CCDC 2 – 2008 (23 pages) is available upon request, otherwise, will form part of the contract sets to the successful tenderer)

END OF SECTION 00 72 13

SECTION 00 73 00 - SUPPLEMENTARY GENERAL CONDITIONS CCDC2 – 2008

The Canadian Standard Construction Document for Stipulated Price Contract (CCDC 2, 2008 version), Definitions and General Conditions governing same, shall be used by the project. The following Supplementary General Conditions are intended to supplement or amend the General Conditions, and where conflicts occur, the Supplementary Conditions shall take precedence.

Where a General Condition or paragraph of the General Conditions of the Stipulated Price Contract is deleted by these Supplementary Conditions, the numbering of the remaining General Conditions or paragraphs shall remain unchanged, and the numbering of the deleted item will be retained, unused.

ARTICLE A-5 PAYMENT

Delete paragraph 5.1 in its entirety and insert:

5.1 "Subject to applicable legislation and the provisions of the Contract Documents, and in accordance with legislation and statutory regulations respecting holdback percentages and, where such legislation or regulations do not exist or apply, subject to a holdback of ten percent (10%) including the HST (Harmonized Sales Tax), the Owner shall:"

- .1 Make progress payments to the Contractor on account of the Contract Price (work performed) when due in the amount certified by the Consultant together with Value Added Taxes as may be applicable to such payments, and
- .2 Upon Substantial Performance of the Work as certified by the Consultant, pay to the Contractor the unpaid balance of monies then due, excepting that amounts as certified by the Consultant to rectify deficiency items, or incomplete portions of individual work items may be retained by the Owner pending Total Performance of the work or other authorization for the release by the Consultant, and
- .3 Upon Total performance of the Work as certified by the Consultant pay to the contractor the unpaid balance of monies due together with such Value Added Taxes as may be applicable to such payment.

Change 5.3.1 (1) to read: "1% per annum above the prime rate."

Delete 5.3.2 (2) in its entirety.

DEFINITIONS

Add subparagraph 19a to definitions:

19a. Submittals

Submittals are documents or items required by the Contract Documents to be provided by the Contractor, such as:

- 1 Shop Drawings, samples, models, mock-ups to include details or characteristics, before the portion of the Work that they represent can be incorporated into the Work; and
- 2 As-built drawings and manuals to provide instructions to the operation and maintenance of the Work.

GC 1.1 CONTRACT DOCUMENTS

Add to the end of subparagraph 1.1.2.2:

1.1.2.2 Except where the Consultant shall be indemnified as a third party beneficiary as provided in subparagraphs 9.2.7.4, 9.5.3.4 and in 12.1.3.

Add subparagraph 1.1.7.5:

1.1.7.5 Should conflicts occur between Contract Documents and any work is done without consulting the Consultant for his decision, the Contractor shall assume full responsibility.

Add subparagraph to 1.1.7.6:

1.1.7.6 In case of discrepancies, noted materials and annotations shall take precedence over graphic indications in the Contract Documents.

Delete paragraph 1.18 in its entirety and insert:

1.18 "The Contractor will be provided with up to a maximum of ten (10) copies, without charge, of the Contract Documents or parts thereof for the performance of the work. Extra copies may be obtained for cost of printing and mailing."

GC 2.4 DEFECTIVE WORK

Add new subparagraphs 2.4.1.1 and 2.4.1.2:

2.4.1.1 The Contractor shall rectify, in a manner acceptable to the Owner and the Consultant, all defective work and deficiencies throughout the Work, whether or not they are specifically identified by the Consultant.

2.4.1.2 The Contractor shall prioritize the correction of any defective work which, in the sole discretion of the Owner, adversely affects the day to day operation of the Owner.

GC 3.1 CONTROL OF THE WORK

Add new paragraph 3.1.3:

3.1.3 Prior to commencing individual procurement, fabrication, and construction activities, the Contractor shall verify, at the Place of work, all relevant measurements and levels necessary for proper and complete fabrication, assembly and installation of the Work and shall further carefully compare such field measurements and conditions with the requirements of the Contract Documents. Where dimensions are not included or contradictions exist, or exact locations are not apparent, the Contractor shall immediately notify the Consultant before proceeding with any part of the affected work.

GC 3.4 DOCUMENT REVIEW

Delete paragraph 3.4.1 in its entirety and substitute new paragraph:

3.4.1 The Contractor shall review the Contract Documents and shall report promptly to the Consultant and error, inconsistency or omission the Contractor may discover. Except for its obligation to make such review and report the result, the Contractor does not assume any responsibility to the Owner or to the Consultant for the accuracy of the Contract Documents. The Contractor shall not be liable for damage or costs resulting from such errors, inconsistencies, or omissions in the Contract Documents, which the Contractor could not have reasonably have discovered. If the Contractor does discover any error, inconsistency, or omission in the Contract Documents the Contractor shall not proceed with the work affected until the Contractor has received corrected or missing information from the Consultant.

GC 3.7 SUBCONTRACTORS AND SUPPLIERS

Add the following paragraph 3.7.7:

- 3.7.7 A copy of the agreement between Contractor and any subcontractor(s) shall be provided to the Consultant if so requested.

GC 3.8 LABOUR AND PRODUCTS

Add the following paragraph 3.8.4:

- 3.8.4 The Contractor is responsible for the safe on-site storage of Products and their protection (including Products supplied by the Owner and other contractors to be installed under the Contract) in such ways as to avoid dangerous conditions or contamination to the Products or other persons or property and in locations at the Place of the Work to the satisfaction of the Owner and the Consultant. The Owner shall provide all relevant information on the Products to be supplied by the Owner.

GC 3.10 SHOP DRAWINGS

Add the words "AND OTHER SUBMITTALS" to the Title after SHOP DRAWINGS in GC 3.10.

Add "and submittals" after the words "Shop Drawings" in paragraphs 3.10.1, 3.10.2, 3.10.4, 3.10.7, 3.10.8, 3.10.8.2, 3.10.9, 3.10.10, 3.10.11 and 3.10.12.

Delete 3.10.3 in its entirety and substitute new paragraph:

- 3.10.3 Prior to the first application for payment, the Contractor and the Consultant shall jointly prepare a schedule of the dates for submission and return of Shop Drawings and any Submittals.

Add the following subparagraph 3.10.6.1:

- 3.10.6.1 The following paragraph shall apply to each shop drawing and submittals reviewed in connection with the project. This review shall not mean that the Consultant approved the detailed design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same. The Contractor is responsible for information that pertains solely to fabricated processes or to techniques of construction and installation, and for coordination of the work of all sub trades.

Delete and insert the words in paragraph 3.10.12

3.10.12 “with reasonable promptness so as to cause no delay in the performance of the Work” and replace with “within ten (10) working days or such longer period as may be reasonably required”

PART 3 EXECUTION OF THE WORK

Add new GC 3.14 as follows:

GC 3.14 CONTRACTOR RESPONSIBILITY FOR WATER TIGHTNESS

GC 3.14.1 The drawings and specifications are not intended to depict each and every condition or detail of construction. As the knowledgeable party in the field, the contractor is in the best position to verify that all construction is completed in a manner which will provide a watertight structure. The contractor has the sole responsibility for ensuring the watertight integrity of the structure.

Add new GC 3.15 as follows:

GC 3.15 PERFORMANCE BY CONTRACTOR

GC 3.15.1 In performing its services and obligations under the Contract, the Contractor shall exercise a standard of care, skill and diligence that would normally be provided by an experienced and prudent contractor supplying similar services for similar projects. The Contractor acknowledges and agrees that throughout the Contract, the Contractor’s obligations, duties and responsibilities shall be interpreted in accordance with this standard. The Contractor shall exercise the same standard of due care and diligence in respect of any products, personnel, or procedures which it may recommend to the Owner.

The Contractor further represents, covenants and warrants to the Owner that:

1. The personnel it assigns to the Project are appropriately experienced;
2. It has sufficient staff of qualified and competent personnel to replace its designated supervisor and project manager, subject to the Owner’s approval, in the event of death, incapacity, removal or resignation.

GC 4.1 CASH ALLOWANCES

Delete paragraph 4.1.4 in its entirety and substitute:

4.1.4 Where cost under a cash allowance exceed the amount of the allowances, unexpended amounts from other cash allowances shall be reallocated at the *Consultant's* direction to cover the shortfall.

Delete paragraph 4.1.5 in its entirety and substitute:

4.1.5 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the Contract Price by Change Order.

Delete paragraph 4.1.7 in its entirety and substitute:

4.1.7 At the commencement of the work, the Contractor shall prepare for the review and acceptance of the Owner and the Consultant, a schedule indicating the times, within the construction schedule referred to in GC 3.5, that items call for under cash allowances and items that are specified to be Owner purchased and Contractor installed or hooked up are required at the site to avoid delaying the progress of the Work.

Add new paragraph 4.1.8:

4.1.8 The *Owner* reserves the right to call, or to have the Contractor call, for competitive bids for portions of the Work, to be paid for from cash allowances.

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

Delete section GC 5.1 in its entirety.

GC 5.2 APPLICATION FOR PROGRESS PAYMENT

Add the following at the end of paragraph 5.2.2:

5.2.2 Such applications shall be accompanied by one or more of the following documents: a Statutory Declaration Waiver of Lien or receipt stating that the holdback monies claimed have been paid to the particular party or parties so named or referred to in the Declaration. Form of Statutory Declaration shall meet the approval of the Consultant.

Add the following paragraph 5.2.8:

5.2.8 The reference to payment for products delivered to the place of work in Article 5.2.7 shall not be construed as covering day-to-day financing of the project. Products delivered to the place of work shall be construed to mean major items of equipment or quantities of items that are essential for the expedient conduct of the work.

GC 5.3 PROGRESS PAYMENT

Supplement paragraph 5.3.1 by adding the following:

5.3.1 A holdback percentage of ten (10) percent (%) shall apply to progress payments. The sworn statement by the Contractor for release of holdback monies shall be in the form of a Statutory Declaration meeting the approval of the Consultant. Amounts as certified by the Consultant to rectify deficiency items, or incomplete portions of individual work items, may be retained by the Owner after Substantial Performance has been obtained, pending Total Performance of the work or other authorization for release by the Consultant.

Amend subparagraph 5.3.1.3 as follows:

5.3.1.3 Delete "20" and replace with "30."

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK

Add the following paragraph 5.4.4:

5.4.4 Before the Contractor submits his application for Substantial Performance of the Work, all Operations and Maintenance Manual materials shall be submitted in accordance with the Contract Documents. The Certificate of Substantial Performance will not be issued until this requirement is met.

GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

Add the following subparagraphs 5.5.1.3 and 5.5.1.4:

5.5.1.3 Submit a certificate from barrister stating that there are no Builders' Liens filed relating to the Contract Works.

5.5.1.4 Submit a clearance letter from the Workers' Compensation Board.

GC 5.7 FINAL PAYMENT

Add the following subparagraphs 5.7.1.1, 5.7.1.2, 5.7.1.3, 5.7.1.4 and 5.7.1.5:

5.7.1.1 Contractor's application for final payment is considered to be valid when the following have been performed:

1. Work has been completed and inspected for compliance with Contract Documents, and the Consultant is satisfied that all the requirements of the Contract have been fulfilled by the Contractor.
2. Defects have been corrected and deficiencies have been completed.
3. Equipment and systems have been tested, adjusted and balanced and are fully operational, and written reports as outlined in the Contract Documents have been provided to the Consultant.
4. Certificates required by Utility companies, manufacturer's representative and inspectors have been submitted.
5. Spare parts, maintenance materials, warranties and bonds have been provided.

5.7.1.2 If Work is deemed incomplete by Consultant, complete outstanding items and request re-inspection.

5.7.1.3 If in opinion of the Consultant, it is not expedient to correct defective work or Work is not performed in accordance with the requirements of the Contract, the Owner may deduct from Contract Price difference in value between work performed and that called for by Contract Documents, amount of which shall be determined by the Consultant.

5.7.1.4 If, within sixty (60) days after the issue by the Consultant of the Certificate of the Substantial Performance, the Contractor has not corrected all the deficiencies, the Owner will retain sufficient money to cover the cost of completing said deficiencies, as determined by the Consultant, in addition to holding monies retained in accordance with the Contract and subject to the provisions of the Builders' lien legislation of Nova Scotia.

5.7.1.5 Neither the final certificate nor the payment thereunder, nor any provision in the Contract Documents shall relieve the Contractor from responsibility for faulty material or workmanship which shall appear within a period of one (1) year from the date of Substantial Performance of the Work and he shall remedy any defects due thereto and pay for any damage to other Work resulting therefrom which shall appear within such period of one year. The Owner shall give notice of observed defects promptly. This article shall not be deemed to restrict any liability of the Contractor arising out of any law in force in the Province of Nova Scotia.

GC 6.2 CHANGE ORDER

Add the following paragraphs 6.2.3, 6.2.4, 6.2.5, 6.2.5, 6.2.6 and 6.2.7:

- 6.2.3 All contemplated changes in the work shall be issued by the Consultant on a "Contemplated Change Order" form.
- 6.2.4 For lump sum pricing, the Contractor shall, upon receipt of the Contemplated Change Order, submit to the Consultant for approval within seven (7) days, a quotation for changes in the work.
- 6.2.5 Quotation for changes shall be priced in sufficient detail (GC6.6 applies).
- 6.2.6 Consultant shall, within five (5) working days, notify the Contractor whether estimates are accepted by Owner or further information required. Acceptance of Owner shall be indicated by writing, and a signed copy of form (Change Order) returned to Contractor.
- 6.2.7 Contractor shall take reasonable measures to stop work or minimize the work in areas affected by or related to the contemplated changes.

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

Add new paragraph 6.4.5:

- 6.4.5 The *Contractor* confirms that, prior to bidding the *Project*, it carefully investigated the Place of the Work and applied to that investigation the degree of care and skill described in paragraph 3.15.1, given the amount of time provided between the issue of the bid documents and the actual closing of bids, the degree of access provided to the Contractor prior to submission of bid, and the sufficiency and completeness of the information provided by the Owner. The Contractor is not entitled to compensation or to an extension of the Contract Time for which could reasonably have been ascertained by the Contractor by such careful investigation undertaken prior to the submission of the bid.

GC 6.5 DELAYS

Delete the period at the end of paragraph 6.5.1 and substitute the following words:

- 6.5.1 “, but excluding any consequential, indirect or special damages.”

Add new paragraph 6.5.6:

- 6.5.6 If the Contractor is delayed in the performance of the Work by any act or omission of the Contractor or anyone employed or engaged by the Contractor directly or indirectly, or by any

cause within the Contractor's control, then the Contract Time shall be extended for such reasonable time as the Consultant may decide in consultation with the Contractor. The Owner shall be reimbursed by the Contractor for all reasonable costs incurred by the Owner as the result of such delay, including all services required by the Owner from the Consultant as a result of such delay by the Contractor and, in particular, the cost of the Consultant's services during the period between the date of Substantial Performance of the Work stated in Article A-1 herein as the same may be extended through the provisions of these General Conditions and any later, actual date of Substantial Performance of the Work achieved by the Contractor.

Add new paragraph 6.5.7:

6.5.7 If the Contractor is delayed in the completion of the Work by any act or neglect of: The HRCE, any employee or either any other Contractor employed by The HRCE, changes ordered in the Work, strikes, lockouts, fire, unusual delay by common carriers, unavoidable casualties, any other cause of any kind whatsoever beyond the Contractor's control or by any cause within the Contractor's control which the Consultant shall decide as justifying the delay, then the time of completion shall be extended for such reasonable time as the Consultant may decide.

Add new paragraph 6.5.8:

6.5.8 No such extension shall be made for delay occurring more than seven (7) days before claim therefore is made in writing to the Consultant, provided however that in the case of a continuing cause of delay, only one (1) claim shall be necessary.

Add new paragraph 6.5.9:

6.5.9 If no schedule is made, no claim for delay shall be allowed on account of failure to furnish such schedule until two (2) weeks after demand for such schedule and not then unless such claim be reasonable.

Add new paragraph 6.5.10:

6.5.10 The Consultant shall not, except by written notice to the Contractor, stop or delay any part of the main Contract Work pending decisions or proposed changes.

GC6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

Amend paragraph 6.6.5 as follows:

6.6.5 Add the words "as noted in paragraph 6.6.3" after the words "of the claim" and add the words "and the consultant", at the end.

GC 6.7 VALUATION OF CHANGES

Add the following Header and paragraphs 6.7.1, 6.7.2, 6.7.3 and 6.7.4 in their entirety:

GC 6.7 VALUATION OF CHANGES

6.7.1 The value of any change shall be determined in one or more of the following way as determined by the Consultant:

- (a) By estimate and acceptance in a lump sum, submitted with sub-contractors' and suppliers' signed quotations and breakdown estimates including itemized material and labour lists.
For changes where the individual trade cost is anticipated to be less than \$1000, the requirement for the detailed cost breakdown may be waived, but individual trade quotation must be supplied.
- (b) By unit prices agreed upon or as listed in the contract.
- (c) Cost of work and percentage or by cost and fixed fee.

6.7.2 In cases of additional work to be paid for under method "c", the Contractor shall keep and present in such form as the Consultant may direct, a correct account of the net cost of labour and materials, together with vouchers. In any case, the Consultant shall certify to the amount due to the Contractor including the profit and overhead. Pending final determination of value, payments on account of changes shall be made on the Consultant's certificate.

6.7.3 In determination of method ".1(a) or ".1(c) above, the labour costs to be calculated by the actual estimated hours at an hourly rate determined as follows:

The hourly labour rate to be total payroll costs including hourly wage, statutory contributions to UIC, WCB, CPP, Training Funds, Health Benefits and other applicable labour burdens paid directly by the employer such as vacation pay, holiday pay, pension plan etc.

The HRCE reserves the right to verify the payroll cost by independent audit.

To the total payroll cost the following percentage factors will be recognized.

- small tools/expenditures 5% (on payroll costs)
- site supervision 5% (on payroll costs)

(d) In determination of methods ".1(a)" and ".1(c)" above, the material costs to be calculated as follows:

Contractors net costs, including contractor discounts from suppliers, FOB the project site plus applicable taxes.

(e) In determination of methods “.1(a)” and “.1(c)” above, equipment rental costs for major pieces of equipment required will be at local industry rates.

(f) In determination of methods “.1(a)” and “.1(c)” above, overhead and fees shall be calculated as follows:

The cost of any authorized change shall be determined by the net total of labour and material or equipment as outlined in “.3(a)”, “.3(b)” and “.3(c)” above on which the percentage markup shall be determined as follows:

For Extras Up to \$5,000:

Sub- Contractors Own Work	- Overhead & Fee – 15% total
General Contractors Own Work	- Overhead & Fee – 15% total
General Contractors on Sub Contractors work (no percentage markup shall be applied to deductions)	- 10% total

For Extras Above \$5,000:

Sub-Contractors Own Work	- Overhead & Fee – 10% total
General Contractors Own Work	- Overhead & Fee – 10% total
General Contractors on sub contractor’s work (no percentage markup shall be applied to deductions)	- 8% total

6.7.4 Submit to the Consultant and The HRCE’s representative detailed breakdown of the hourly labour rate as defined in paragraph “.3(a)”.

GC 8.2 NEGOTIATION, MEDIATION, AND ARBITRATION

Add the following paragraphs 8.2.9, 8.2.10, 8.2.11, 8.2.12, 8.2.13, 8.2.14, and 8.3:

8.2.9 Within five days of receipt of the notice of arbitration by the responding party under paragraph 8.2.6, the Owner and the Contractor shall give the Consultant a written notice containing:

- a) a copy of the notice of arbitration;
- b) a copy of supplementary conditions 8.2.9 to 8.2.14 of this contract, and;
- c) any claims or issues which the Contractor or the Owner, as the case may be, wishes to raise in relation to the Consultant arising out of the issues in dispute in the arbitration.

8.2.10 The Owner and the Contractor agree that the Consultant may elect, within ten days of receipt of the notice under paragraph 8.2.9, to become a full party to the arbitration under paragraph 8.2.6 if the Consultant:

- a) has a vested or contingent financial interest in the outcome of the arbitration;
- b) gives the notice of election to the Owner and the Contractor before the arbitrator is appointed;
- c) agrees to be a party to the arbitration within the meaning of the rules referred to in paragraph 8.2.6, and;
- d) agrees to be bound by the arbitral award made in the arbitration.

8.2.11 If an election is made under paragraph 8.2.10, the Consultant may participate in the appointment of the arbitrator and, notwithstanding the rules referred to in paragraph 8.2.6, the time period for reaching agreement on the appointment of the arbitrator shall begin to run from the date the respondent receives a copy of the notice of arbitration.

8.2.12 The arbitrator in the arbitration in which the Consultant has elected under paragraph 8.2.10 to become a full party may:

- a) on application of the Owner or the Contractor, determine whether the Consultant has satisfied the requirements of paragraph 8.2.10, and;
- b) make any procedural order considered necessary to facilitate the addition of the Consultant as a party to the arbitration.

8.2.13 The provisions of paragraph 8.2.9 shall apply mutatis mutandis to written notice to be given by the Consultant to any sub-consultant.

8.2.14 In the event of notice of arbitration given by the Consultant to a sub-consultant, the sub-consultant is not entitled to any election with respect to the proceeding as outlined in 8.2.10, and is deemed to be bound by the arbitration proceeding.

8.3 An application for arbitration shall be accompanied by security in the amount of \$1000 to apply to the cost of arbitration. Any claims of excess costs must be submitted in writing to the Consultant within two weeks of completion or alleged completion of the work. No claims shall be accepted after this date and, also, no claims shall be accepted for disputed work unless the Consultant has been notified as specified.

GC 9.1 PROTECTION OF WORK AND PROPERTY

Delete subparagraph 9.1.1.1 in its entirety and substitute the following new paragraph 9.1.1.1:

9.1.1.1 errors in the Contract Documents which the Contractor could not have discovered applying the standard of care described in paragraph 3.15.1.

Delete paragraph 9.1.2 in its entirety and substitute the following new paragraph 9.1.2:

9.12 Before commencing any Work, the Contractor shall determine the locations of all underground utilities and structures indicated in the Contract Documents, or that are discoverable by applying to an Inspection of the Place of Work exercising the degree of care and skill described in paragraph 3.15.1.

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

Add in paragraph 9.2.6 after the word “responsible”, the following new words:

9.2.6 Or whether any toxic or hazardous substances or materials already at the Place of Work (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the Contractor or anyone for whom the Contractor is responsible in a manner which does not comply with legal and regulatory requirements, or which threatens human health and safety or the environment, or material damage to the property of the Owner and others,

Add in subparagraph 9.2.7.4:

9.2.7.4 “and the Consultant” after “Contractor”:

Add in paragraph 9.2.8 after the word “responsible”, the following new words:

9.2.8 or that any toxic or hazardous substances or materials already at the Place of the Work (and which were then harmless or stored, contained or otherwise dealt with in accordance with legal and regulatory requirements) were dealt with by the Contractor or anyone for whom the Contractor is responsible in a manner which does not comply with legal and regulatory requirement, or which threatens, humane health and safety or the environment, or material damage to the property of the Owner or others.

GC 9.5 MOULD

Add in subparagraph 9.5.3.4:

9.5.3.4 “and the Consultant” after “Contractor”

GC 10.1 TAXES AND DUTIES

Add the following paragraph 10.1.3:

10.1.3 The Contractor shall indicate on each application for payment as a separate amount, the appropriate Harmonized Sales Tax the Owner is legally obliged to pay. This amount will be paid to the Contractor in addition to the amount certified for payment under the Contract.

GC 10.2 LAWS, NOTICES, PERMITS AND FEES

Delete from the first line of paragraph 10.2.5 the word, "The" and substitute the words:

10.2.5 "Subject to paragraph 3.15.1, the"

GC 10.4 WORKERS' COMPENSATION

Add the following paragraphs 10.4.3, 10.4.4, and 10.4.5:

10.4.3 The contractor is referred to regulations, as applicable, under the Worker's Compensation Act of Nova Scotia.

10.4.4 Registration with Worker's Compensation Board shall be continuous during the contract. Should registrations be scheduled to expire during the contract period, the Contractor shall submit a copy of registration renewal one month prior to the expiration of the current certificate.

10.4.5 The Contractor shall furnish evidence of coverage under the Worker's Compensation Act, R.S.N.S. and a clearance Certificate providing proof of registration with Worker's Compensation Board prior to commencement of work. (A photocopy of the Contractors registration certificate is acceptable proof). On-going proof of good standing with the Worker's Compensation Board during the term of the contract is required.

GC 11.1 INSURANCE

Delete sentences and replace with the following in subparagraph 11.1.1.1:

- 11.1.1.1 "General liability insurance shall be maintained from the commencement of the work until one year from the date of Substantial Performance of the Work. Liability coverage shall be provided for completed operations hazards from the date of Substantial Performance of the Work, as set out in the certificate of Substantial Performance of the Work, on an ongoing basis for a period of 6 years following the Substantial Performance of the Work" **and replace with:** " General Liability Insurance or Wrap- Up Liability Insurance, (as detailed in the Information to Tenders section under "Insurance Requirements"), shall be maintained from the commencement of the work until final completion and acceptance of the work including the making good of faulty work or materials, except that coverage of completed operations liability shall in any event be maintained for twelve (12) months from date of Substantial Performance of the work as certified from the Consultant, and approved by the Owner".

Add the following subparagraphs 11.1.1.1.1, 11.1.1.1.2, and 11.1.1.2.1:

- 11.1.1.1.1 The general liability insurance to be maintained by the Contractor shall include Commercial General Liability Insurance covering Premises and Operations Liability, elevators, board form property damage, board from automobile, owners and contractors protective, blanket contractual, personal injury, completed operations liability contingent employers liability, cross liability clause, non-owned automobile liability, and a 30 day notice of cancellation clause.
- 11.1.1.1.2 All liability insurance policies shall be written in such terms as will fully protect the Contractor and
The Halifax Regional Centre for Education as an additional named insured.
- 11.1.1.2.1 Liability coverage of not less than two million dollars (\$2,000,000) is required with regard to operations of owned automobiles.

Delete subparagraph 11.1.1.4 in its entirety and insert the following subparagraphs:

- 11.1.1.4 Broad Form (All Risks) Builders Risk Coverage - Prior to the commencement of any Work the Contractor shall maintain and pay for Broad Form (All Risks) Builders Risk Coverage in the joint names of The HRCE and the Contractor totaling not less than one hundred percent (100%) of the total value of the Work done and materials delivered on the site (contract value), so that any loss under such policies of insurance will be payable to The HRCE and the Contractor as their respective interests appear. The Builders Risk Insurance shall include all materials related to the work while in transit or at other locations.

- 11.1.1.4.1 Should a loss be sustained under the Builders Risk Coverage, the Contractor shall act on behalf of The HRCE and Contractor for the purpose of adjusting the amount of such loss with the insurance companies. As soon as such adjustment has been satisfactorily completed, the Contractor shall proceed to repair the damage and complete the Work and shall be entitled to receive from The HRCE in addition to any sum due under the Contract, the amount at which The HRCE interest has been appraised in the adjustment made with the insurance companies as referred to above, said amount to be paid to the Contractor as the Work of restoration proceeds. Any loss or damage which may occur shall not affect the rights and obligations of either party under the Contract except as aforesaid and except that the Contractor shall be entitled to a reasonable extension of time for the performance of the Work, as The HRCE may decide.
- 11.1.1.4.2 Upon approval by The HRCE of the Substantial Performance certificate issued by the Consultant, the Contractor's obligation to maintain Builder Risk Insurance shall cease and The HRCE shall assume full responsibility for insuring the whole of the Work against loss or damage.
- 11.1.1.4.3 "Broad form" property insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors* The Broad form" property insurance shall be provided from the date of commencement of the *Work* until the earliest of:
- 11.1.4.3.1 Ten (10) Calendar days after the date of *Substantial Performance of the Work*;
 - 11.1.4.3.2 on the commencement of use or occupancy of any part or section of the *Work* unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square meter in area, or parking purposes, or for the installation, testing and commissioning or equipment forming part of the *Work*; and
 - 11.1.4.3.3 when left unattended for more than thirty (30) consecutive calendar days or when construction activity has ceased for more than thirty (30) consecutive calendar days.

Paragraph 11.1.2 is clarified as follows:

- 11.1.2 Submit certified true copies of each insurance policy to the Owner's Contract Authority within seven (7) working days after notification of award or in any event prior to payment of the first progress claim. Such copies shall be exclusive of information pertaining to premium or premium bases used by the insurer to determine the cost of the insurance. Prior to the commencement of any work, the Contractor shall file with the Owner a certified copy of each insurance policy and certificate required.

Delete 11.1.5 in its entirety and replace with the following:

11.1.5 Insurance contracts shall be procured from and the premiums paid to a resident agent of an insurance Company licensed to underwrite insurance in the Province of Nova Scotia.

Add the following paragraph 11.1.9:

11.1.9 All of the insurance policies shall contain a clause stating that no change in terms and conditions or cancellation may at any time be made without the full knowledge and consent of the owner.

GC 11.2 CONTRACT SECURITY

Add the following subparagraph 11.2.2.1:

11.2.2.1 "Bonds shall be procured from a Nova Scotia resident agent of an insurance company licensed to do business in Nova Scotia and shall be maintained in good standing and held by the Owner until one (1) year after Substantial Performance of the Work.

Add the following paragraph 11.2.3:

11.2.3 If a Certified Cheque is held as contract security it shall be in an amount equal to ten (10) percent (%) of the Contract Price. Supplement the Certified Cheque as necessary to maintain the amount equal to ten (10) percent (%) of the total amount payable (Contract Price plus HST).

- .1 The Certified Cheque will be deposited at the chartered bank holding The HRCE deposits.
- .2 The HRCE will return the cheque amount to the Contractor upon satisfactory completion of the contract and duration as specified in the Tender documents.
- .3 Should Contractor default, total amount payable under the Certified Cheque will be the face value of the cheque plus all accrued interest.
- .4 Payment for completion of work, due to failure of performance of the Contractor, shall include all reasonable obligations under the Contract, including architectural and engineering costs arising because of the default of the Contractor.
- .5 Payment for labour and materials shall be limited to those who have a direct contract with the Contractor for the provision of labour and/or material (which includes equipment rental).

GC 12.3 INDEMNIFICATION

Add the following paragraph 12.1.1.3:

- 12.1.1.3 The Contractor shall indemnify and hold harmless the Consultant, its agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceeding by third parties that arise out of, or are attributable to, the Contractor's performance of the Contract, provided such claims are attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, and caused by negligent acts or omissions of the Contractor or anyone for whose acts the Contractor may be liable, and made in writing within a period of six (6) years from the date of Substantial Performance of the Work, or within such shorter such period as may be prescribed by any limitation statute or the province or territory of the Place of Work.

GC 12.3 WARRANTY

Delete from the first line the word, "The" and substitute the words in paragraph 12.3.2:

- 12.3.2 "Subject to paragraph 3.15.1, the..."

Add the following paragraph 12.3.7:

- 12.3.7 Warranty repairs or replacements which arise during warranty period which affect the operation of the system shall be attended to immediately upon notification from the Consultant.

END OF SECTION 00 73 00

SECTION 00 73 10 - HRCE GENERAL TERMS & CONDITIONS

1. General

- 1.1. These Terms and Conditions, shall apply only to those documents (Quotations, Request for Proposals and Tenders, herein referred to as Public RFX or RFX) that reference them specifically. In the event of any conflict or disagreement between these Terms and Conditions and the RFX documents, the RFX documents have precedence and will be assumed to be correct.
- 1.2. These Terms and Conditions are intended to cover a wide range of procurements, including goods and services. As such, not all clauses will be applicable in all situations. If Suppliers have questions regarding any of these Terms and Conditions, they should contact the Halifax Regional Centre for Education (HRCE) Procurement Division. To satisfy special requirements, supplementary Terms and Conditions may also apply to some acquisitions. If this is the case, the RFX documents will reference any such documents, in addition to these Terms and Conditions.
- 1.3. For the purpose of these Terms and Conditions HRCE intends to only contract with responsible Suppliers who are in the business of providing the goods and/or services submitted upon, and can provide proof that they can furnish satisfactory performance based on past work experience with HRCE, other companies, or government agencies and have the financial managerial, and resource capabilities for the size of project bid upon. Satisfactory performance includes meeting all of the requirements of the various federal and provincial regulations and agencies for the completion of work and making payment to sub-contractors in a timely basis.
- 1.4. All of the terms, conditions and/or specifications stated or referenced in the Solicitation are assumed to be accepted by the Tenderer and incorporated in the Bid.

2. RFX Documents

- 2.1. RFX Documents should be obtained as indicated on the Cover Sheet of the tender document.
- 2.2. While HRCE has tried to ensure accuracy in the RFX documents, it is not guaranteed or warranted by HRCE to be accurate, nor is it necessarily comprehensive or exhaustive.
- 2.3. HRCE cannot ensure the accuracy of RFX documents obtained from any other source. (i.e. Construction Association of Nova Scotia (CANS), Nova Scotia Electronic Tendering Bulletin Board, Project Consultants, etc.).
- 2.4. All inquiries to this RFX are to be directed, in writing, to HRCE Procurement Division representative indicated in the RFX documents. Information obtained from any other source is not official and will not bind HRCE.
- 2.5. HRCE will assume that all Suppliers have resolved any questions they might have about the RFX and have informed themselves as to existing conditions and limitations, site restrictions, etc. before providing a RFX submission.
- 2.6. Nothing in the RFX is intended to relieve Suppliers from forming their own opinions and conclusions with respect to the matters addressed in the RFX or its associated documents.
- 2.7. In the event that HRCE Regional Office (33 Spectacle Lake Drive, Dartmouth) is closed (this includes partial day closures) due to inclement weather on the date and time of the RFX closing, the closing date and time will be extended one (1) business day. Tenderers should note that closure of Schools does not necessarily mean the closure of the HRCE's Regional Office. Closures are detailed on HRCE website.

3. Verbal instructions: Any changes to RFX call, specifications, terms and conditions shall be stated in writing. Verbal statements made by employees or representatives of HRCE, whether or not they appear to have the proper authority, shall not be binding on HRCE.

4. Addenda: HRCE reserves the right to modify the terms of the RFX documents prior to closing, at its sole discretion by addenda.

- 4.1. HRCE Procurement Division will make every effort to ensure the information provided on hrsb.ca is complete and accurate, please report any omissions or discrepancies to the Procurement Division immediately. **Any questions or requests for clarification arising from omissions, discrepancies, or ambiguities, must be made in writing no later than five(5) working days prior to the closing date, not including the closing date.** Replies to requests for clarification, if required, will be made in the form of written addenda, copies of which will be

posted on www.hrsb.ca/tender no later than three (3) working days prior to the date of closing, not including the closing date.

- 4.2. By downloading files from the www.hrsb.ca, you will automatically become registered for the applicable RFX. HRCE Procurement Division will make reasonable efforts, strictly as a courtesy, to directly inform registered Suppliers of any addenda, **however it is the sole responsibility of each registered Supplier to ensure that they have all the documents associated with any RFX and, to this end, every registered Supplier should review HRCE Tender Web Site daily.** These documents must be downloaded from the www.hrce.ca/tender or obtained from HRCE Procurement Division, as applicable. Suppliers must acknowledge receipt of all addenda(s) with their RFX Submission.

5. **Suppliers Responsibility:** Suppliers are solely responsible for their own expenses in preparing, delivering or presenting a RFX and for subsequent negotiations, if any, with HRCE. It will be the responsibility of the Supplier to acquire at the Suppliers cost, any RFX documents as indicated on the Cover Sheet of the tender document.
6. **Existing Conditions:** Suppliers will be deemed to have familiarized themselves with the existing conditions which may affect the performance of required goods, services and construction. No plea of ignorance of such conditions as a result of failure to make all necessary examinations will be accepted as a basis for any claims for extra compensation or an extension of time. Suppliers are to ensure that they understand the expected use for the requested goods, service and construction and submit their RFX submission accordingly.

7. **RFX Submissions**

- 7.1. RFX will close at the time, date and location specified in the RFX documents (Atlantic Time Zone).
- 7.2. All RFX submissions must be received in their entirety on or before the closing time specified. Suppliers are responsible for ensuring that their RFX submission, however submitted, is received on time and at the location specified.
- 7.3. RFX Submissions must be submitted on the forms provided or in such format as directed in the RFX documents. These forms must be legible, complete, filled out in ink, or by typewriter, with the signature in longhand and the completed form shall be without interlineations, alterations or erasures.
- 7.4. If an electronic transmission (i.e. Facsimile, e-mail or hrsbc.ca upload) can be accepted, as detailed in the applicable RFX documents, it is the responsibility of the Supplier:
- 7.4.1. to ensure that the submissions are delivered on or before the closing time and date shown on the RFX documents;
- 7.4.2. that the correspondence is legible and properly transmitted; and
- 7.4.3. that the name and number of the RFX is clearly displayed.
- 7.5. Electronic transmission of a RFX submission cannot be used where original documents are required, e.g. bid bonds, certified cheques, samples, etc., or as may be otherwise stated in the RFX documents.
- 7.6. **Sealed RFX submissions** must be delivered to HRCE Receptionist, 1st floor, 33 Spectacle Lake Drive, Dartmouth, Nova Scotia, on or before the closing time and date shown on the RFX documents. The RFX Submission is to be submitted on the provided forms, signed (together with the required RFX security as applicable) in a sealed opaque envelope, clearly identified with Suppliers name, RFX identification number and name, and closing date on the outside of the envelope. RFX Submissions are date and time stamped upon receipt at the Procurement Division (not at any other location) by the Procurement date time stamp. Any submission received after the closing date and time shown on the RFX documents will not be accepted and will be returned to the Supplier unopened and deemed non-compliant. – **N/A**
- 7.7. **Facsimile submissions** received are date and time stamped by the Procurement Division Facsimile, no other time stamp will be considered. A facsimile submission received after the closing date and time shown on the RFX documents will not be accepted and shall be deemed non-compliant. **The facsimile number for the Procurement Department of HRCE is (902) 464-0161. Do not send RFX correspondence to any other fax number.** – **N/A**
- 7.7.1. Where specified, facsimile submissions are accepted for the convenience of the Supplier; HRCE cannot ensure the confidentiality or error-free receipt of facsimile submissions.

7.8. Amendments/Withdrawn Submissions

7.8.1. Submissions may be withdrawn or amended by written request (on company letterhead or equivalent), prior to RFX closing date and time, but cannot be altered or changed in any way after the RFX closing.

7.8.2. Facsimile transmissions modifying supplier provided information are acceptable when signed by a duly authorized officer or agent. Submission of such electronic transmissions is at the risk of the Supplier. HRCE assumes no liability for the receipt of the electronic transmissions or their proper inclusion with original RFX submission. An electronic submission must be submitted prior to closing time and date specified in the RFX documents.

7.8.3. An amendment to a RFX submission replaces any other RFX submission amendment previously submitted by the supplier; only the last of any RFX submission amendment received will be accepted.

7.9. All RFX submissions must be signed by an authorized representative of the entity.

7.10. HRCE's time clocks will be assumed to be correct in the event of dispute. – N/A

7.11. HRCE reserves the right in its sole discretion to clarify any RFX submission after closing by seeking further information from that Supplier, without becoming obligated to clarify or seek further information from any or all other Supplier. However, Suppliers are cautioned that any clarifications sought will not be an opportunity either to correct errors or change their Bids in any substantive manner.

8. Brand Name: Some terminology may be used that would imply or denote a particular supplier. Brand names may be utilized to designate the type and quality of the product requested. Such usage shall not to be construed as restrictive in any way. Suppliers must be prepared to provide samples if required.

9. Substitute

9.1. If the Supplier is offering an equivalent (similar) substitute product to those specified, unless a specific product is requested, the supplier must clearly identify this substitution and supply the manufacturer's name, product number and provide any technical information required so that HRCE can determine the acceptability of the substitute.

9.2. HRCE reserves the right to inspect or test any product bid to determine equivalency, and may require demonstrator or sample items in order to be able to evaluate the items proposed.

9.3. HRCE shall be the sole judge of the acceptability of any substitute or proposed equivalent.

9.4. Specifications may, for technical or logistical reasons, require that the items specified be supplied without substitution.

10. Warranty

10.1. The supplier must describe the duration, type (e.g. on-site, depot, ship-in or carry-in) and terms of the manufacturer's warranty on all goods. If the supplier provides any additional/supplementary warranty coverage, describe this as well.

10.2. If warranties can be upgraded or extended, identify the upgrade costs separately. Do not include warranty upgrade or extension costs in the price unless the RFX documents specifically states that the upgrade is a mandatory requirement.

11. Pricing

11.1. All prices must be extended and totaled, where practical to do so. RFX Submission may be rejected as incomplete if total figures are not provided. In the case of an error in the extension of prices, the unit prices shall prevail.

11.2. Prices must be in Canadian funds, and shall include all shipping, handling, freight, offloading, duty, insurance and any other charges, which are applicable at time RFX is awarded (FOB – Destination). HRCE will not assume responsibility for any goods or services until they have been delivered to the destination(s) specified in the

Solicitation. It is the responsibility of the Supplier to find out from the appropriate authorities what rates and charges are applicable to this RFX. No extra charges will be paid by HRCE.

- 11.3.** In the event that a number of Suppliers provide submission in substantially the same amount, HRCE may, at its discretion, call upon those Suppliers to submit further bids.

12. Permits and Taxes: It is the responsibility of the Supplier to ensure that quotations include all taxes, permits, and other charges required to supply the goods, services and construction. The successful Supplier is to comply with all codes, regulations, and by-laws and all government and applicable standards pertaining to the work and job-site including, and not limited to, the Nova Scotia Occupational Health and Safety Act and Regulations. HRCE is required to pay a Harmonized Sales Tax (HST) at a rate specified by the Province of Nova Scotia. This tax is to be shown as a separate line item.

13. Standards

- 13.1.** All goods, services and construction supplied to HRCE shall, when standards are available, be certified in accordance with the applicable code(s), but not limited to:
- 13.1.1. Canadian Standards Association;
 - 13.1.2. Canadian Government Standards Board;
 - 13.1.3. Underwriters Laboratories of Canada; and
 - 13.1.4. And all applicable Federal, Provincial and Municipal regulations and acts.
- 13.2.** HRCE reserves the right to discontinue the purchase of any product/service that does not continue to meet the applicable standard(s).

14. Inspection: HRCE reserves the right to inspect any goods, services or construction supplied either during or after manufacture and delivery, and shall be the sole judge as to the acceptability of goods, services and construction to meet the needs of HRCE and fulfills the requirements as specified.

15. Rejection of RFX Submissions/Compliance:

- 15.1.** Failure to comply with any of the mandatory terms or conditions contained or referenced in the RFX documents shall result in the rejection of the RFX submission.
- 15.2.** HRCE specifically reserves the right to accept or reject any or all RFX submission and implies no obligation on HRCE to accept any RFX submission, a portion of any RFX submission or any RFX submission. HRCE reserves the right to cancel any RFX in its entirety and shall not be responsible, in any manner, for expenses incurred by the Supplier for preparing a RFX submission. HRCE may award all or a portion of the work to one or more Suppliers. Without limiting the generality or any other provision hereof, HRCE reserves the right to reject or accept any RFX submission:
- 15.2.1. that contains any irregularity or informality;
 - 15.2.2. that is not accompanied by the security documents required;
 - 15.2.3. that contains an alteration in the quoted price that is not initialed by the or on behalf of the Supplier;
 - 15.2.4. that is incomplete or ambiguous;
 - 15.2.5. contains clauses additional to the RFX that are "qualified" or "conditional"; and/or
 - 15.2.6. that does not strictly comply with the requirements contained in these instructions.
- 15.3.** HRCE reserves the right to waive minor non-compliance where such non-compliance is not of a material nature in its sole and absolute discretion, or to accept or reject in whole or in part any or all RFX submissions, with or without giving notice. Such minor non-compliance will be deemed substantial compliance and capable of acceptance. HRCE will be the sole judge of whether a RFX submission is accepted or rejected.
- 15.4.** HRCE reserves the right to accept or reject any or all RFX submission, not necessarily accept the lowest priced RFX submission, or to accept any RFX submission which it may consider to be in its best interest.

16. Evaluation criteria: If applicable, award of the RFX will be based on "Best Value" (which includes, but not limited to; price, discounts, product specifications, warranty, delivery, reference checks, etc.

17. Cancellation/no award

- 17.1. Issuing a RFX implies no obligation on HRCE to accept any submission, or a portion of any submission. The lowest or any RFX submission will not necessarily be accepted.
- 17.2. RFX's may be cancelled in whole or in part by HRCE in its sole discretion when:
 - 17.2.1. the RFX submission price exceeds the funds allocated for the purchase;
 - 17.2.2. there has been a substantial change in the requirements after the RFX has been issued;
 - 17.2.3. information has been received by the RFX after the RFX has been issued that the RFX believes has substantially altered the procurement;
 - 17.2.4. there was insufficient competition in order to provide the level of service, quality of goods or pricing required.
- 17.3. If no compliant RFX submission is received in response to a RFX, the HRCE reserves the right to enter into negotiations with one or more suppliers in order to complete the procurement.
- 17.4. HRCE will be the sole judge of whether there is sufficient justification to cancel any RFX.
- 17.5. No action or liability will lie or reside against HRCE in its exercise of its rights under this section.

18. Eligibility and Conflict of Interest

- 18.1. A RFX Submission may not be eligible for acceptance if current or past corporate or other interests of the Tenderer may, in HRCE's opinion, give rise to a conflict of interest in connection with a project.
- 18.2. Suppliers are cautioned that acceptance of their RFX submission may preclude them from submitting a response on subsequent phases where a conflict of interest may arise. Suppliers should study the project implementation strategy to determine whether or not they plan to submit response on subsequent phases.
- 18.3. If the RFX submission covers the first phase of what may prove to be a multi-phased project, the successful Supplier on the initial phase may be permitted to respond on subsequent phases as long as, in HRCE's opinion, no conflict of interest would be created in performance of the work by that Supplier.
- 18.4. Sub-contracting to any firm or individual whose current or past corporate or other interests may, in HRCE's opinion, give rise to a conflict of interest in connection with this bid will not be permitted. This includes, but is not limited to, any firm or individual involved in the preparation of the RFX documents.

19. Disputes: In case of dispute as to whether or not an item or service quoted or delivered meets RFX requirements, the decision of HRCE, or its authorized representative, shall be final and binding on all parties.

20. Exceptions: A RFX submission shall be considered an agreement to all terms and conditions provided herein and in various RFX documents, unless specifically noted otherwise in the RFX documents.

21. Irrevocable Offer: A RFX submission represents an irrevocable offer, unless otherwise stated in the RFX documents and shall be valid for a period of ninety (90) days following the closing date for RFX submissions.

22. Patent right and royalties: The successful Supplier shall pay all royalties and patent license fees required for the performance of the work. The successful Supplier shall hold HRCE harmless from and against claims, demands, losses, costs, damages, action suits or proceedings arising out of the successful Supplier's performance of the Contract which are attributable to an infringement or an alleged infringement of a patent of invention by the successful Supplier or anyone for whose acts the successful Supplier may be liable.

23. Assignment: The successful Supplier shall not assign the Contract (or portion thereof) nor sub-contract without the prior written consent of HRCE, consent shall not be unreasonably withheld.

24. Purchase Order: Work by the Supplier will begin only with the issuance of HRCE's official purchase order and/or any Contract Documents as applicable. The purchase order number must appear on any/all invoices covering same. No work is authorized until the successful Supplier has received an official HRCE purchase order and/or required Contract Documents. HRCE accepts no responsibility for any work performed prior to the issuance of a purchase order and/or required Contract Documents.

25. Delivery

- 25.1.** Where the RFX Document includes a mandatory delivery schedule, HRCE will assume that the Supplier can meet the requested schedule and is satisfied that the goods or services required will be available for delivery on the requested date(s).
- 25.2.** If Suppliers wish to specify a delivery schedule different from that requested in the RFX document, they must provide specific delivery dates or a schedule in calendar days from the date a Purchase Order is issued. RFX Submission that do not meet the delivery schedule as requested in the RFX documents may be rejected.
- 25.3.** Time is of the essence, and supplier's delivery schedule is legally binding. HRCE reserves the right to assess penalties or cancel awards to Suppliers who fail to meet their stated delivery or completion dates.

26. Invoices

- 26.1.** All invoices are to be submitted quoting the Purchase Order number (as applicable). The H.S.T. number must be shown on each invoice. Invoices must include a description of the goods, services and construction provided with HRCE Work Order Numbers (where applicable). Invoices must also clearly indicate list price, discounts offered and net price, if applicable. All invoices are to be forwarded by email to: accountspayable@hrce.ca
- 26.2.** All Suppliers are required to maintain their tax status in good standing. In this regard, Suppliers are advised that verification of good standing with the Nova Scotia Minister of Finance and Revenue Canada (GST/HST) may be carried out prior to the award of a contract to a successful Supplier.
- 26.3.** In order to maximize efficiencies, as well as to be more environmentally friendly, vendor payments are now being paid via EFT (Electronic Funds Transfer) direct deposit to vendor bank accounts. A vendor direct deposit form must be filled out with banking information for EFT payments.

27. Payment:

- 27.1.** HRCE's normal payment terms are thirty (30) days from acceptance that the goods, services and construction meet the specifications. Alternative payment schedules may be proposed and are to be shown as an option and list any additional discounts to HRCE. Early payment discount terms (minimum period ten (10) days) may be considered in the evaluation of the RFX response. Payment of term discount invoices will be calculated from the date of the invoice or goods have been received, whichever is later. Discount terms must appear on the invoice.
- 27.2.** The Supplier shall make application for payment at least monthly with the application based on progress or services provided during that month. HRCE will hold back ten percent (10%) of any payment until the lien periods have expired and the Supplier has provided HRCE with a complete release of any lien registered as a result of any work carried out by the Supplier, or any sub-contractor or supplier to the Supplier.

28. Right to offset: The successful Supplier agrees that HRCE may apply payments for goods, services and construction to any amount owing to HRCE by the Supplier or supplier including any related administration fees.

29. Confidentiality: The Supplier shall keep private, treat as being confidential, and not make public or divulge during, as well as after, the term on this Agreement, any information or material to which the Supplier or staff becomes privy as a result of acting under this Agreement without having first obtained HRCE's consent in writing.

30. Freedom of Information and Protection of Privacy (FOIPOP) Act and Personal Information International Disclosure Protection Act (PIIDPA)

- 30.1.** As a public body, HRCE is subject to provincial legislation, Freedom of Information and Protection of Privacy (FOIPOP) Act. RFX submissions and associated documents are subject to disclosure and protection under this legislation. In the event an application for disclosure of information is made under FOIPOP, HRCE is subject to the disclosure and protection of information in accordance with that legislation. Suppliers are recommended to visit the following websites for more information on the Act: <http://www.gov.ns.ca/just/IAP/default.asp> and <http://www.foipop.ns.ca/>
- 30.2.** The Province of Nova Scotia is required to comply with the Personal Information International Disclosure Protection Act (PIIDPA) (S.N.S 2006, c.3). The act creates obligations for the Province of Nova Scotia and its service providers when personal information is collected, used or disclosed. Requirements include limiting storage, access and disclosure of personal information to Canada, except as necessary or otherwise required by law. Suppliers are recommended to visit the following PIIDPA websites for more information on the Act:

http://nslegislature.ca/legc/bills/60th_1st/3rd_read/b019.htm
<http://www.gov.ns.ca/just/IAP/PIIDPAquest.asp#p01>

and

- 30.3.** The Supplier acknowledges and confirms that it is a “service provider” as defined in the Personal Information International Disclosure Protection Act, SNS 2006 c. 3 (“PIIDPA”), that the Supplier has read and understands its obligations as a service provider thereunder and that as a service provider It is legally bound by the obligations imposed on it by PIIDPA. It is a condition precedent to HRCE entering into the Agreement with the Supplier that the Supplier irrevocably undertakes covenants and agrees to be bound by and comply with the obligations imposed on it as a service provider under PIIDPA.
- 30.4.** The Supplier further covenants, warranty and represents to HRCE that it will not at any time provide or allow the release of personal information to which it has access in its capacity as a service provider to HRCE in response to any “foreign demand for disclosure” or permit or allow the “unauthorized disclosure of personal information” as each of those terms are defined in PIIDPA.
- 30.5.** The Supplier shall implement and strictly enforce security arrangements that will ensure that all personal information that it collects or uses on behalf of HRCE is protected at all times from unauthorized access or disclosure and shall confirm in writing to HRCE, upon request, the details of such security arrangement. The Supplier also agrees to implement and enforce any additional security procedures as may be required by HRCE from time to time to protect the personal information that the Supplier collects on behalf of HRCE. HRCE shall be authorized, upon giving prior written notice to the Supplier, to enter the premises of the Supplier during normal business hours for the purpose of conducting an audit of the security arrangement referenced herein.
- 30.6.** All personal information that the Supplier obtains or becomes aware of while providing services to HRCE is not and shall not be or be deemed to be the property of the Supplier. The Supplier acknowledges and agrees that it will not, either directly or indirectly, acquire any rights to use or own any such information other than the right to use it for the sole purpose of fulfilling its obligations to HRCE under the Agreement.
- 30.7.** All RFX submissions become the property of HRCE. By providing a RFX submission, the supplier hereby grants HRCE a license to distribute, copy, print or translate the RFX submission for the purposes of the RFX. Any attempt to limit HRCE’s right in this area may result in rejection of the RFX submission.
- 30.8.** Suppliers RFX submission may be subject to disclosure under the Province's "freedom of information" legislation. By submitting a RFX submission, the Supplier agrees to the appropriate disclosure of the information supplied, subject to the provisions of the governing law. HRCE cannot guarantee the confidentiality of the complete content of any RFX submissions after the procurement has been awarded to the successful supplier.
- 30.9.** During the delivery and installation of goods and/or services, the supplier or supplier’s staff may have access to confidential information belonging to HRCE. Should this occur, the supplier must ensure that such information is not released to any third parties or unauthorized individuals; failure to comply may result in legal action being taken and/or the supplier’s disqualification from any further RFX’s issued by HRCE.
- 31. Indemnification:** The Supplier shall indemnify and hold harmless HRCE, their agents, representatives and employees from and against all claims, demands, losses, costs, damages, actions, suits or proceedings arising out of, or resulting from the performance of this work, provided that any such claim is caused in whole or in part by the negligent act or omission of the Supplier, and sub-contractor, supplier, licensee, anyone directly or indirectly employed by any one of them or anyone for whose act any of them is liable, regardless of whether or not it is cause in part by a party indemnified hereunder.
- 32. Insurance:** Unless otherwise stated, Commercial General Liability Insurance with policy limits of not less than five (5) million dollars (\$5,000,000.00) must be filed with the Procurement Department of HRCE; such insurance shall be in the name of the Supplier and HRCE. The insurance must include non-owned automobile liability with policy limits of not less than two (2) million dollars (\$2,000,000.00). All insurances are to be maintained in good standing for the duration of the Contract.
- 33. Termination for convenience:** HRCE may terminate a contract, in whole or part, whenever HRCE determined that such termination is in the best interest of HRCE, without just cause giving sixty (60) days written notice to the proponent. However, in no event shall the proponent be paid an amount that exceeds the submitted price for the work performed.

- 34. Termination for default:** When the proponent has not performed or has unsatisfactorily performed the contract, HRCE may terminate the contract for default. Upon termination for default, outstanding payment will be withheld at the discretion of HRCE. Failure on the part of the proponent to fulfill the contract obligations shall be considered just cause for termination of the contract. The proponent will be paid for work satisfactorily performed prior to termination, less any excess costs incurred by HRCE in re-procuring and completing the work.
- 35. Workers Compensation:** Prior to commencing the work, the Supplier shall provide a current clearance letter from the Workmen's Compensation Board (WCB) and must maintain this coverage during the whole term of the Contract.
- 36. WHMIS:** All controlled products supplies to HRCE must have approved Workplace Hazardous Materials Information System (WHMIS) supplier labels; Material Safety Data Sheets must also be supplied. Failure to comply with this requirement may result in rejection of any shipment, and may result in cancellation of the order and the return of goods to the supplier at the supplier's expense.
- 37. Health and Safety Act:** The Supplier shall take every precaution to ensure that every employee, self-employed person and employer performing work in respect of the project complies with the latest revisions of the Nova Scotia Occupational Health and Safety Act and the Regulations, HRCE Occupational Health and Safety Policy BP 303.1, and all other safety measures as required by authorities having jurisdiction.
- 38. Site Safety Plan:** Before being permitted access to the site to commence construction the Supplier may be requested provide HRCE with a written Project Specific Site Safety Plan. The Site Safety Plan provided shall be a written course of action that, through a pre-job evaluation, identifies and sets out specific actions to be taken to eliminate or control hazards associated with the work to be performed and to also deal with concerns or hazards that may develop during the course of the project. This Plan shall include, but not be limited to, identification of safety hazards anticipated during the project, solutions to those hazards, safety procedures, identification of designated safety officers and provision for safe access to the site for HRCE staff and or Consultants. Receipt and acceptance of the safety plan shall be mandatory prior to commencement of work.
- 39. Extension to the Broader Public Sector**
- 39.1.** HRCE may choose to allow the Broader Public Sector to purchase goods or services from some RFX's. The Broader Public Sector are generally permitted to purchase from "Standing Offers", which are contracts resulting from a RFX. Other RFXs may also be available to the Broader Public Sector; if so, the Solicitation documents will state this.
- 39.2.** By submitting a response to a RFX, the Supplier agrees to extend the same pricing to other eligible Broader Public Sector institutions as per the terms and specifications in the Solicitation
- 40. Governing Laws and Trade Agreements**
- 40.1.** Unless the RFX documents specifically state otherwise, the RFX, all submissions, and any subsequent contracts will be construed and interpreted in accordance with the laws of the Province in which the Solicitation was issued.
- 40.2.** RFX's subject to the Atlantic Procurement Agreement, the Agreement on Internal Trade, any other inter-provincial trade agreements, or any international trade agreements, will be specifically identified as such in the public notice and/or the Solicitation documents.
- 40.3.** Information of any applicable trade or procurement agreements and/or legislation can be obtained by contacting HRCE Procurement Department.
- 40.4.** Suppliers agree to comply with all applicable laws, regulations and standards, including all labour, occupational health & safety, and worker compensation requirements of the Province.
- 40.5.** HRCE may consider and evaluate any RFX submission from other jurisdictions on the same basis that the purchasing authorities in those jurisdictions would treat a similar RFX submission from a supplier located in this Province. HRCE will be the sole judge of whether these conditions will be used and the extent to which they will be applied.

- 40.6. Suppliers registered to do business in any Atlantic Province can bid on RFX issued by any other Atlantic Province without having to satisfy any local registration or residency requirements.
- 40.7. Under Canadian law (and international agreements), your RFX submission must be arrived at separately and independently, without conspiracy, collusion or fraud; see:
<http://www.competitionbureau.gc.ca/internet/index.cfm?itemid=1243&lg=e> for further information.

41. Other General Conditions

- 41.1. No RFX submissions shall be accepted from any person or corporation who, or which, has a claim or has instituted a legal proceeding against HRCE or against whom HRCE has a claim or has instituted a legal proceeding with respect to a previous contract, without prior approval of HRCE.
- 41.2. The Supplier shall perform the obligations of this Contract in a good and workmanlike manner in compliance with all applicable legislation in effect in Nova Scotia, and in accordance with industry standards and practice.
- 41.3. The Supplier shall be solely responsible for all means, methods, techniques and procedures necessary for performing the work required under this Contract.
- 41.4. All Suppliers must comply with the Nova Scotia Corporations Registration Act (CRA) or the Partnerships and Business Names Registration Act (PBNRA) as one of the conditions of doing business with the Province of Nova Scotia. In this regard, Suppliers are advised that verification of registration and good standing may be carried out prior to the final award of a contract to a successful Supplier. Suppliers residing outside Nova Scotia (which are not otherwise carrying on business in Nova Scotia) are expected to be registered in an equivalent manner in their respective jurisdictions.
- 41.5. Unless otherwise specified, all materials installed by the Supplier as part of this Contract shall be new and shall comply with the specifications and any applicable building codes. The Supplier is, at all times, responsible for correcting any defective work or materials at the Supplier's cost, and payment by HRCE to the Supplier does not relieve the Supplier of that responsibility.
- 41.6. Where applicable, the end user must be provided with complete operation manuals, warranty registration forms, user licenses/ authentications and/or other associated documentation normally provided by the manufacturer, reseller, installer and/or consultant.
- 41.7. The Supplier shall, at all times, keep HRCE premises free from accumulations of waste and rubbish. Disposal of all waste and rubbish shall be at approved waste disposal sites.
- 41.8. If the Supplier files for bankruptcy, becomes insolvent or fails to perform the Supplier's obligations under this Contract in a timely and workmanlike manner, HRCE may, by written notice, immediately terminate the employment of the Supplier and the Supplier shall be entitled only to the value of work performed and materials supplied up to the date of the termination.
- 41.9. The Supplier shall not permit smoking by any of its employees or sub-contractors on HRCE property and will act in accordance to the HRCE policy BP101.3 Tobacco-Free Schools and Workplaces.
- 41.10. The Supplier warrants its work and materials for a minimum of twelve (12) months after the date of substantial completion.
- 41.11. The Supplier, if performing work on HRCE property may be required to provide a safety program certified with the Nova Scotia Construction Safety Association or with an approved alternate safety association and/or program.
- 41.12. HRCE reserves the right to split an award amongst Suppliers as deemed in the best interests of HRCE.

END OF SECTION 00 73 10

SECTION 01 11 00 - HRCE SUMMARY OF WORK

1. Project Location & General Scope

**1.1. Cole Harbour District High,
2 Chameau Cres, Dartmouth B2W 4X4**

1.2. Scope: Refer to Section 00 00 15 for scope and schedule information.

2. Contract Documents

2.1. Work will be performed under CCDC-2, 2008 contract.

3. General Conditions

3.1. Halifax Regional Centre for Education and CCDC-2, 2008, form an integral part of this Project Manual, a copy of which is bound herein.

4. Project Manual

4.1. Sections of the Project Manual are numbered in conformance with the Master List of Section Titles and Numbers, CSC Document 004E, published jointly by Construction Specifications Canada and The Construction Specifications Institute (USA). Sections are arranged in their standard format.

4.2. Sections are written as units of the Work which have been assigned numbers in conformance with the CSC/CSI system. They are arranged in sequence for this Manual. Gaps in the order of numerical sequence do not indicate that a section has been inadvertently omitted from this Manual, but, rather that a Section is not required for completion of the Work.

4.3. Wherever the project location building name occurs in the Contract Documents it shall be taken to mean all work included in the Contract.

4.4. Wherever in the Contract Documents the words "approval", "approved", "direction", "directed", "selection", "selected", "request", "requested", "report", and similar words are used, such approvals, directions, selections, requests and reports shall be given by the HRCE unless specifically stated otherwise.

4.5. Wherever in the Contract Documents the word "provide" is used in any form, it shall mean that the Work concerned shall include both supply and installation of the products required for completion of that part of the Work.

4.6. Wherever in this Project Manual it is specified that Work is to proceed or to meet approval, direction, selection or request of jurisdictional authorities or others, such approval, direction,

selection or request shall be in writing.

5. Errors & Omissions

- 5.1.** If errors or omissions are observed in the Contract Documents, immediately notify the HRCE Procurement in writing of all such errors or omissions. In the event no such notice is given, the Contractor will be held responsible for the results of any such error or omission and the cost of rectifying the same.

6. Division 1

- 6.1.** The provisions of all Sections of **Division 1** shall apply to each Section of this Specification.

7. Wage Rates

- 7.1.** Pay all employees engaged on the Work a wage not less than the minimum wage per hour as set out by the Province of Nova Scotia. For overtime work beyond 48 hours in any one week, pay no employee at a rate of less than one and one-half times the minimum wage per hour noted above. Provide for these wage rates in tendered contract amount.

8. Work Performed Under Separate Contracts

- 8.1.** Work not to be included in the Contract, as noted "NIC" on the Drawings, shall be governed by Article 37, Separate Contracts, of General Conditions of Contract.
- 8.2.** Furniture installation will be carried out by others.
- 8.3.** Computer installation will be carried out by others.

9. Project Schedule

- 9.1. Refer to Section 00 00 15 Description of Work.**
- 9.2.** Existing services (mechanical & electrical) will need to be maintained through the renovations.
- 9.3.** During construction, all life safety systems as well as mechanical and electrical systems must be in active, usable condition to permit the school to operate or alternate methods used to ensure the safe operation of the school as directed by HRCE project representative.
- 9.4.** As construction progresses revise the schedule to compensate for any delays or unforeseen activities so as to maintain the contract completion date. Each schedule submission is to be complete with a statement indicating the changes made, the reason they were changed and confirmation that the project completion date will not change. The above schedule information is to be submitted monthly or more often if necessary.

10. Site Progress Records

- 10.1.** Maintain at site a permanent written record of progress of Work. Make the record available at all times with copies provided when requested. Include in record each day:
 - 10.1.1.** Commencement and completion dates of the Work of each trade in each area of Project.
 - 10.1.2.** Attendance of Contractor's and Subcontractor's Work forces at Project and a record of the work they perform.
 - 10.1.3.** Visits to site by representatives of the Owner, Engineer, jurisdictional authorities, Contractor, Subcontractors, and suppliers.
- 10.2.** Maintain a progress chart in approved format. Show on chart proposed Work schedule and progress of Work by Contractor and Subcontractor.

11. Examination

- 11.1.** Site:
 - 11.1.1.** Examine site, and ensure that site conditions have been examined, that all are fully informed on all particulars which affect Work thereon and at the place of construction, and in order that construction proceeds competently and expeditiously.
 - 11.1.2.** Ensure by examination that all physical features, and working restrictions and limitations which exist are known.
- 11.2.** Previously Completed Work:
 - 11.2.1.** Verify dimensions of existing Work in place before construction of Work to be incorporated with it.
 - 11.2.2.** Verify that previously executed Work and surfaces are satisfactory for construction, and that performance of subsequent Work will not be adversely affected.
 - 11.2.3.** Commencement of Work will constitute acceptance of site conditions and previously executed Work as satisfactory.
 - 11.2.4.** Report to Engineer defects in prior Work which will affect quality of subsequent Work, or construction schedule.
- 11.3.** Construction Measurements:
 - 11.3.1.** Before commencing installation of Work, verify that its layout is accurate in accordance with intent of Drawings, and that locations, elevations, and clearances to adjacent infrastructure are maintained.
 - 11.3.2.** If Work is installed in wrong location, rectify it before other Work concerned proceeds.

12. PROTECTION OF WORK, PROPERTY & PERSONS

- 12.1.** Include in Work necessary methods, materials, and construction to ensure that no damage or harm to Work, materials, property and persons results from the Work of this Contract. Temporary facilities relating to protection are specified in Section 01 52 00.
- 12.2.** Protect, and if damaged make good, adjacent private and public property.
- 12.3.** Keep surfaces, on which finish materials will be applied, free from grease, oil, and other contamination which would be detrimental in any way to the application of finish materials.
- 12.4.** Protect finished surfaces of completed Work from damage by restriction of access or by use of physical means suitable to the material and surface location. Establish with each Subcontractor the suitability of such protection in each case.
- 12.5.** Protect existing underground infrastructure, mechanical, electrical, telephone and similar services from damage. If necessary, relocate active services to ensure that they function continuously in safety and without risk of damage.
- 12.6.** Cap off and remove unused utility services encountered during Work after approval is given by the utilities concerned or jurisdictional authorities, whichever may apply. Relocation, removal, protection and capping of existing utility services shall be performed only by the applicable utility and of other services by licensed mechanics.
- 12.7.** To prevent soiling or damage to finish flooring where pedestrian traffic occurs after the flooring has been installed, install and maintain 6 mil. polyethylene membrane or reinforced kraft paper temporary protection, secured in place and with joints sealed by reinforced pressure sensitive tape.
- 12.8.** Install plywood panels of minimum ¼" thickness over completed finish flooring materials, on which further construction Work is performed by other trades or delivery of products is made, or both. Seal joints between panels with reinforced pressure sensitive tape.
- 12.9.** Prevent spread of dust beyond the construction zone by wetting, or by other approved means, as it accumulates.
- 12.10.** The outside work area shall be appropriately demarked and/or surrounded by rigid chain link panels or fencing to prevent unauthorized entry to the work area. Any area of roof having work completed is to be covered below with this fencing approximately 10' from the edge of the building. It is to be maintained at all times throughout the project. All waste disposal bins are to be fenced in using the same type of fencing as indicated above during working hours. After working hours, all waste disposal bins shall be located a minimum of 25 feet from any structure. Any windows where the debris chute is located are to be covered. All entrances below the roof area are to have covered scaffolding erected to ensure a safe travel path to a distance of ten feet from edge of building. All workers shall contain their activity to the work site area. Access to the school shall only be allowed as planned in coordination with HRCE Operations and the

school administration.

- 12.11.** The contractor is responsible for security of all project materials and access to the project site and/or the school through the project site at all times until completion of work and acceptance of the finished project by HRCE. Such additional security costs for security personnel or other means of security as deemed necessary by the contractor will be the sole responsibility of the contractor. The HRCE will provide security personnel up to and including the Substantial Completion date as noted on the bid submission documents.
- 12.12.** The contractor shall keep the work site free from accumulated debris caused by the employees or work and shall remove all debris at the end of each work shift. Debris shall not be deposited in HRCE controlled garbage and/or recycling containers.
- 12.13.** All waste materials and debris created during demolition and/or construction shall be disposed of in a dumpster provided by the contractor, to be removed at the end of the construction project, using a methodology that is in compliance with the applicable HRM solid waste by laws. Otherwise, the material must be removed and disposed of off site at the end of each working day. The waste materials may not be stored on site unless they are held in an approved project dumpster no closer than twenty five (25) feet from any structure.
- 12.14.** All temporary structures such as portable washroom facilities, materials storage trailer, work trailer, debris dumpster, vehicles, etc., shall be located a minimum of (25) twenty-five feet from the school building.
- 12.15.** Where applicable, a hot work permit will be required to be completed prior to commencement of work and all conditions of the permit must be maintained until completion of hot work. A copy of the hot work permit signed by the contractor representative shall be provided to HRCE upon completion of each hot work session. Contractor must assign a designated fire watch as noted on the permit document who shall remain on site for three hours after completion of each hot work session.
- 12.16.** A school washroom will be designated for use where appropriate. However, protection of the surfaces as indicated above must be maintained. It should also be noted that access to the building during summer months will be limited for security reasons. Contractor is responsible to provide temporary portable washroom facilities for general use of contractor staff.
- 12.17.** Access to Interior of School - All interior access is to be scheduled with the PM. This will allow for notice to the school admin., custodial and possible scheduling of a security guard for after hour access.
- 12.18.** Adhesives / Torch Work - All adhesive use and torch work must be completed after school hours.

13. Cleaning

- 13.1.** Ensure that during and after construction the public streets and existing asphalt parking lot are cleaned as required.

14. Salvage

- 14.1.** Unless otherwise specified, salvaged material resulting from construction, and surplus materials and construction debris shall become property of Contractor, who must dispose of it away from Site.

15. Site Limitations

- 15.1.** Since the existing building will be occupied during the Work (in accordance with the Phasing Schedule) the Architect will designate the precise areas on the site which may be utilized for work and storage, and where personnel will be permitted to be present. Refer also to Drawings. Allow for hoarding to secure construction areas from occupied portions of the Building and Site.
- 15.2.** All access to the construction site is to be coordinated with the Project Manager for HRCE and communicated at the pre-construction meeting.
- 15.3.** Any Work carried out in the building is to be carried out during hours approved by the School Administration.
- 15.4.** Any disruption to services within the building must occur during hours approved by School Administration.
- 15.5.** Any Work which may have an adverse affect on the occupancy functions, must have prior approval of the School Administration and **may** require scheduling during off-hours.

16. Security Regulations

- 16.1.** Perform Work in conformance to the security regulations of the building as directed by the Project Manager for HRCE.

17. Project Identification

- 17.1.** No project sign is required on this Project.

18. Owner's Occupancy

- 18.1.** The Owner reserves the right to occupy and use portions of the Project, whether partially or entirely completed, or whether completed on schedule or not, provided such occupancy does not interfere with the Contractor's continuing Work.
- 18.2.** Partial occupancy or installation by the Owner of his equipment shall not imply acceptance of the Project in whole, or in part, nor shall it imply acknowledgement that terms of the Agreement are fulfilled.

END OF SECTION 01 11 00

SECTION 01 11 25 - PRICES

1. General

- 1.1. Prices included in the Contract shall be complete for the applicable Work, and shall include for each price:
- 1.1.1. Expenditures for wages and for salaries of workmen, engineers, superintendents, draftsmen, foremen, timekeepers, accountants, expeditors, clerks, watchmen and such other personnel as may be approved, employed directly under the Contractor and while engaged on the applicable Work at the site and expenditures for travelling and HRCE allowances of such employees when required by location of the applicable Work or when covered by trade agreements and when approved; provided, however, that nothing shall be included for wages or salary of the Contractor if an individual, or of any member of the Contractor's firm if the Contractor is a firm or the salary of any officer of the Corporation if the Contractor is a corporation, unless otherwise agreed to in writing.
 - 1.1.2. Expenditures for material used in or required in connection with the construction of the applicable Work including material tests and required by the laws or ordinances of any authority having jurisdiction and not included under Subparagraph .9.
 - 1.1.3. Expenditures for preparation, inspection, delivery, installation and removal of materials, equipment, tools and supplies.
 - 1.1.4. Temporary facilities as required for the applicable Work.
 - 1.1.5. Travelling expenses properly incurred by the Contractor in connection with the inspection and supervision of the applicable Work or in connection with the inspection of materials prepared or in course of preparation for the applicable Work and in expediting their delivery.
 - 1.1.6. Rentals of all equipment whether rented from the Contractor or others, in accordance with approved rental agreements including any approved applicable insurance premiums thereon and expenditures for transportation to and from the site of such equipment, costs of loading and unloading, cost of installation, dismantling and removal thereof and repairs or replacements during its use on the applicable Work, exclusive of any repairs which may be necessary because of defects in the equipment when brought to the Work or appearing within thirty (30) days thereafter.
 - 1.1.7. The cost of all expendable materials, supplies, light, power, heat, water and tools (other than tools customarily provided by tradesmen) less the salvage value thereof at the completion of the applicable Work.

- 1.1.8. Assessments under the Workmen's Compensation Act, the Unemployment Insurance Act, Canada Pension Act, statutes providing for government hospitalization, vacations with pay or any similar statutes; or payments on account of usual vacations made by the Contractor to his employees engaged on the applicable Work at the site, to the extent to which such assessments or payments for vacations with pay relate to the Work covered by the specified price; and all sales taxes or other taxes where applicable.
- 1.1.9. The amounts of all Subcontracts related to the specified price.
- 1.1.10. Premiums on all insurance policies and bonds called for under this Contract as related to the specified price.
- 1.1.11. Royalties for the use of any patented invention on the applicable Work.
- 1.1.12. Fees for licenses and permits in connection with the applicable Work. No Building Permit is required for the project.
- 1.1.13. Duties and taxes imposed on the applicable Work.
- 1.1.14. Such other expenditures in connection with the applicable Work as may be approved.
- 1.1.15. Provided always that except with the consent of the Owner, the above items of cost shall be at rates comparable with those prevailing in the locality of the Work.

END OF SECTION 01 11 25

SECTION 01 11 41 - PROJECT COORDINATION

1. Requirements Included

- 1.1. Each Trade Contractor's responsibilities include the coordination of Work within his own Contract and with the Work of other Contracts.

2. Related Requirements

- 2.1. Project Meetings: Section 01 31 19
- 2.2. Submittals: Section 01 33 00

3. Description

- 3.1. Coordinate Work on which subsequent Work depends to facilitate mutual progress, and to prevent conflict between parts of the work.
- 3.2. Ensure that each Section makes known for the information of the Construction Manager and other Sections, the environmental and surface conditions required for the execution of its Work, and the sequence of others Work required installation of its Work.
- 3.3. Ensure that each Section, commencing Work, and that each Section is assisted in the execution of its preparatory Work by Sections depending upon its preparation.
- 3.4. Deliver materials supplied by one Section to be installed by another well before the installation begins.
- 3.5. Sections giving installation information in error, or too late to incorporate in the Work, shall be responsible for having Work done which was thereby additionally made necessary.
- 3.6. Coordinate warranty conditions of interconnected Work to ensure that full coverage is obtained.
- 3.7. Remove work installed in error which is unsatisfactory for subsequent Work.

4. Cutting And Patching

- 4.1. Include under Work of this Section all cutting and patching of asphalt required by the Work.
- 4.2. Finish new surfaces flush with existing surfaces.
- 4.3. Cut and patch as required making work fit.
- 4.4. Make cuts with clean, true, smooth edges.
- 4.5. Patching of existing or new asphalt shall be performed only by workmen with expertise in that particular trade and who normally perform that Trade.
- 4.6. Replace, and otherwise make good, damaged or defective Work. If required by the Construction Manager.

- 4.7. Do not endanger Work or property by cutting, digging, or similar activities. No Section shall cut or alter the Work of another Section unless approved by the Section which has installed it.
- 4.8. Cut and drill with true smooth edges and to minimum suitable tolerances.
- 4.9. If required, before cutting, drilling, or sleeving structural load bearing elements, obtain approval of location and methods.
- 4.10. Cutting, drilling and sleeving of Work shall be done only by the Section which has installed it. The Section requiring drilling and sleeving shall inform the Section performing the Work of the location and other requirements for drilling and sleeving. The Contractor shall directly supervise performance of cutting and patching.
- 4.11. Cutting and Patching for Holes Required by Mechanical & Electrical Work:
 - 4.11.1. Include under Work of Mechanical Divisions cutting or provision of holes up to 8" in diameter and related patching.
 - 4.11.2. Include under Work of this Section holes and other openings required by the work of Mechanical Divisions which are larger than 8" in diameter or least dimension, and chases, bulkheads, furring and required patching. This Section shall be responsible for determination of Work required for holes in excess of 8" diameter or least dimension.
 - 4.11.3. Include under the Work of Electrical Divisions all cutting or provision of holes and related patching for the Work of that Division.
- 4.12. Include under Work of this Section all other cutting and patching required by the Work except as described in Clause .11 above.
- 4.13. Patching or replacement of damaged Work shall be done by the Subcontractor under whose Work it was originally executed, and at the expense of the Subcontractor who caused the damage.
- 4.14. Make patches invisible in final assembly.

5. Quality Assurance

- 5.1. Requirements of Regulatory Agencies:
 - 5.1.1. Make known and coordinate the requirements of jurisdictional authorities, as made explicit by the Contract Documents, and by representatives of such authorities
- 5.2. Source Quality Control:
 - 5.2.1. Ensure that Work meets specified requirements
 - 5.2.2. Schedule, supervise and administer inspection and testing as specified in Section 01 45 00.
- 5.3. Job Records:
 - 5.3.1. Maintain job records and ensure that such records are maintained by subcontractors.

Submittals

- 5.4. Prepare a Project schedule in accordance with Section 01 33 00, and ensure that all subcontractors and suppliers are aware of the details of this schedule, and progressively of their general compliance with the schedule.
- 5.5. Become aware of the required submittals specified in each Section, and expedite submission of such submittals so as not to hinder the Project Schedule.
- 5.6. Review submittals and make comments as specified in Section 01 33 00.

6. Job Conditions

- 6.1. Ensure that Work proceeds under conditions meeting specified environment and job safety requirements
- 6.2. Ensure that protection of adjacent property and the Work is adequately provided and maintained to meet specified requirements.

7. Product Delivery, Storage And Handling

- 7.1. Site has limited spaces for storage, only delivery of materials agreed upon by the Construction Manager will be allowed. Comply with Construction Manager's allocations. Any requirement for modifications to the building in order to allow delivery and storage of the materials to complete this work is the responsibility of the contractor.
- 7.2. Schedule delivery of products & removal of material with Construction Manager.
- 7.3. Make available areas for storage of products and construction equipment to meet specified requirements, and to ensure a minimum of interference with progress of the Work and relocations.
- 7.4. Trade Contractor to provide flag persons, traffic signals, barricades and Flares/lights/lanterns as required to perform the Work and to protect the public.
- 7.5. Material and Waste - Deliveries and Removals - Must be coordinated to be completed 30 minutes after school dismissal where applicable.

END OF SECTION 01 11 41

SECTION 01 31 19 – PROJECT MEETINGS

1. Pre-Award Meeting

- 1.1.** A Pre-award meeting will be held at which time the following will be addressed:
- 1.1.1.** Owner and HRCE's functions.
 - 1.1.2.** The Consultant and the Consultant's functions.
 - 1.1.3.** The General Contractor and the General Contractor's functions.
 - 1.1.4.** Documentation requirements from the General Contractor.
 - 1.1.5.** Obligees for Performance and Payment Bonds from Sub-contractors.
 - 1.1.6.** Progress Claims.
 - 1.1.7.** CO's & CCO's.
 - 1.1.8.** Construction Schedule.
 - 1.1.9.** Project Start-up.
 - 1.1.10.** Job Meetings.
 - 1.1.11.** Superintendent – General Contractor's Representative.
 - 1.1.12.** Design / Administration authority.
 - 1.1.13.** Owner's Representative.
 - 1.1.14.** Special Consultants.
 - 1.1.15.** Quality of Workmanship.
 - 1.1.16.** Accountability.
 - 1.1.17.** Harmonized Sales Tax.
 - 1.1.18.** Contract Close-out Documentation.

2. Preconstruction Meeting

- 2.1.** Within fifteen (15) days after award of Contract, arrange a meeting between the, Consultant, Subcontractors, Project Superintendents, Inspection and Testing Company Representatives, and representatives of others whose coordination is required during construction.
- 2.2.** Discuss at the meeting the means by which full cooperation and coordination of the participants during construction can be achieved.
- 2.3.** Document the responsibilities and necessary activities of the participants during construction as discussed, and distribute to each participant.
- 2.4.** Establish procedures for maintenance and completion of Project record drawings specified in Section 01 77 00.
- 2.5.** Review and establish methods of maintaining life safety and egress for the school occupants. Communicate these methods thoroughly with the School Principal.

3. Progress Meeting

- 3.1.** Invite representatives of HRCE, to attend twice monthly site meetings called by the Contractor during the progress of the Work.

- 3.2. Inform HRCE of each meeting and of proposed agenda a minimum of five (5) days before meeting.
- 3.3. Submit proposed schedule of site meetings to Engineer and Owner.
- 3.4. Record, prepare and distribute minutes of each meeting to HRCE and to each other participant within 72 hours of meeting.
- 3.5. Ensure that all representatives who attend meetings have the authority to conduct business on behalf of firms they represent.
- 3.6. Details of Progress Meetings to be discussed at the project start-up meeting.

4. Suggested Agendum (Preconstruction Meeting)

- 4.1. Distribution and discussion of:
 - 4.1.1. List of major subcontractors and suppliers.
 - 4.1.2. Projected Construction Schedules.
- 4.2. Critical work sequencing.
- 4.3. Major equipment deliveries and priorities.
- 4.4. Project Coordination:
 - 4.4.1. Designation of responsible personnel.
- 4.5. Procedures and Processing of:
 - 4.5.1. Field decisions
 - 4.5.2. Proposal requests
 - 4.5.3. Submittals
 - 4.5.4. Change orders
 - 4.5.5. Applications for Payment.
- 4.6. Adequacy of distribution of Contract Documents.
- 4.7. Procedures for maintaining Record Documents.
- 4.8. Use of premises:
 - 4.8.1. Office, work and storage areas.
 - 4.8.2. Owner's requirements.
- 4.9. Construction facilities, controls and construction aids.
- 4.10. Safety/Tool Box Meetings.
- 4.11. Security procedures.
- 4.12. Housekeeping procedures.
- 4.13. Egress/life safety procedures

5. Suggested Agendum (Progress Meetings)

- 5.1. Review and approval of minutes of previous meeting.
- 5.2. Safety meeting minutes.
- 5.3. Review of work progress since previous meeting.
- 5.4. Field observations, problems, conflicts.
- 5.5. Problems which impede Construction Schedule.
- 5.6. Review of off-site fabrication, delivery Schedules.

- 5.7. Corrective measures and procedures to regain projected schedules.
 - 5.8. Revisions to Construction Schedules.
 - 5.9. Maintenance of quality standards.
 - 5.10. Pending changes and substitutions and effect on Construction Schedule.
 - 5.11. Other Business.
-
- 6. Attend, with representatives of HRCE weekly meetings with the School Administration to review construction activities and concerns of Building Occupants.
 - 7. Quarterly meetings with Contractor and the HRCE / User during Warranty Period including major sub-trade contractors.
 - 8. Dates for meetings will be set at time of completion.

END OF SECTION 01 31 19

SECTION 01 33 00 – SUBMITTAL PROCEDURES

1. General Requirements

- 1.1. Make submittals specified in this Section to Consultant unless otherwise specified, with additional submissions made, in manner he directs, to other parties involved with construction of the Project as their interests are concerned. These parties are, but shall not be restricted to, consultants, jurisdictional authorities, and Subcontractors whose Work must be coordinated with Work related to Submittals.
- 1.2. Ensure that submissions are made to allow sufficient time for review without the construction schedule being delayed.

2. Document Submissions Required

- 2.1. At Commencement of Contract:
 - 2.1.1. Performance and Payment Bonds.
 - 2.1.2. Public Liability and Property Damage Insurance Certificates.
 - 2.1.3. List of Subcontractors by firm name.
 - 2.1.4. Construction Schedule and other required schedules and estimates.
 - 2.1.5. Site Specific Safety Plan/Safety Policy.
 - 2.1.6. Workers' Compensation Board status.
- 2.2. During Construction:
 - 2.2.1. Weekly progress reports.
 - 2.2.2. Job meeting reports and minutes.
 - 2.2.3. Updated construction schedules.
 - 2.2.4. Shop drawings as required.
 - 2.2.5. Inspection and test reports.
 - 2.2.6. Daily communication of Hot Work Permits as needed.
- 2.3. Submissions at completion of Work are specified in Section 01 77 00, Contract Closeout.

3. Administrative

- 3.1. Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time no claim for extension by reason of such default will be allowed.
- 3.2. Do not proceed with Work affected by submittal until review is complete.
- 3.3. Present shop drawings, product data, samples and in Imperial units.
- 3.4. Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has

been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

- 3.5. Notify Consultant in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- 3.6. Verify field measurements and affirm that affected adjacent work is coordinated.
- 3.7. Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- 3.8. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant's review.
- 3.9. Keep one review copy of each submission on site.

4. Construction Schedules

- 4.1. Submit proposed construction schedule at beginning of Project, as specified in Project Documents.
- 4.2. As construction progresses, submit up-dated construction schedules as specified in Project documents.

5. Shop Drawings And Product Data

- 5.1. The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- 5.2. Submit drawings stamped and signed by professional consultant registered or licensed in Province of Nova Scotia of Canada.
- 5.3. Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- 5.4. Allow seven (7) days for Consultant's review of each submission. Do not proceed with work involving relevant products until completion of shop drawing review.
- 5.5. Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of work, state such in writing to Consultant prior to proceeding with work.
- 5.6. Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.

Accompany submission with transmittal letter, in duplicate, containing:

- 5.6.1.** Date
- 5.6.2.** Project title and number
- 5.6.3.** Contractor's name and address
- 5.6.4.** Identification and quantity of each shop drawing, product data and sample.
- 5.6.5.** Other pertinent data.
- 5.7.** Submission to include:
 - 5.7.1.** Date and revision dates.
 - 5.7.2.** Project title and number.
 - 5.7.3.** Name and address of:
 - 5.7.3.1.** Subcontractor.
 - 5.7.3.2.** Supplier.
 - 5.7.3.3.** Manufacturer.
 - 5.7.4.** Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - 5.7.5.** Details of appropriate portions of Work as applicable:
 - 5.7.5.1.** Fabrication.
 - 5.7.5.2.** Layout, showing dimensions, including identified field dimensions, and clearances.
 - 5.7.5.3.** Setting or erection details.
 - 5.7.5.4.** Capacities.
 - 5.7.5.5.** Performance characteristics.
 - 5.7.5.6.** Standards.
 - 5.7.5.7.** Relationship to adjacent work.
- 5.8.** After Consultant's review, distribute copies.
- 5.9.** Submit for review one electronic copy in PDF file format of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
- 5.10.** Submit electronic copies of product data sheets for brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- 5.11.** Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant.
 - 5.11.1.** Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - 5.11.2.** Testing must have been within three (3) years of date of contract award for project.

- 5.12. Documentation of testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- 5.13. Delete information not applicable to project.
- 5.14. Supplement standard information to provide details applicable to project.
 - 5.14.1. If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of work may proceed.
 - 5.14.2. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of work of sub-trades.
- 5.15. Shop Drawings are specified for submission under the following:
 - Section 03 20 00 Concrete Reinforcement
 - Section 05 12 23 Structural Steel
 - Section 05 31 00 Steel Deck
 - Section 05 50 00 Metal Fabrications
 - Section 06 10 11 Rough Carpentry
 - Section 06 40 00 Architectural Woodwork
 - Section 07 41 43 Aluminum Composite Panels
 - Section 07 46 13 Preformed Metal Siding
 - Section 07 55 00 Modified Bitumen Roofing System & Flashing
 - Section 07 84 00 Fire Stopping and Smoke Seals
 - Section 08 11 14 Steel Doors & Frames
 - Section 08 11 16 Aluminum Doors & Frames
 - Section 08 14 10 Wood Doors
 - Section 08 50 50 Aluminum Windows
 - Section 08 62 11 Vinyl Windows
 - Section 08 71 10 Door Hardware
 - Section 09 22 16 Non-Load Bearing Wall Framing
 - Section 09 30 13 Ceramic Tile
 - Section 10 11 13 Communication Boards
 - Section 10 11 23 Tackboards
 - Section 10 14 53 Traffic Signs
 - Section 10 28 10 Toilet & Bath Accessories
 - Section 10 50 00 Miscellaneous Specialties
 - Section 11 40 11 Food Services Catalogued & Custom Equipment
 - Section 12 21 13 Horizontal Blinds
 - Section 12 21 16 Roller Shades

Section 14 42 13 Wheelchair Platform Lift

All pre-manufactured Mechanical & Electrical items as noted in Mechanical & Electrical Divisions.

6. SAMPLES

- 6.1. Submit for review samples in duplicate as requested in respective specification Sections, as requested by the Consultant. Label samples with origin and intended use.
- 6.2. Deliver samples prepaid to Consultant's business address.
- 6.3. Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- 6.4. Adjustments made on samples by Consultant are not intended to change.
- 6.5. Make changes in samples which Consultant may require, consistent with Contract Documents.
- 6.6. Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.
- 6.7. Samples are specified for submission under the following Sections:

Section 07 41 43 Aluminum Composite Panels

Section 07 46 13 Preformed Metal Siding

Section 08 14 10 Wood Doors

Section 08 50 50 Aluminum Windows

Section 09 30 13 Ceramic Tile

Section 09 51 13 Acoustical Ceiling Units

Section 09 65 19 Resilient Tile Flooring

Section 12 21 13 Horizontal Blinds

Section 12 21 16 Roller Shades

Refer to Mechanical & Electrical Divisions for sample requirements in those Trades.

7. Record Drawings

- 7.1. Record, as the Work progresses, changes and deviations in the location of Work concealed by the finished Work, and such other approved changes that occur during progress of Work, to ensure that an accurate record is provided for future maintenance and alterations.
- 7.2. White prints will be provided by the HRCE for use in preparing record drawings. Record changes in the Work on these prints in red ink.
- 7.3. Dimension location of concealed Work in reference to building walls, and elevation in reference to floor elevation. Indicate at which point dimension is taken to conceal Work. Dimension all terminations and offsets of runs of concealed work.
- 7.4. Record work constructed differently than shown on Contract Documents, changes in the work caused by site conditions, by Owner, Consultant, Contractor and Subcontractor

originated changes, and by site instructions, supplementary instructions, field orders, change orders, addenda, correspondence and directions of jurisdictional authorities.

- 7.5. Record location of mechanical and electrical services, piping, valves, conduits, pull boxes, junction boxes and similar work not clearly in view, and position of which is required for maintenance, alteration work and future additions. Do not conceal critical work until its location has been recorded.
- 7.6. Identify record drawings as a "Project Record Copy". Maintain in good condition, do not use for construction purposes and make available to Consultant at all times.
- 7.7. Submit record drawings at completion of Work. Final acceptance of the Work will be predicated on receipt and approval of record drawings.

8. Extra Stock

- 8.1. Supply extra stock at completion of Project as specified in other Sections of the Project Manual.
- 8.2. Deliver extra stock as directed by the Architect to location he designates.
- 8.3. Extra stock is specified to be supplied in the following Sections:

Section 09 30 13 Ceramic Tile

Section 09 51 13 Acoustical Ceiling Units

Section 09 65 19 Resilient Tile Flooring

Section 09 91 23 Painting

Refer to Mechanical & Electrical Divisions for Extra Stock requirements in those Trades.

9. Maintenance Manual & Operating Instructions

- 9.1. Submit three (3) copies of Maintenance Manual with application for completion certificate.
- 9.2. Include in Maintenance Manual one (1) copy of each final approved shop drawing issued for Project on which have been recorded changes made during fabrication and installation caused by unforeseen conditions.
- 9.3. Submit extended guarantees together in one (1) report binder.
- 9.4. The Manuals shall:
 - 9.4.1. Consist of a hard-cover, black, vinyl-covered, loose-leaf, letter-size binder.
 - 9.4.2. Have a title sheet, or sheets preceding data on which shall be recorded Project name, Project number, date, list of contents, and Contractor's and Subcontractors' names.
 - 9.4.3. Be organized into applicable Sections of Work with each Section separated by hard paper dividers with plastic covered tabs marked by Section.

- 9.4.4. Contain only typed or printed information and notes, and neatly drafted drawings.
- 9.4.5. Contain maintenance and operating instructions on all building, and mechanical and electrical equipment.
- 9.4.6. Contain maintenance instructions as specified in various Sections.
- 9.4.7. Contain brochures and parts lists on all equipment.
- 9.4.8. Contain sources of supply for all proprietary products used in the Work.
- 9.4.9. Contain lists of supply sources for maintenance of all equipment in Project of which more detailed information is not included above.
- 9.4.10. Contain finished hardware schedule.
- 9.4.11. Contain charts, diagrams and reports specified in Mechanical & Electrical Divisions.

10. Extended Warranties

- 10.1. Submit the extended warranties listed in this Article and as specified in each applicable Section of this Project Manual.
- 10.2. Extended warranties shall commence on termination of the standard one-year warranty granted in this Contract.
- 10.3. Submit each extended warranty on a standard Form of Warranty, a sample of which is included in this Section.
- 10.4. Secure each extended Warranty by a Maintenance Bond in an amount indicated.
- 10.5. Submit extended warranties for:

Section 06 40 00 Architectural Woodwork – extended 4 years

Section 07 41 43 Aluminum Composite Panels – extended 10 years (panel finish)

Section 07 55 00 Modified Bitumen Roofing System & Flashing:

- 2 year CRCA materials and workmanship against leaks and blow off
- 10 year material warranty the membrane will perform as a roofing material
- 1 year CRCA warranty against defects of materials and workmanship for the sheet metal work.

Section 07 92 10 Joint Sealants – extended 5 years

Section 08 11 16 Aluminum Doors & Frames – extended 4 years

Section 08 14 10 Wood Doors – extended 4 years

Section 08 50 50 Aluminum Windows – extended 4 years

Section 08 62 11 Vinyl Windows – extended 5 years

Section 08 71 10 Door Hardware – various, refer to that Section

Section 09 30 13 Ceramic Tile – extended 4 years

Section 09 51 13 Acoustical Ceiling Units – extended 4 years

Section 09 65 19 Resilient Tile Flooring – extended 4 years

Section 10 11 13 Communication Boards – extended 24 years

Section 10 11 23 Tackboards – extended 9 years

Section 12 21 13 Horizontal Blinds – extended 5 years

Section 12 21 16 Rollers Shades – extended 5 years

Section 14 42 13 Platform Lift – extended 5 years

Refer to Mechanical & Electrical Divisions for extended Warranty requirements in those trades.

11. Inspection Laboratory Reports

11.1. Submit copies of inspection and test reports obtained by the Contractor and Subcontractors for their Work or for Jurisdictional Authorities, if requested by Consultant.

11.2. Submit reports in accordance with requirements specified in Section 01 41 00.

12. Documentation On Suppliers & Manufacturers

12.1. Provide information under headings identifying the following: Associated Technical Section, Manufacturer, Supplier, Contact Name, and Phone Numbers.

SAMPLE FORM OF WARRANTY FOLLOWS THIS PAGE

Sample Form for Warranty

Date

Client

Project

.....

Warranty
(title of work)

We hereby undertake to warrant all materials supplied and installed under our Contracts and include the providing of necessary materials and labour to cover the result of faulty materials or workmanship. Upon written notification from Client or the Architect that the above work is defective any repair or replacement work required shall be to the Architect's satisfaction at no cost to the Client. This Warranty shall not apply to defects caused by the work of others, maltreatment of materials, negligence or Acts of God. This Warranty shall remain in effect for the total period from the acceptance of the Work to (...date....), irrespective of the date of completion or the beneficial use by the Owner.

Signature

Authorized Signing Officer

Name of Firm

Address

END OF SECTION 01 33 00

SECTION 01 35 13 – APPENDIX A - SPECIAL PROJECT PROCEDURES

1. Introduction

- 1.1. School construction, renovation and maintenance projects are scheduled every year as a normal and necessary course of business by operations departments in each Nova Scotia Centre for Education. Building modifications, repairs and additions/demolitions to buildings may impact the school environment without appropriate controls. With increased controls based primarily on the CSA standards implementation, proper scheduling and clear communication on adequate controls can be put into place to eliminate/minimize the impact to all occupants.
- 1.2. Projects of this nature may generate varying levels of dusts, noises and odors. It is possible, unknown/unforeseeable environmental contaminants, such as spills, mould, fumes, lead or asbestos exposure maybe identified.
- 1.3. To successfully complete work within the school environment, it is necessary to plan and implement appropriate containment and control strategies. This document is developed to provide a minimum standard for contaminant controls for various types of projects in schools. These standards are in addition to and should complement all legislated protocols for working with regulated materials such as asbestos, lead paints, PCB's etc.
- 1.4. Executing a successful project will depend primarily on clear, concise communication. This may involve a number of parties (Project Manager, Operations staff, School Administration and Health & Safety staff and Joint Occupational Health & Safety Committee).

2. Communication Plan

- 2.1. The most critical element of any project management plan is effective communication between all stakeholders. Communication between the Operations project manager/supervisor, the contractor and school administrators before the start of a project is very important. This meeting is meant to explain the scope, schedule and risk assessment for the project. The meeting will also help establish clear expectations when managing planned and unplanned exposure risks associated with contaminant controls.
- 2.2. The communication plan shall include:
 - 2.2.1. A description of potential contaminants, which may include but is not limited to:
 - 2.2.1.1. Particulates (dirt, concrete/silica, steel, fiberglass, wood dust, ash, cellulose, etc.)
 - 2.2.1.2. Moisture: external water infiltration, internal system leaks (domestic water, sanitary, storm, sprinkler)
 - 2.2.1.3. Noise from equipment/tool operation,
 - 2.2.1.4. Fumes/odors from equipment exhaust, boiler exhaust, septic waste, chemical/adhesives, etc.

- 2.2.1.5. Hazardous materials including, asbestos, PCB, mercury, lead, fuel oil, fungi/mould, etc.
 - 2.2.1.6. Excessive heat/cold
 - 2.2.2. A description of the control measure which may include but not be limited to:
 - 2.2.2.1. Isolation within an enclosure (water, noise, hazardous materials)
 - 2.2.2.2. Ventilation and filtration
 - 2.2.2.3. Dehumidifiers/blowers (moisture)
 - 2.2.2.4. Personal protective equipment
 - 2.2.2.5. Schedule outside or inside school hours
 - 2.2.2.6. Sound dampeners
 - 2.2.2.7. Monitoring
 - 2.2.2.8. Security
 - 2.2.3. Other Hazards created by the work, including but not limited to fire safety and the need to alter fire safety plans.
- 2.3. For small routine work orders the communication plan may only involve one tradesperson and the school principal or designate. This communication is equally as important for management of contaminant controls.

3. Contaminant Control Management

- 3.1. Regardless of the contaminant or control measure used, the following procedures shall apply for every project:
 - 3.1.1. Every project, including all routine work requests, shall be assessed, as per this document, by appropriate personnel for potential contaminant risk.
 - 3.1.2. Clear lines of communication must be established between project personnel, site supervisor or project manager and the school administration.
 - 3.1.3. Control strategies as per this document, shall be, communicated to workers as well as the site JOHSC and implemented prior to starting the work.
 - 3.1.4. Where isolation is used as a control, all entry points must be clearly posted to describe the purpose of the enclosure and limitations of access.
 - 3.1.5. During the execution of the project, the control measures must be regularly inspected and maintained before the start of each work shift, and throughout the shift as required.
 - 3.1.6. A process for stop work and remediation orders must be established to ensure the project manager; site supervisor and school administrator have a means to cease project operations when a contaminant control breach may impact the school environment. Breached control measures must be reported immediately to HRCE project manager upon discovery. He/she will be responsible to communicate to the school principal or designate. Work shall be stopped immediately until the control measures are re-established.

- 3.1.7.** Access to the controlled work site is only permitted by authorized personnel. The project supervisor or designate shall determine appropriate personal protective equipment (PPE) and necessary worker orientation.

4. Particulate Control

- 4.1.** Exposure to minimal levels of dust is a normal condition in most outdoor and indoor environments and is typically controlled inside a building through building ventilation, filtration and routine housekeeping measures. However, as noted, construction projects generally create elevated dust levels in work areas, whether inside or outside of a building.
- 4.2.** Operational Services Managers must ensure maintenance staff and contracted service providers implement dust control measures appropriate for the type and scope of work being performed. This will include assessing the type and amount of dust being created as well as the location of the work being conducted.
- 4.2.1.** Interior Construction Projects:
- 4.2.2.** Construction projects may be described as projects that may include Fine Arts Lab, wall creation/demolition, etc.
- 4.3.** As a minimum for these types of construction projects, all interior entry points into a construction zone must be effectively sealed. The barrier must prevent contaminants from the work area to be distributed to other areas of the school. Appropriate signage must be posted to indicate only authorized persons are permitted access.
- 4.4.** Entrance design could range from a two flap plastic tarp door to a fully constructed sealed entry door with negative hepa-filtered ventilation on the construction side of the barrier.
- 4.5.** Exterior Construction Projects:
- 4.5.1.** Exterior work shall be performed so as not to affect the safety of building occupants. It will also provide controls to avoid impact to adjacent properties. Depending up on the results identified in the risk assessment, at a minimum consideration must be given to prevent dust from entering into the school environment. This may be controlled through isolation, dampening application, closing building AHU and window/door openings.

5. Noise Control

- 5.1.** Hearing plays an essential role in communication, speech and language development and learning within a school environment. During construction the contractor is responsible for ensuring acceptable noise levels will be adhered to for the HRCE staff and students within the building. Noise related to a project may prove to be very distracting for staff and students. To minimize distractions and interruptions in student learning the following are important to consider:
- 5.1.1.** Contractors are responsible to ensure appropriate noise control measures are taken
- 5.1.2.** "No work" periods may need to be incorporated into construction schedules

- 5.1.3. Work causing a noise disruption may need to take place during unoccupied times and/or during pre-determined acceptable times of the day (i.e. before and after class times)
- 5.1.4. It may be necessary for the School Administrator to make a request to the HRCE Project Manager or the Contractor to exclude undertaking certain noisy activities during particular periods and/or activities.

6. Moisture Control

- 6.1. Moisture levels are to be controlled during construction and maintenance activities. Moisture levels above normal may impact the air in the room and/or building and may also penetrate building materials giving the potential to lead to mould growth.
- 6.2. Certain activities (i.e. tape and mud of drywall, painting, pressure washing, concrete cutting with water or other water based dust-suppression) introduce high amounts of moisture into the room environment and ventilation and or drying is required to control local moisture.
- 6.3. An enclosure properly set-up to contain other contaminants will similarly contain/control high levels of airborne moisture. A wet-vac should be available on-site for activities which have a risk of water spillage of more than 5 gallons at any instance.
- 6.4. Standing and or stagnate water must be avoided on construction sites, for a number of reasons, including, but not limited to; insects breed in these bodies of water, the water may give off odours, it is a nuisance to walk through, and it may be an ice hazard in cold weather.
- 6.5. It is important that all water leaks and flooding are reported immediately to the HRCE's project manager and building supervisor. Where works to existing "plumbing" is to occur the water lines (potable, heating, fire suppression) must be isolated and drained (de-energized/de-pressurized) following Lock Out - Tag Out procedure. Adequate supplies such as buckets and absorbents should be present when drains are not available to drain a line.
- 6.6. When an interruption to the water supply, potable or service, is to occur then the "owner's representative" and building supervisor should be notified 24 hours in advance. Bottled water provision may be required.
- 6.7. Materials used in the construction and or maintenance activities are to be stored in dry areas. The introduction of materials to the activities with moisture levels above the acceptable (XXX%)CNBC states for wood, on dry weight basis, a max of 19%, I can't find info on drywall but assume it is much lower range is prohibited as these materials are highly susceptible to colonization by mould spores.

7. Fumes

- 7.1. Fumes may be produced on a project site for a variety of reasons such as use of motorized equipment, off gassing of sealants, adhesives and finish products, cutting/torching processes, exposure of sanitary systems, process ignition gases such as propane and acetylene, proximity of project temporary washrooms, radon, etc.
- 7.2. The impact of fumes on occupants may range from discomfort to health risk, to life safety risk.

- 7.3. The project manager or supervisor must ensure that all potential fume sources are identified and remedial or control measures included in the scope of work by the contractor.
- 7.4. Monitoring equipment may be required to determine for example radon exposure or safety of confined space access.

8. Activity Assessment

- 8.1. Activities that may produce contaminants which require control may be considered as low, medium and high impact.
- 8.2. Low impact activities include routine maintenance and repairs that may create localized dust or odors or brief periods of noise which are not considered harmful to occupants but may be a nuisance which requires minimal control. These may include activities such as opening ceiling tiles or gyproc walls, replacing a plumbing fixture, paint touch ups, drilling through a wall, etc.
- 8.3. Medium impact activities include larger repair jobs or longer duration projects that will create more wide spread levels of contaminant which must be controlled to prevent exposure to building occupants. Boiler cleaning, ceiling replacement, long periods of hammer drilling, etc.
- 8.4. High impact activities include large demolition and construction projects, or jobs with exposure to contaminants that are a risk to health or life safety such as asbestos remediation, mould abatement, lead paint clean up, etc.

9. Hazard Assessment

- 9.1. A hazardous assessment is required to be completed for each job to ensure hazards are identified and corresponding controls are implemented. Depending upon the circumstances at the site it may be necessary to upgrade and/or add other precautions.
- 9.2. Determine the most appropriate hazard classification and apply the corresponding protocols. The attached hazard assessment identifies the minimum controls that must be in place during the corresponding activities. Depending on the specific circumstances at a site further controls may be required. When the hazards are deemed to be in the C or F category the form including specific controls must be submitted to the HRCE for review, prior to commencing work. The contractor may still be required to complete their own hazard assessment of the job/work.

10. Contaminant Controls Procedure for initiating work for all Contaminant Controls:

10.1. Contaminant Control I

- 10.1.1. The tradesperson or project manager for the HRCE will discuss the details, including the scope and any impacts of the job/project with the principal.

- 10.1.2. Ensure fire exiting requirements and life safety systems are addressed or adequate mitigating plans are implemented for the building, construction staff and building occupants.
 - 10.1.3. Presence of lead paint or ACM's (Asbestos Containing Materials) must be determined prior to the start of any job. Specific protocols or Codes of Practice may apply.
 - 10.1.4. Consideration will be given for work that is anticipated to generate significant noise, odours or VOC's (Volatile Organic Compounds) and this will be scheduled outside of school hours or during times when the noise will not disrupt occupant activities. This will require coordination with the Principal.
 - 10.1.5. The work area shall be isolated where possible. This may be achieved at varying levels, by closing doors and opening outside windows for ventilation or by installing appropriate hoarding and negative pressure units to ensure contaminants are not circulated throughout the school causing further health and safety concerns.
 - 10.1.6. Dust shall be minimized during the activity. When drilling, sanding or cutting is taking place, wetting the area may be necessary to reduce dust.
 - 10.1.7. Good housekeeping practices shall be maintained at all times on the work site. Bag and remove dust and debris from the building as soon as possible.
 - 10.1.8. Possible environmental impacts shall be managed and minimized. If work uncovers environmental contaminants or suspected contaminants such as oil spills (current or historic) or potentially friable asbestos materials (check the school asbestos audit) that may be disturbed, this information shall be brought to the attention of the HRCE's employee responsible for the project so that appropriate actions can be taken.
 - 10.1.9. When the activity is completed the work area shall be inspected and cleaned. Dust and debris shall be removed from the area and all efforts will be made to return items to their pre-maintenance activity location.
 - 10.1.10. The Principal shall be notified that the work is completed.
- 10.2. Contaminant Control II** - All Contaminant Control I measures shall apply, as well as;
- 10.2.1. Cover furniture, bookshelves and teaching materials with plastic sheets.
 - 10.2.2. Water misting while performing dust generating activities may be required.
 - 10.2.3. Seal un-used doors. Seal wall penetrations, electrical outlets, or any other source of air leaks in the construction area.
 - 10.2.4. Seal exhaust air vents in construction area and open the windows. If possible shut down air handling system in the area for duration of project.
 - 10.2.5. A walk out mat at exterior of exit door to trap dust may be required.
- 10.3. Contaminant Control III** - All Contaminant Control I and II measures shall apply, as well as;
- 10.3.1. Install an impermeable dust barrier from the true ceiling to the floor consisting of two layers of 6 mil fire retardant polyethylene or solid wall and sealed door. The wall shall remain in place until the job is finished and the clean-up is completed.

- 10.3.2. Seal all wall penetrations
- 10.3.3. Seal off all return and supply air handling ducts and close all windows.
- 10.3.4. Turn off the air handling system in the area of construction.
- 10.3.5. Maintain negative air pressure in the construction area using HEPA filter equipped exhaust ventilation. The pressure differential between the project area of contamination and the building's occupied areas shall be demonstrable by a means approved by the HRCE employee responsible for the project.
- 10.3.6. Ensure that the air is exhausted directly outside and away from intake vents.
- 10.3.7. Vacuum all horizontal surfaces including drop cloths with a hepa vacuum.
- 10.3.8. Remove drop clothes
- 10.3.9. Vacuum again all horizontal surfaces with HEPA Vacuum.
- 10.3.10. Restore ventilation.
- 10.3.11. Remove enclosure and equipment.

10.4. Control IV: (External Work)

- 10.4.1. External work may impact building interior or occupants.
- 10.4.2. To reduce the impact to building interior or occupants, it may be necessary to contain the work area from impacting building interior. This may include closing or opening windows, tarping ceilings to capture debris or water, temporary relocation of occupants or ventilation controls.
- 10.4.3. The job supervisor shall consider weather conditions and forecast to reduce the effect of any weather impacts to the building materials or building occupants.
- 10.4.4. It may be necessary to use protective tarps and ground cover sheets below equipment and work areas to contain building debris such as paint chips, materials, dust or oil from equipment.
- 10.4.5. When the job is completed and the tarps have been lifted, inspect the ground around the job for debris and clean as necessary.

Fire Protection

10.5. Type V: General Fire Protection

- 10.5.1. Ensure fire exiting requirements and life safety systems are addressed or adequate mitigating plans are implemented for the building, construction staff and building occupants. Staff must be aware of temporary modifications to fire safety plans.
- 10.5.2. MSDSs for all materials to be used must be reviewed and available on site.
- 10.5.3. Construction materials stored outside must be a minimum distance of ten feet from the building and be in a secured area.
- 10.5.4. Flammable or Combustible liquids must be stored as per Fire Code requirements. All flammable and combustible liquids or materials must be kept in a secure area at all times.

10.6. Control VI: Fire Protection (minor hot work) - All Contaminant Control V shall apply as well as;

- 10.6.1. Notify the Principal that a risk of fire has increased and the area in which the hot work will occur.

- 10.6.2.** Refer and implement the HRCE's hot work permit process. At a minimum the following should be considered;
 - 10.6.2.1.** Sweep the work area and remove all unnecessary materials in the vicinity; particularly all combustible and flammable materials and liquids shall be removed from the area (35 feet).
 - 10.6.2.2.** Have an appropriate size fire extinguisher available.
 - 10.6.2.3.** Inspect the work location for areas (such as a hole in the wall) where hot material or sparks could fall and smolder and close them off so that any hot debris can only fall within your field of view.
 - 10.6.2.4.** If it is possible that the flame will go past the object being welded or soldered and excessively heat a flammable or combustible material then either protect that material with a non-flammable material or wet the material and keep it wetted during the use of heat or grinding.
 - 10.6.2.5.** Remain in the area while the joint and/or heated materials cool to room temperature (ambient) while checking for the smell or appearance of smoke in the area.
 - 10.6.2.6.** Stay in the area for at least 2 hour and then re-inspect for any smell or appearance of smoke.
 - 10.6.2.7.** Ask another staff person to inspect the area for the smell or appearance of smoke. Record who you asked to do the final inspection.
- 10.6.3.** Type VII: Fire Protection (hot work w fire watch) - All Contaminant Control V and VI shall apply as well as;
- 10.6.4.** Notify the Principal that a risk of fire has increased and the area in which the hot work will occur. If any life safety system components (sprinkler, detectors, fire alarms) are not function, hot work should not proceed until these systems are functioning unless fire watch procedures for life systems are followed. See Activation of Fire Watch for Life Safety Systems checklist. Appendix...XX
- 10.6.5.** Refer and implement the HRCE's hot work permit process. At a minimum the following should be considered;
 - 10.6.5.1.** Cover all floor openings with fire stop material. Seal duct work openings with metal covers or blankets and close all doors.
 - 10.6.5.2.** Ensure that there are no potentially explosive atmospheres in the area.
 - 10.6.5.3.** Hot work on vessels, pressure tanks or boilers, use only contractors who are qualified by nationally or internationally recognized boiler and pressure vessel code.
 - 10.6.5.4.** Notify the local fire department of the type of work and the work schedule.
 - 10.6.5.5.** Before hot work is started, designate one employee responsible to complete the fire watch: while work is in progress, during lunch breaks and other breaks and for one hour after all flames are extinguished for the day and monitor the area for an additional two hours. After three hours after the last flame has been extinguished, have a second employee do a

final survey of the area for smells or evidence of smoldering or fire and record the inspection.

APPENDIX
Fire Watch Activation Checklist

1. Documentation (identify locations to be checked on an hourly basis, provide contact information for relevant HRCE staff and outside agencies} HRCE provided template to be used for documentation.
2. Procedure reviewed with Custodian or individual responsible for fire watch. Any high risk areas shall be identified to be highlighted on the documentation page and checked during the rounds.
3. Staff working in the building have been notified of the Fire Watch and that they are responsible to monitor areas for signs of fire or smoke and have been reminded of required actions to take according to the school fire safety plan.
4. Staff responsible for fire watch have been trained in how to use a fire extinguisher. (PASS)
5. Staff responsible for the fire watch have a means of communication (cell phone or walkie-talkies)
6. Staff responsible for the fire watch are aware of the procedure for initiating fire alarm and what systems are functioning. i.e. systems (sprinklers, alarm panel or if school has monitoring company or if calling 911 is required)
7. The School Insurance Program (SIP) Emergency Information Line has been notified 1-902-448-2840
8. All relevant information has been documented in the school's fire books. Including date, time and reason for fire watch.

Fire Watch De-Activation Checklist

1. Document the date, time and actions taken to remedy the deficiency requiring the fire watch.
2. School Insurance Program (SIP) has been notified
3. Copy of the Fire Watch documentation is kept in the fire book and the original is sent to the HRCE Project Representative.

END OF SECTION 01 35 13

SECTION 01 35 29 - OCCUPATIONAL HEALTH & SAFETY REQUIREMENTS

1. References

- 1.1.** CSA S269.1-1975 Falsework for Construction Purposes.

2. CONSTRUCTION SAFETY MEASURES

- 2.1.** Observe construction safety measures of:

2.1.1. National Building Code 2010, Part 8

2.1.2. National Fire Code of Canada

2.1.3. Provincial Government, including but not limited to the:

2.1.3.1. Occupational Health & Safety Act revised Statutes of Nova Scotia 1996, Chapter 7 and regulations.

2.1.3.2. Workers' Compensation Act

2.1.3.3. Fire Protection Act

2.1.3.4. Dangerous Goods Transportation Act

- 2.2.** In case of conflict or discrepancy the more stringent requirement shall apply.

- 2.3.** Ensure that employees working on this specific project have met training requirements as legislated by the Nova Scotia Occupational Health & Safety Act and its regulations.

- 2.4.** Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of the building.

3. Equipment & Tools

- 3.1.** Each user of equipment or tools shall be responsible to examine for sufficiency before use. Make equipment and tools safe if necessary.

4. WHMIS

- 4.1.** Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets.

- 4.2.** Have a copy of WHMIS data sheets available at the workplace on delivery of materials.

5. Hazardous Material

- 5.1. Should material resembling hazardous materials other than those identified with the Contract Documents, including but not limited to spray or trowel applied asbestos, be encountered in course of work; stop work immediately. Do not proceed until written instructions have been received from Consultant.
- 5.2. Where work entails use, storage, or disposal of toxic or hazardous materials, chemicals and or explosives, or otherwise creates a hazard to life, safety, health, or the environment; work shall be in accordance with the Jurisdictional Authority.

6. Site Cleaning

- 6.1. Except where special permission is obtained, maintain clear access on public sidewalks and roads.
- 6.2. Maintain walks and roads clear of construction materials and debris, including excavated material. Clean walks and roads as frequently as required to ensure that they are cleared of materials, debris and excavated material.

7. Fire Safety Requirements

- 7.1. Enforce fire protection methods, good housekeeping and adherence to local and Underwriter's fire regulations including, but not limited to, Fire Protection Act and the Provincial Building Code Act. Provide UL approved fire extinguishers, and other fire-fighting services and equipment, except where more explicit requirements are specified as the responsibility of individual Sections.
- 7.2. Smoking is not permitted on school property.
- 7.3. Advise Fire Chief in the area of Work of any work that would impede fire apparatus response, including but not limited to violation of minimum overhead clearance prescribed by the fire chief, erecting of barricades and digging of trenches and in areas where work is being done.
- 7.4. Ensure nothing subverts the integrity of fire protection provided for the building structure.

8. Reporting Fires

- 8.1. Know the location of the nearest fire alarm box and telephone, including the emergency phone number.
- 8.2. Report immediately all fire incidents to the fire department as follows:
 - 8.2.1. Activate nearest fire alarm box, or
 - 8.2.2. Telephone local fire department
 - 8.2.3. Where fire alarm box is exterior to building, the person activating the fire alarm box shall remain at the box to direct Fire Department to scene of the fire.
 - 8.2.4. When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

9. Safety Document Submission

- 9.1. Ensure Safety Document Submission applies to Work of this specific project and site.
- 9.2. Submit two (2) copies of Project Safety Document at the Pre-Construction Meeting. Do not commence Work nor deliver material on-site prior to submission.
- 9.3. Include in Safety Document submission specific information detailing the methods and procedures to be implemented ensuring adherence to the acts, regulations, codes and policies specified in this section and to:
 - 9.3.1. Ensure the Health & Safety of persons at or near the Work; including, but not limited to, the Public.
 - 9.3.2. Ensure the measures and procedures of the regulatory agencies specified are carried out.
 - 9.3.3. Ensure every employee, self-employed person and employer performing Work under this contract complies with the regulatory agencies specified.
 - 9.3.4. Where changes to the methods and procedures in the execution of work change submitted safety methods and procedures, modify submitted Safety Documentation and submit modifications, in writing to the Consultant and Owner prior to implementation.

10. Safety Document Organization

- 10.1. Organize information in the form of an instructional manual as follows:
 - 10.1.1. Place in binders of commercial quality, accommodating 8½" x 11" paper size.
 - 10.1.2. Cover: Identify binder with typed or printed title 'Project Safety Document' and list the title of project.
 - 10.1.3. Provide tabbed fly leaf for each separate heading, with typed heading on tab.
 - 10.1.4. Where drawings are within the safety document, provide with reinforced punched binder tab. Bind in with text; fold in larger drawings to size of text pages.
 - 10.1.5. Arrange content under Safety Document headings specified herein.

11. Safety Document Headings

11.1. Employee Safety Training

11.1.1. Place, under this heading, a statement indicating employees working on this specific project have met specified training requirements, if required.

11.2. Company Safety Policy

11.2.1. Place, under this heading, information pertaining to the company's policy and commitment to Occupational Health & Safety, including the responsibilities of management, supervisors and workers.

11.3. Company Safety Rules in General Terms

11.3.1. Place, under this heading, information of a general, global nature, applying to every work environment where the company has staff and pertaining to rules directing compliance to policy. For example state company safety rules with respect to use of hard hats, safety glasses, safety foot ware, CSA approval on such items, and use of alcohol or non-prescription drugs.

11.4. Hazard Assessment

11.4.1. Place, under this heading, information identifying possible hazards specific to this project and identify safe methods and procedures for the execution of work to ensure safety in the work place.

11.4.2. Arrange contents of this heading by technical section number of the project manual.

11.5. Emergency Action Plan

11.5.1. Place, under this heading, information detailing action to be taken in the event of various emergencies.

11.5.2. Arrange content under the following sub-headings:

11.5.2.1. First Aid

11.5.2.1.1. Include information concerning establishment of a First Aid Station, related supplies, staff awareness of location and staff training in First Aid Care of Casualties.

11.5.2.2. Contact of Emergency Support Groups:

11.5.2.2.1. Include relative information including phone location for emergency use, the emergency telephone numbers and their location for the various organizations which must be contacted in case of an emergency, and staff training in procedures.

Cessation of Work:

11.5.2.2.2. Include relative information how work cessation during emergencies is handled and communicated to persons present on site.

11.6. Joint Occupational Health & Safety Committee/Representative:

11.6.1. Place under this heading information detailing membership and terms of reference.

OCCUPATIONAL HEALTH & SAFETY SUMMARY FOLLOWS THIS PAGE

Occupational Health & Safety Summary (to be submitted with each monthly Progress estimate)

The following information summarizes Occupational Health & Safety activities on the project conducted by the Contractor during the month and includes activities of Subcontractors. Activities include all matters prescribed by the Occupational Health & Safety Act and Regulations and the submitted Occupational Health & Safety Document for the Project.

Indicate the applicable # number below:

List new Contractors on Site below:

____ new contractors on site,

____ orientations

____ toolbox talks

____ safety meetings

____ Joint Occupational Health
and Safety Committee meetings

____ hazard assessments

____ formal written inspections

____ warnings issued to employees or subcontractors

____ other, explain _____

The Contractor certifies that the above noted activity list is accurate and that during the month:

Check

All activities on the Project were found to be in compliance with the Occupational Health & Safety Act and Regulations

Some activities on the Project were not found to be in compliance with the Occupational Health & Safety Act and Regulations but were adequately corrected in an appropriate time frame.
Explain _____

Prepared by

Certified by

(Contractor Project Manager)

(Contractor Senior Management)

END OF SECTION 01 35 29

SECTION 01 37 00 - SCHEDULE OF VALUES

1. Related Documents

1.1. General Conditions of Contract.

2. General

2.1. Submit to the Architect, and Owner, Schedule of Values, within twenty (20) days after signing Agreement.

2.2. Use Schedule of Values as basis for Contractor's Progress Claim.

3. Form Of Submittal

3.1. Form included at end of this Section.

3.2. **The form included below is a suggested guide but might not be appropriate for all projects. Contractors may submit their own template to the Owner for review/approval.**

4. Preparing Schedule Of Values

4.1. Itemize separate line item cost for work required.

4.2. Round off figures to nearest ten (10) dollars.

4.3. The sum of all values listed in the schedule shall equal the total contract sum.

5. Review And Submittal

5.1. After review by Architect and Owner, revise and resubmit Schedule as directed.

5.2. The form shall be completed and supported by such evidence as to its correctness as the Architect may reasonably direct.

Schedule of Values

Project Name *#4070-Fine Arts Lab – Cole Harbour District High*

Contract Number

Architect

Contractor

Date

<u>Item</u>	<u>Description</u>	<u>Item Amount</u>
1. General Requirements		
1.1.	Mobilization & Initial Expenses	
1.2.	Site Overhead & Fee	
1.3.	Bonds	
1.4.	Certificates	
1.5.	Testing	
1.6.	Construction Facilities & Temporary Controls	
1.7.	Other (Specify)	
	Total (Items 1.1 to 1.7)	_____
2. Excavation, Backfill, Sitework		
	Total (Item 2.)	_____
3. Concrete		
	Total (Item 3.)	_____
4. Masonry		
	Total (Item 4.)	_____
5. Metals		
	Total (Item 5.)	_____
6. Wood & Plastics		
6.1.	Rough Carpentry	
6.2.	Finish Carpentry	
6.3.	Architectural Woodwork	
	Total (Items 6.1 to 6.3)	_____
7. Thermal & Moisture Protection		
7.1.	Insulation	
7.2.	Air Vapour Barrier	
7.3.	Aluminum Composite Panels	
7.4.	Preformed Metal Siding	
7.5.	Fire Stopping	
7.6.	Roofing	
	Total (Item 7.1 to 7.6)	_____

8. Doors And Windows

- 8.1. Metal Doors & Frames
- 8.2. Wood Doors
- 8.3. Hardware
- 8.4. Windows

Total (Items 8.1 to 8.4) _____

9. Finishes

- 9.1. Acoustic Ceiling Systems
- 9.2. Gypsum Board and Support Systems
- 9.3. Hard Tile
- 9.4. Resilient Tile
- 9.5. Painting

Total (Items 9.1 to 9.5) _____

10. Specialties

- 10.1. Tackboards, Communication Boards
- 10.2. Toilet & Bath Accessories
- 10.3. Manufactured Specialties
- 10.4. Food Service Equipment

Total (Items 10.1 to 10.4) _____

11. Mechanical

- 11.1. As per Sections

Total (Item 11.) _____

12. Electrical

- 12.1. As per Sections

Total (Item 12.) _____

TOTAL (Items 1 - 12) _____

END OF SECTION 01 37 00

SECTION 01 41 00 - REGULATORY AGENCIES

1. Jurisdictional Authorities

- 1.1.** Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of building.

2. Definitions

- 2.1.** The "Constructor" named in the Construction Safety Act, Chapter 52, Revised Statutes of Nova Scotia, as amended by 1972, Chapter 25; and Construction Safety Regulations, pursuant to Chapter 52 R.S.N.S., including any amendments, shall mean the "Contractor" for the Work performed under this Specification.

3. Fire Prevention, Safety & Protection

- 3.1.** General Construction Safety Measures:
- 3.1.1.** Observe safety measures of the
 - 3.1.1.1.** National Building Code 2010, Part 8.
 - 3.1.1.2.** National Fire Code of Canada.
 - 3.1.1.3.** Provincial Government, including but not limited to the Occupational Health & Safety Act Revised Statutes of Nova Scotia 1996, Chapter 320, and the Construction Safety & Industrial Safety Regulations made pursuant to the Occupational Health and Safety Act, 1996.
 - 3.1.1.4.** Workers'/Workmen's Compensation Board.
 - 3.1.2.** In case of conflict or discrepancy the more stringent requirement shall apply.
 - 3.1.3.** Maintain clear emergency exit paths for personnel.
- 3.2.** Except where special permission is obtained, maintain clear access on public sidewalks and roads.
- 3.3.** Maintain walks and roads clear of construction materials and debris, including excavated materials. Clean walks and roads as frequently as required to ensure that they are cleared of materials, debris and excavated materials.
- 3.4.** WHMIS:
- 3.4.1.** Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health & Welfare Canada.

- 3.4.2. Have a copy of WHMIS data sheets available at the workplace on delivery of materials.

Blockage of Roadways

- 3.5. Advise Fire Chief of any work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by fire chief, erecting of barricades and the digging of trenches.

4. Smoking Precautions

- 4.1. Observe, at all times, smoking regulations.

5. Rubbish And Waste Materials

- 5.1. Rubbish and waste materials are to be kept to a minimum.
5.2. The burning of rubbish is prohibited.

6. Flammable And Combustible Liquids

- 6.1. The handling, storage and use of flammable and combustible liquids are to be governed by the current National Fire Code of Canada.
6.2. Flammable and combustible liquids such as gasoline, kerosene and naphtha will be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes, requires the permission of the Fire Chief.
6.3. Transfer of flammable and combustible liquids is prohibited within buildings or jetties.
6.4. Transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat-producing devices.
6.5. Flammable liquids having a flash point below 38°C such as naphtha or gasoline will not be used as solvents or cleaning agents.
6.6. Flammable and combustible waste liquids, for disposal, will be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and the Fire Department is to be notified when disposal is required.

7. Hazardous Substances

- 7.1. Work entailing the use of toxic or hazardous materials, chemicals and/or explosives, otherwise creates a hazard to life, safety or health, will be in accordance with the National Fire Code of Canada.

- 7.2. Where flammable liquids, such as lacquers or urethanes are to be used, proper ventilation will be assured and all sources of ignition are to be eliminated. The Fire Chief is to be informed prior to and at the cessation of such work.

8. Questions and/or Clarification

- 8.1. Direct any questions or clarification on Fire Safety in addition to above requirements to Fire Chief.

9. Fire Inspection

- 9.1. Site inspections by Fire Chief will be coordinated through HRCE Project Manager.
- 9.2. Allow Fire Chief unrestricted access to the work site.
- 9.3. Co-operate with the Fire Chief during routine fire safety inspection of the Work site.
- 9.4. Immediately remedy all unsafe fire situations observed by the Fire Chief.

10. Reference Standards

- 10.1. Where edition date is not specified, consider that references to manufacturer's and, published codes, standards and specifications are made to the latest edition, (revision) approved by the issuing organization, current at the date of this Specification.
- 10.2. Reference standards and specifications are quoted in this Specification to establish minimum standards. Work which in quality exceeds these minimum standards shall be considered to conform.
- 10.3. Should the Contract Documents conflict with specified reference standards or specifications the General Conditions of the Contract shall govern.
- 10.4. Where reference is made to manufacturer's directions, instructions or specifications they shall include full information on storing, handling, preparing, mixing, installing, erecting, applying, or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated.
- 10.5. Have a copy of each code, standard and specification, and manufacturer's directions, instructions and specifications, to which reference is made in this Specification, always available at construction site.
- 10.6. Standards, specifications, associations, and regulatory bodies are generally referred to throughout the specifications by their abbreviated designations:

AA	The Aluminum Association
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ARI	Air Conditioning & Refrigeration Institute
ASTM	American Society for Testing & Materials
CCA	Canadian Construction Association
CGSB	Canadian General Standards Board
CSA	Canadian Standards Association
NSDTIR	Department of Transportation & Infrastructure Renewal, Province of Nova Scotia
IAO	Insurers Advisory Organization
NBC	National Building Code
NFPA	National Fire Protection Association
CANS	Construction Association of Nova Scotia
ULC	Underwriters Laboratories of Canada
WHMIS	Workplace Hazardous Materials Information System

END OF SECTION 01 41 00

SECTION 01 45 00 - QUALITY CONTROL

1. Section Includes

- 1.1. Inspection and testing, administrative and enforcement requirements
- 1.2. Tests and mix designs.
- 1.3. Mock-ups.
- 1.4. Mill tests.
- 1.5. Equipment and system adjust and balance.
- 1.6. Verification by affidavits and certificates that specified products meet requirements of reference standards: In applicable Sections of the Specification.
- 1.7. Testing, balancing and adjusting of equipment: In applicable Mechanical and Electrical Sections of the Specification.
- 1.8. Cutting & Patching: Section 01 11 41.

2. Related Sections

- 2.1. Section 01 33 00 Submittal Procedures: Submission of samples to confirm product quality.
- 2.2. Section 01 61 00 Material & Equipment: Material and workmanship quality – reference standards.
- 2.3. Section 01 77 00 Contract Closeout.

3. REVIEW OF WORK

- 3.1. The Owner shall have access to the Work. If part of the Work is in preparation at locations other than the Place of the Work, access shall be given to such work whenever it is in progress.
- 3.2. Give timely notice to the Owner's Representative, requesting review of the Work as indicated in the Contract Documents.
- 3.3. If the Contractor covers or permits to be covered Work that has been designated for review by the Owner before such is made, uncover such Work, have the review satisfactorily completed and make good such Work at no extra cost to Owner.

4. Inspection, Special Tests, Approvals

- 4.1. Engage the services of appropriate inspection testing agencies ensuring the Work meets codes, acts and regulations, and laws in force at the place of Work. Include such costs in the Contract Price.

- 4.2. Give timely notice requesting inspection to those required to provide inspections, special tests, or approvals, where Work is designated, by the Owner's instructions or the law of the place of Work, for special tests.
- 4.3. If the Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have the inspections or tests satisfactorily completed and make good such Work at no extra cost to the Owner.
- 4.4. The Owner may order any part of the Work to be examined if the Work is suspected to be not in accordance with the Contract Documents. If, upon examination such Work is found not in accordance with the Contract Documents, correct such Work and pay the cost of examination and correction. If such Work is found in accordance with the Contractor Documents, the Owner shall pay the cost of examination and replacement.

5. Independent Inspection Agencies

- 5.1. Independent Inspection/Testing Agencies may be engaged by the Owner for the purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Owner.
- 5.2. Provide access to the Work, and equipment required for executing inspection and testing by the appointed agencies.
- 5.3. Employment of inspection/testing agencies does not relax the Contractor's responsibility to perform Work, or carry out his own inspections and testing in accordance with the Contract Documents.
- 5.4. If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Owner at no cost to the Owner. Pay costs for retesting and reinspection.

6. Access To Work

- 6.1. Allow inspection/testing agencies access to the Work, off site manufacturing and fabrication plants.
- 6.2. Co-operate to provide reasonable facilities for such access.

7. Procedures

- 7.1.** Notify the appropriate agency and Owner in advance of the requirement for tests, in order that attendance arrangements can be made.
- 7.2.** Submit samples and/or materials required for testing, at specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.
- 7.3.** Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

8. Rejected Work

- 8.1.** Remove defective Work, whether the result of poor workmanship, use of defective products or damage and whether incorporated in the Work or not, which has been rejected, including (but not limited to) defective Work rejected by the Owner as failing to conform to the Contract Documents. Replace or re-execute in accordance with the Contract Documents.
- 8.2.** Make good other Contractor's work damaged by such removals or replacements promptly.
- 8.3.** If in the opinion of the Owner, it is not expedient to correct defective Work or Work not performed in accordance with the Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work performed and that called for by the Contract Documents, the amount of which shall be determined by the Owner.

9. Reports

- 9.1.** Submit four (4) copies of inspection and test reports to the Owner.
- 9.2.** Provide copies to Contractor's Consultant and Subcontractor of Work being inspected or tested.

10. Tests and Mix Designs

- 10.1.** Furnish test results and mix designs as may be requested.
- 10.2.** The cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by law of the Place of Work shall be appraised by the Owner and may be authorized as recoverable.

11. Mock-Up

- 11.1. Prepare mock-up for Work for each finish in the Work and other work specifically requested in the specifications. Include for Work of all Sections required to provide mock-ups.
- 11.2. Construct in all locations as specified in specific Section.
- 11.3. Prepare mock-up for Owner's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in the Work.
- 11.4. Failure to prepare mock-up in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- 11.5. If requested the Owner will assist in preparing a schedule fixing the dates for preparation.
- 11.6. Mock-ups may remain as part of the Work, unless specified otherwise in the Contract Documents.

12. Mill Tests

- 12.1. Submit mill test certificates as may be requested.

13. Equipment And Systems

- 13.1. Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.
- 13.2. Refer to Contract Documents for definitive requirements.

END OF SECTION 01 45 00

SECTION 01 52 00 – CONSTRUCTION & TEMPORARY FACILITIES

1. General

- 1.1. Include in the Work construction and temporary facilities required as construction aids or by jurisdictional authorities or as otherwise specified. Install to meet needs of construction as Work progresses. Maintain construction and temporary facilities during use, relocate them as required by the Work, remove them at completion of need and make good adjacent Work and property affected by their installation.
- 1.2. Include in the Work construction and temporary facilities to provide for construction safety such as: fences, barricades, bracing, supports, storage, sanitation and first aid facilities, fire protection, stand pipes, electrical supply, construction equipment with its supports and guards, stairs, ramps, platforms, runways, ladders, scaffolds, guardrails, temporary flooring, rubbish chutes, and walkway, morality and guard lights, and as otherwise required of the Constructor by the Construction Safety Act, of the Province of Nova Scotia, as well as all other applicable regulations or jurisdictional authorities.
- 1.3. Construct temporary Work of new materials unless use of second-hand materials is approved.
- 1.4. Ensure that structural, mechanical, and electrical characteristics of temporary facilities are suitable and adequate for use intended. Be responsible that no harm is caused to persons and property by failure of temporary facilities because of placing, location, stability, protection, structural sufficiency, removal, or any other cause.
- 1.5. Locate temporary facilities as directed and coordinated with School Administration and HRCE.
- 1.6. Relocate construction and temporary facilities as required by the Progress of the Work, and remove at completion of Work.
- 1.7. Do not permit construction personnel to use new washroom and toilet facilities.
- 1.8. Interior work zones to be complete with temporary negative air ventilation units to be functioning at all times to control dust migration to occupied areas.
- 1.9. Refer also to HRCE Policies & Guidelines contained in Appendix A of Section 01 35 13.

2. Services

- 2.1. Temporary Electric Power:
 - 2.1.1. The Contractor will provide a source of electric power for all construction purposes.
 - 2.1.2. Coordinate with the Building Operator locations of power sources and arrange to connect under his direction.
 - 2.1.3. Install electric service distribution conductors and necessary components. Determine anticipated demand which will be placed on service during normal peak

periods and obtain approval on this basis before making installation. Supply power of characteristics required by the Work. Install a power centre for miscellaneous tools and equipment for each major building floor area with distribution box, a minimum of four 20 amp grounded outlets, and circuit breaker protection for each outlet. Make connections available to any part of the Work within distance of a 100'-0" extension.

2.2. Temporary Lighting:

2.2.1. Install lighting for

2.2.1.1. emergency evacuation, safety and security throughout the Project at intensity levels required by jurisdictional authorities.

2.2.1.2. performance of Work throughout Work areas as required, evenly distributed, and at intensities to ensure that proper installations and applications are achieved.

2.2.1.3. performance of finishing Work in areas as required, evenly distributed and of an intensity of at least 15 foot candles.

2.2.2. Permanent fluorescent lighting may be used during construction, provided that fixtures, lamps and lenses are completely cleaned. Incandescent sources may be used during construction to the extent of 20% of the total. Electrical Division Contractor to provide 20% spare lamps to the Owner for replacement purposes.

2.3. Temporary Sanitary Facilities:

2.3.1. Provide sanitary facilities for persons on the Work site. Facilities in areas of the building are only to be used under extraordinary circumstances and with prior approval.

2.4. Maintain fire protection as required by jurisdictional authorities. The Contractor is responsible for de-activating and re-activating Fire Alarm zones as required by the Work of the Contract and to maintain protection in the existing building.

3. Construction Aids

3.1. Hoists & Cranes:

3.1.1. Select, operate and maintain hoisting equipment and cranes as may be required. Operate such equipment only by qualified hoist or crane operators. Make hoist available for Work of each Section.

3.2. Building Enclosure:

3.2.1. Include in Work temporary enclosure for building as required to protect it, in its entirety or in its parts, against the elements, to maintain environmental conditions required for Work. Design enclosures to withstand wind pressures required for the building by jurisdictional authorities. Erect enclosures to allow complete accessibility for installation of materials during the time enclosures remain in place.

3.3. Scaffolding:

3.3.1. Each user of scaffolding shall be responsible for its examination and testing for sufficiency before using it. He shall make it secure if necessary, or shall notify the Contractor in writing that he will not commence work until it is made secure; otherwise he will be held responsible for accidents due to its insufficiency.

4. Barriers

4.1. Install barricades for traffic control, and to prevent damaging traffic over exterior and interior finished areas, as well as safety barricades and otherwise, as may be required.

4.2. Construct hoardings and walkways as required by HRCE or jurisdictional authorities.

5. Protection

5.1. Protect roofs and podiums by substantial temporary construction to ensure that no damage occurs. Provide protection by materials of sufficient thickness to prevent all damage to structure and finish, and to waterproofing qualities of membranes, whenever each of these individual components are exposed. Damage shall include harm resulting from all construction work, such as falling objects, wheel and foot traffic, failure to remove debris, operation of machinery and equipment, and scaffolding and hoisting operations. Positively secure protection to prevent displacement from any cause.

5.2. Box with wood or otherwise protect from damage, by continuing construction, finished sills, jambs, corners, and the like.

END OF SECTION 01 52 00

SECTION 01 61 00 - MATERIAL & EQUIPMENT

1. General

- 1.1. Products refer to materials, manufactured components and assemblies, fixtures and equipment incorporated in the Work.
- 1.2. Use only products of Canadian manufacture unless such products are not manufactured in Canada, are specified otherwise, or are not competitive.
- 1.3. Products for use in the Project and on which the Tender was based shall be in production at that time, with a precise model and shop drawings available for viewing.
- 1.4. Where equivalent products are specified, or where alternatives are proposed under "substitution of products", these products claimed by the Contractor as equivalent shall be comparable in construction, type, function, quality, performance, and, where applicable, in appearance, as approved. Where specified equivalents are used in the tendered bulk sum price for the Work, they shall be subject to final approval.
- 1.5. Incorporate products in the Work in strict accordance with manufacturers' directions unless specified otherwise.
- 1.6. Products delivered to the Project site for incorporation in the Work shall be considered the property of the Owner. Maintain protection and security of products stored on the site after payment has been made for them.
- 1.7. Do not install permanently incorporated labels, trademarks and nameplates, in visible locations unless required for operating instructions or by jurisdictional authorities.

2. Specified Products

- 2.1. Products specified by manufacturer's name, brand name or catalogue reference shall be the basis of the bid and shall be supplied for the Work without exception in any detail, subject to allowable substitutions as specified.
- 2.2. Where several proprietary products are specified, any one of the several will be acceptable.
- 2.3. For products specified by reference standards, the onus shall be on the supplier to establish that such products meet reference standard requirements. The Architect may require affidavits from the supplier, as specified in Section 01 33 00, or inspection and testing at the expense of the supplier, or both, to prove compliance. Products exceeding minimum requirements established by reference standards will be accepted for the Work if such products are compatible with and harmless to Work with which they are incorporated.

3. Substitution Of Products During Progress Of Work

- 3.1.** Products substituted for those specified or approved, or both, shall be permitted only if the listed product cannot be delivered to maintain construction schedule and if the delay is caused by conditions beyond the Contractor's control.
- 3.2.** Obtain approval for substitutions. Application for approval of substitutions shall be made only by Contractor. Process proposals for substituted Work in accordance with procedures established for changes in the Work.
- 3.3.** Submit, with request for substitution, documentary evidence that substituted products are equal to, or superior to, approved products, and a comparison of price and delivery factors for both specified or approved products, and proposed substitute.
- 3.4.** Ensure that substituted products can be both physically and dimensionally incorporated in the Work with no loss of intended function, performance, space or construction time, and that spare parts and service are readily available. The Contractor shall be responsible for additional installation costs, including architectural and engineering fees, required by incorporation of substituted products, and for adaptations made otherwise necessary to ensure that above requirements are satisfied.

4. Product Handling

- 4.1.** Manufacture, pack, ship, deliver and store products so that no damage occurs to structural qualities and finish appearance, nor in any other way detrimental to their function or appearance, or both.
- 4.2.** Ensure that products, while transported, stored or installed, are not exposed to an environment which would increase their moisture content beyond the maximum specified.
- 4.3.** Schedule early delivery of products to enable Work to be executed without delay. Before delivery, arrange for receiving at site.
- 4.4.** Deliver package products, and store until use, in original unopened wrapping or containers, with manufacturer's seals and labels intact.
- 4.5.** Label packaged products to describe contents, quantity and other information as specified.
- 4.6.** Product handling requirements may be repeated and additional requirements specified, in other Sections.

5. Storage & Protection

- 5.1. Coordinate material delivery to ensure that areas within or on building are available to receive them.
- 5.2. Store manufactured products in accordance with manufacturer's instructions, when such instructions are attached to products or submitted by him.
- 5.3. Store finished products and woodwork under cover at all times.
- 5.4. Store and handle flammable liquids and other hazardous materials in approved safety containers and as otherwise prescribed by safety authorities. Store no flammable liquids or other hazardous materials in bulk within the Project.
- 5.5. Storage and special protection requirements may be repeated, and additional requirements specified, in other Sections.

6. Defective Products & Work

- 6.1. Products and Work found defective; not in accordance with the Specifications; or defaced or injured through negligence of the Contractor, his employees or subcontractors, or by fire, weather or any other cause will be rejected for incorporation in the Work.
- 6.2. Remove rejected products and Work from the premises immediately.
- 6.3. Replace rejected products and Work with no delay after rejection. Provide replacement products and execute replacement Work precisely as required by the Specification for the defective Work replaced. Previous inspection and payment shall not relieve the Contractor from the obligation of providing sound and satisfactory Work in compliance with this Project Manual.

7. Workers, Suppliers & Subcontractors

- 7.1. Assign Work only to workers, suppliers, and Subcontractors who have complete knowledge, not only of the conditions of this Project Manual, but of jurisdictional requirements, and reference standards and specifications.
- 7.2. Give preference to use of local workers, suppliers, and Subcontractors wherever possible.

8. Workmanship

- 8.1. Unless otherwise specified in a more detailed manner, workmanship shall be of the highest quality recognized by trade executing the Work in accordance with standard practices, by the best methods recommended by the manufacturer of the Product, and as approved by the Architect.

END OF SECTION 01 61 00

SECTION 01 77 00 – CONTRACT CLOSEOUT

1. Section Includes

- 1.1. Final cleaning.
- 1.2. Spare parts and maintenance materials.
- 1.3. Take over procedures.

2. Related Sections

- 2.1. Individual Specifications Sections: Specific requirements for operation and maintenance data.

3. Final Cleaning

- 3.1. Refer to the General Conditions of Contract.
- 3.2. Before final inspection, replace glass and mirrors broken, damaged and etched during construction, or which are otherwise defective.
- 3.3. In addition to requirements for cleaning-up specified in General Conditions of the Contract, include in Work final cleaning by skilled cleaning specialists on completion of construction.
- 3.4. Remove temporary protections and make good defects before commencement of final cleaning.
- 3.5. Remove waste products and debris other than that caused by the Owner, other contractors or their employees, and leave the Work clean and suitable for occupancy by Owner.
- 3.6. Remove surplus products, tools, construction machinery and equipment. Remove waste products and debris other than that caused by the Owner or other Contractors.
- 3.7. Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- 3.8. Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors and ceilings.
- 3.9. Vacuum clean and dust building interiors, behind grilles, louvres and screens as affected by Work.
- 3.10. Wax, seal, shampoo, buff or prepare floor finishes, as recommended by the manufacturer. Use products compatible with products used by building maintenance staff.
- 3.11. Broom clean and wash all horizontal and vertical surfaces as affected by Work.
- 3.12. Clean up and make good exterior grades, lawns, planting and surfaces after removal of temporary access and facilities.
- 3.13. Removing of visible labels left on materials, components, and equipment.
- 3.14. Maintain cleaning until Owner has taken possession of building or portions thereof.

4. Spare Parts And Maintenance Materials

- 4.1. Spare parts and maintenance materials provided shall be new, not damaged or defective, and of the same quality and manufacture as Products provided in the Work. If requested, furnish evidence as to type, source and quality of Products provided.
- 4.2. Defective Products will be rejected, regardless of previous inspections. Replace products at own expense.
- 4.3. Store spare parts and maintenance materials in a manner to prevent damage, or deterioration.
- 4.4. Provide spare parts, special tools, maintenance and extra materials in quantities specified in individual specification Sections.
- 4.5. Provide items of same manufacture and quality as items in the Work.

5. Demonstration Of Systems & Equipment

- 5.1. Give a complete demonstration of all systems and equipment in the presence of the Consultant at the following times:
- 5.2. When each is 100% completed at the request of the Contractor.
- 5.3. At time of inspection to validate final completion.
- 5.4. At final completion for the benefit of the maintenance staff for the Project.
- 5.5. Responsible personnel representing the Subcontractor responsible for the Work being demonstrated shall be present at each demonstration.

6. Submittals

- 6.1. Submit with application for substantial performance certificate.
 - 6.1.1. Certificate of substantial completion inspection report from electrical utility or inspection.
 - 6.1.2. Certificate of verification of fire alarm system.
 - 6.1.3. Certificate from the Fire Marshal's Office and I.A.O. of final inspection of sprinkler system.
 - 6.1.4. Air balance reports.
 - 6.1.5. Other reports required or specified.
 - 6.1.6. Maintenance Manuals and Operating Instructions.
- 6.2. Submit with application for release of final payment:
 - 6.2.1. Final project record drawings.
 - 6.2.2. Extra stock.
 - 6.2.3. Performance bonds which shall remain in effect for one (1) year after take-over date.
 - 6.2.4. Completed Liability Insurance Policy extended for one (1) year from take-over date.

- 6.2.5. Written guarantee covering all workmanship and materials used in the Work.
- 6.2.6. Maintenance bonds as specified.
- 6.2.7. Extended Warranties as specified
- 6.2.8. Certificate from Workers' Compensation Board.
- 6.2.9. Certificate from Health Services Tax Division.

7. Final Inspection Procedures

- 7.1. Schedule, make arrangements for and administer final inspections and close out in the following stages.
- 7.2. Contractor's Inspection:
 - 7.2.1. Determination that Project meets requirements for substantial performance and inspection is the responsibility of the Contractor.
 - 7.2.2. The Contractor and all Subcontractors shall conduct an inspection of the work, identify deficiencies and defects; repair as required. Notify the Consultant in writing of satisfactory completion of the contractor's Inspection and that corrections have been made. Request a Consultant's Substantial Performance Inspection.
- 7.3. Consultant's Inspection: Consultants and the Contractor will perform an inspection of the Work to identify obvious defects or deficiencies. The contractor shall correct Work accordingly.
- 7.4. Substantial Performance Inspection:
 - 7.4.1. When the items noted above are complete, request a substantial performance inspection of the Work by the Consultant, and the Contractor. If Work is deemed incomplete by the Consultant, complete the outstanding items and request a re-inspection.
 - 7.4.2. Substantial performance inspections shall be scheduled to begin within eight working days of the Contractor's request.
 - 7.4.3. Present at the substantial performance inspection will be:
 - 7.4.3.1. The Consultant and his Sub-consultants that he requires and notifies.
 - 7.4.3.2. The Owner's representatives, upon notification by the Consultant.
 - 7.4.3.3. The Contractor and such Subcontractors that he considers are required.
 - 7.4.3.4. The Contractor will compile a substantial performance deficiency list at this inspection and issue it to the Consultant and Owner.
 - 7.4.3.5. The Contractor shall correct substantial performance deficiencies before a date agreed upon by the Contractor and Consultant.
 - 7.4.3.6. Upon the Consultant's approval of substantial performance, the Contractor shall submit an application for a substantial performance certificate.
 - 7.4.3.7. When the Contractor has satisfied himself that these corrections have been completed in a satisfactory manner by his inspection he shall schedule a

final Contractor's inspection by the Consultant, and the Owner's representatives if required, within five working days of the Contractor's request.

7.4.3.8. Upon the Consultant's approval of completion, the Contractor shall submit an application for a completion certificate.

8. Substantial Performance

- 8.1.** The Consultant will issue a Certificate of Substantial Performance when satisfied outstanding deficiencies noted during inspections prior to the substantial completion inspection have been corrected, the Work is substantially complete and is so certified by the Owner.
- 8.2.** A list of remaining deficiencies to be rectified before final acceptance will be attached to the Certificate of Substantial Performance.
- 8.3.** Make submissions specified in Subparagraph 1.06 of this Section.

9. Certificate For Release Of Amount Due At Substantial performance

- 9.1.** The Consultant will issue to the Owner a certificate for release of money in an amount equal to the amount due the Contractor under the Agreement providing he is satisfied the Work has been substantially completed.
- 9.2.** The certificate shall indicate the date of substantial performance.
- 9.3.** Payment shall be due upon date of substantial performance.

10. Completion Certificate

- 10.1.** The Consultant will issue a Certificate of Completion (DSS Document DC670-92) when he is satisfied that outstanding deficiencies noted during inspections have been corrected and the Work is completed and is so certified by the Owner.
- 10.2.** The date of the completion certificate will commence the required sixty (60) day period before release of final payment.

11. Certificate For Release Of Final Payment

- 11.1.** The Consultant will issue to the Owner a certificate for release of final payment sixty (60) days after date of completion certificate providing he is satisfied the Work has been completed.
- 11.2.** The certificate will be in an amount equal to the remaining money due the Contractor under the Contract, and shall indicate the date of final completion.
- 11.3.** Payment shall be due upon date of final completion.

12. Warranties

12.1. Establishment of Warranties:

12.1.1. Warranties shall commence on date of substantial performance certificate.

12.2. Warranty Period:

12.2.1. The Owner will advise the Consultant of defects observed during warranty periods.

12.2.2. The Consultant will notify the Contractor of defects observed during warranty period and request him to remedy the defects in accordance with the Contractor documents.

12.2.3. Thirty (30) days before expiration of warranties the Owner's representatives, the Consultant and the Contractor will inspect the Work as arranged by the Contractor noting defects of products and workmanship.

12.2.4. The Contractor shall immediately remedy such noted defects.

END OF SECTION 01 77 00

CONTRACTOR'S CHECKLIST

Enclose the following documents with your bid:

- Bid Security as required in section 21.1 (Information for Tenderers)*** - in the amount of 10% of the Contract Price (before HST).
- Contract Security for bids over \$100,000 as required in section 22.6.1.1 (Information for Tenderers)*** – required upon award.
- Certificate of Insurance*** indicating a minimum of ***\$5,000,000 Commercial General Liability Insurance*** per occurrence and ***Commercial Auto Liability Insurance*** covering all owned, non-owned and hired vehicles for a minimum combined single limit of ***\$2,000,000*** per occurrence and ***Builder's Risk Insurance*** in the amount of the contract price. ***Please comply with the insurance requirements as indicated in the sample insurance form (attached)***
- Tentative Work Schedule (Timelines)*** – Subsequently, within five (5) business days of tender award the successful tenderer shall provide a schedule clearly indicating timelines for completion of all aspects of the project.
- Workers' Compensation Board Letter*** of Good Standing
- Certificates of good standing with CRCA (Canadian Roofing Contractors Association) and RCANS (Roofing Contractors Association of Nova Scotia).*** – **N/A**
- Certificate of Recognition from one of the seven safety audit companies that jointly sign with the WCB:***
 - East Coast Mobile Medical Inc.
 - HSE Integrated
 - Nova Scotia Construction Safety Association
 - Nova Scotia Trucking Safety Association
 - Occupational Health & Educational Services (2002) Inc.
 - Safety Services Nova Scotia
 - Stantec Inc.This list can be found on WCB's website: www.wcb.ns.ca.
- Completed HRCE Safety Plan***
- Applicable Warranty Information***

CERTIFICATE OF LIABILITY INSURANCE

This certificate is issued as a matter of information only and confers no rights upon the certificate holder and imposes no liability on the insurer.
 This certificate does not amend, extend or alter the coverage afforded by the policies below.

1. CERTIFICATE HOLDER - NAME AND MAILING ADDRESS	2. INSURED'S FULL NAME AND MAILING ADDRESS
Halifax Regional Centre for Education	Contractors Name and Address
33 Spectacle Lake Drive	
Dartmouth, NS	
POSTAL CODE B3B 1X7	POSTAL CODE

3. DESCRIPTION OF OPERATIONS/LOCATIONS/AUTOMOBILES/SPECIAL ITEMS TO WHICH THIS CERTIFICATE APPLIES (but only with respect to the operations of the Named Insured)
 Insured project details and address: (List specific Project details)
 Policy Includes: Contractual Liability, Primary and Non-Contributory, Waiver of Subrogation, Broad Form Property Damage

4. COVERAGES
 This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated notwithstanding any requirements, terms or conditions of any contract or other document with respect to which this certificate may be issued or may pertain. The insurance afforded by the policies described herein is subject to all terms, exclusions and conditions of such policies.

LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS

TYPE OF INSURANCE	INSURANCE COMPANY AND POLICY NUMBER	EFFECTIVE DATE YYYY/MM/DD	EXPIRY DATE YYYY/MM/DD	LIMITS OF LIABILITY (Canadian dollars unless indicated otherwise)				
				COVERAGE	DED.	AMOUNT OF INSURANCE		
COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE OR <input checked="" type="checkbox"/> OCCURRENCE <input checked="" type="checkbox"/> PRODUCTS AND /OR COMPLETED OPERATIONS <input checked="" type="checkbox"/> EMPLOYER'S LIABILITY <input checked="" type="checkbox"/> CROSS LIABILITY <input checked="" type="checkbox"/> TENANTS LEGAL LIABILITY <input checked="" type="checkbox"/> POLLUTION LIABILITY EXTENSION	XX Insurance 123Binder (Wrap - Up Liability)	2017/11/20	2018/11/20	COMMERCIAL GENERAL LIABILITY BODILY INJURY AND PROPERTY DAMAGE LIABILITY - GENERAL AGGREGATE		\$5,000,000		
						- EACH OCCURRENCE		\$5,000,000
				PRODUCTS AND COMPLETED OPERATIONS AGGREGATE		\$5,000,000		
				<input type="checkbox"/> PERSONAL INJURY LIABILITY OR <input checked="" type="checkbox"/> PERSONAL AND ADVERTISING INJURY LIABILITY		\$1,000,000		
				MEDICAL PAYMENTS		\$25,000		
				TENANTS LEGAL LIABILITY		\$1,000,000		
				POLLUTION LIABILITY EXTENSION		\$2,000,000		
<input checked="" type="checkbox"/> NON-OWNED AUTOMOBILES <input type="checkbox"/> HIRED AUTOMOBILES	XX Insurance 123 Binder	2017/11/20	2018/11/20	NON OWNED AUTOMOBILE		\$2,000,000		
AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> DESCRIBED AUTOMOBILES <input type="checkbox"/> ALL OWNED AUTOMOBILES <input type="checkbox"/> LEASED AUTOMOBILES ** ** ALL AUTOMOBILES LEASED IN EXCESS OF 30 DAYS WHERE THE INSURED IS REQUIRED TO PROVIDE INSURANCE	XX Insurance 123 Binder	2017/11/20	2018/11/20	BODILY INJURY AND PROPERTY DAMAGE COMBINED		\$2,000,000		
				BODILY INJURY (PER PERSON)				
				BODILY INJURY (PER ACCIDENT)				
				PROPERTY DAMAGE				
EXCESS LIABILITY <input type="checkbox"/> UMBRELLA FORM <input type="checkbox"/>				EACH OCCURRENCE				
				AGGREGATE				
OTHER LIABILITY (SPECIFY) <input checked="" type="checkbox"/> Builders Risk - All Risk <input type="checkbox"/>	XX Insurance 123 Binder	2017/11/20	2018/11/20	Limit - (Project Limit)				
				Extra Expense		\$1,000,000		
<input checked="" type="checkbox"/> Professional Liability	XX Insurance 123 Binder	2017/11/20	2018/11/20	Limit of Liability - Per Claim		\$5,000,000		

5. CANCELLATION
 Should any of the above described policies be cancelled before the expiration date thereof, the issuing company will endeavor to mail 30 days written notice to the certificate holder named above, but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives.

6. BROKERAGE/AGENCY FULL NAME AND MAILING ADDRESS	7. ADDITIONAL INSURED NAME AND MAILING ADDRESS (but only with respect to the operations of the Named Insured)
	Halifax Regional Centre for Education
	33 Spectacle Lake Drive
BROKER CLIENT ID:	Dartmouth, NS
	POSTAL CODE B3B 1X7

8. CERTIFICATE AUTHORIZATION

ISSUER	CONTACT NUMBER(S) TYPE NO. TYPE NO.
AUTHORIZED REPRESENTATIVE	TYPE NO. TYPE NO.
SIGNATURE OF AUTHORIZED REPRESENTATIVE	DATE 2017/11/20 EMAIL ADDRESS

HALIFAX REGIONAL CENTRE FOR EDUCATION

Project Safety Plan Outline

During the planning of each project, environmental and occupational health and safety issues will be assessed like any other key project component.

Prior to beginning a new project, tendering contractors shall examine the work area to identify potentially hazardous site specific situations.

Once identified, these hazards should be prioritized on this Hazard Assessments/Project Safety Plan Outline and corrective *actions* noted to eliminate or control each hazard. The dates of when and names of the persons who are responsible for completing the *action* should also be assigned.

Copies of the completed Safety Plan Outline shall be submitted as part of the tender document submittal, sent to the HRCE Operations Services Regional Manager, made available on the job site and communicated to the workers.

Project Name: _____

Project Location: _____

Project Start date: _____

Project End date: _____

Company Name: _____

Completed by: _____
(Contractor's project manager)

Date: _____

Copy to: _____

PLANNING:

Does the Contractor's Occupational Health and Safety Program deal with the work activities associated with this project? Yes No

Describe tasks to be undertaken: _____

HAZARDS ASSESSMENT:

Identify the hazards that could present themselves on this project (e.g. live electrical wires, over water, confined space, etc) and describe what steps will be taken to prevent an incident (e.g. cover up, de-energize, safe work practices, netting, etc). Prioritize from #1 as needing immediate action.

#	Hazard	Required Action	Completed by	Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

ENVIRONMENTAL ASSESSMENT:

Identify the environmental issues that could present themselves on this project (e.g. oil spills, asbestos, etc.) and describe the action that will be taken to eliminate or reduce the risk of occurrence (e.g. mop kits, air sampling, etc.)

#	Hazard	Required Action	Completed by	Date
1				
2				
3				
4				
5				

EMERGENCY RESPONSE:

In the event of an incident, pre-plan the response and write up the procedures. Minimally, the following list should be completed and posted on site:

Contact	Phone #	Contact	Phone #
Fire	911	Poison Control	428-8161
Ambulance	911	Dangerous Goods	1-800-565-1633
Doctor	911	Waste Disposal	
Police	911	Insurance	
HRCE Office	493-5110	Min/Dept of Labour	1-800-952-2687
Min./Dept.of Transport.		Min/Dept of Environment	1-800-565-1633

- Identify and arrange source of first aid, ambulance and rescue.
- Accidents will be reported to: _____
- Accidents will be investigated by: _____
- Back-up call to: _____
- HRCE # emergency/after hours: day 493-5110 after 4:00 pm 442-2476

SAFETY MEETINGS:

On this project, given the nature of the work and the anticipated size of the work force, the following frequency will apply:

Site meetings _____

Site Audits _____

Follow up with HRCE Manager: _____

SITE IMPLEMENTATION:

- Health and Safety Rep & Safety Committee:
Establish liaison between HRCE, contractor, site administration
First Aid, PPE, other safety items as required.

- Documentation:
Applicable MSDS
Safety program
Applicable work procedures
Permits
First Aid Certification

TRAINING:

The following training/testing will be mandatory on site:

1) _____

2) _____

3) _____

TENTATIVE SCHEDULE OF WORK:

- 1) Date Project Will Commence: _____
- 2) Number of Weeks to Complete Project: _____ weeks

NOTE:

Within one week of tender award the successful bidder shall provide a schedule clearly indicating timelines for completion of all aspects of the project.

1 General

1.1 RELATED WORK

- .1 01 74 21 Construction/Demolition Waste Management and Disposal

1.2 REFERENCE STANDARDS

- .1 Perform work in accordance with the following standards:
 - .1 Canadian Construction Safety Code, latest edition.
 - .2 NBC 2010 Code, Part 8 - Safety Measures at Construction and Demolition sites.
 - .3 CSA S350 - Code of Practice for Safety in Demolition of Structures.
 - .4 NFC 2010 Code - Part 6 governing installation and maintenance of portable fire extinguishers.
 - .5 CSA C22.1, "Canadian Electrical Code", governing temporary electrical installations.
 - .6 Transportation of Dangerous Goods Acts.

1.3 WORK INCLUDED

- .1 Demolition, removal and disposal of the all work itemized on the drawings.
- .2 Coordinate removals in order to maintain services as required for operation.
- .3 Obtain all necessary permits required to perform the above noted work.

1.4 EXISTING CONDITIONS

- .1 Take over structures to be demolished based on their condition on date that the contract is awarded.
- .2 Inspect adjacent existing property to extent possible and ensure that its condition and stability is recorded.
- .3 Photograph adjacent existing properties in sufficient detail to record its conditions before Work of this Section commences. These photographs will be used to compare the condition of adjacent construction before and after performance of Work of this Section in the event damage of adjacent construction is claimed as a result of demolition.
- .4 Should unlabelled drums or potentially hazardous materials be encountered in the course of demolition, stop work and notify the Architect. Do not proceed until written instructions have been received from the Architect.

1.5 PROTECTION

- .1 For demolition within the existing Campus provide dust proof partitions, negative air pressure and all other measures required to maintain a clean environment for the building occupants.
- .2 Prevent movement, settlement or damage of adjacent properties, structures, services, paving, roadways, and parking areas. Make good damage and be liable for injury caused by demolition.
- .3 Prevent debris from blocking existing surface drainage systems, which must remain in operation.
- .4 Ensure safe passage of the public past area of demolition.
- .5 Prevailing weather conditions and weather forecast shall be considered. Demolition work shall not proceed when extreme weather conditions constitute a hazard to the works and site.
- .6 Protect existing items designated to remain. In event of damage, immediately replace such items or make repairs to approval of the Architect at no additional cost to the Owner.
- .7 Protect the supply of electricity to areas of property to remain in service.
- .8 Protect telephone service to areas of property to remain in service.
- .9 Protect water and sewer service to areas of the property to remain in service.
- .10 Take precautions to support structures and, if safety of building being demolished or adjacent structures or services, etc. appears to be endangered, cease operations and notify the Architect.
- .11 Prevent debris from blocking surface drainage system, mechanical and electrical systems which must remain in operation.
- .12 Ensure that adjacent properties, and other equipment are protected from damage resulting from Work of this Section. Install protection consisting of fences, barricades, signs, and substantial construction to provide physical protection.
- .13 Post danger signs in conspicuous locations to warn persons that demolition is in progress.
- .14 Erect protection to provide safe access which must be maintained to existing buildings and support area of the building being demolished.
- .15 Protect existing services from damages. Where required, arrange to relocate existing active services to ensure that they function continuously in safety and without risk of damage. Cap off and remove unused services encountered during demolition after approval is given by the Architect and utilities or jurisdictional authorities, whichever may apply.

- .16 Maintain security of areas in which demolition is proceeding by control of access through enclosing fences, barricades, and hoardings during times Work is in progress, and by locking hardware otherwise.
- .17 Maintain security of areas in which demolition is proceeding while Work is shut down because of a strike or a lockout.
- .18 Prevent spread of dust beyond the demolition area by wetting, or by other approved means, as it accumulates.
- .19 Keep sidewalks, streets, and roads free of dust and debris from demolition Work. Clean up accumulations as they occur.
- .20 Provide up-to-date proof of certification of all equipment to be used on site.
- .21 Temporary shoring and protection shall be designed by a professional engineer registered or licensed to practice in Nova Scotia.

1.6 SALVAGEABLE MATERIALS

- .1 Salvage, recycling or reuse of materials or equipment from the buildings to be demolished is encouraged.
- .2 Re-grade and label salvageable lumber as required by law.
- .3 The Contractor shall protect the owner from any claims, however, rising, from the salvage, recycling or reuse of materials or equipment from the demolished buildings.

2 Execution

2.1 ENVIRONMENTAL PROTECTION

- .1 Perform work in an environmentally acceptable manner. Comply with requirements of Division 1.

2.2 PREPARATION

- .1 Obtain all necessary permits and approvals.
- .2 Inspect site and verify with the Architect items designated for removal and items to be preserved.
- .3 Locate and protect utility lines to remain. Notify utility companies before starting demolition.
- .4 Employ rodent and vermin exterminators to comply with Health and Environmental regulations.

2.3 EXAMINATION

- .1 Before commencing Work, ensure in examination of the site and Work to be demolished that all possible factors concerning demolition are investigated, and that the following are known in particular:

- .1 Methods and means available for material handling, disposal, storage, and transportation.
 - .2 Construction details of structures to be demolished.
 - .3 Construction details of other existing and adjacent properties.
 - .4 Location of utility and other services.
- .2 Review demolition Work to be performed in all its details. Do not proceed without review of the demolition methods that will be used.

2.4 DEMOLITION - GENERAL

- .1 Remove any equipment or materials intended for reuse, recycling or salvage.
- .2 Sub-Contractor shall provide a detailed description of the proposed methods and procedures for demolition prior to commencing work on the site.
- .3 Do not disrupt active or energized utilities designated to remain undisturbed.
- .4 At end of each day's work leave site in safe condition so that no part is in danger of toppling or falling.
- .5 Carefully remove and lower structural framing and other heavy or large objects.
- .6 Demolish to minimize dusting and noise. Spray water on structures during demolition as required and when ever requested by the Architect to control dust.
- .7 Remove and dispose of all demolition items and materials from site in accordance with authorities having jurisdiction and as per "3.8 Disposal of Material" of this section.
- .8 In removal of pavements, curbs and gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other approved method.
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying granular materials.
- .9 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .10 Demolish concrete walls in small sections. Carefully remove and lower structural framing and other heavy or large objects.
- .11 Dispose of materials not designated for salvage or re-use in work, off site.
- .12 Do not sell or burn materials on site.

2.5 DISPOSAL OF MATERIAL

- .1 Reuse, recycling and salvage of materials and equipment is permitted and encouraged with regulatory requirements. Do not reuse salvaged material in this project unless approved by the Architect.

- .2 Sale of materials shall not take place on or from the site.
- .3 All debris must be disposed off site at an approved disposal facility.
- .4 The contractor will provide a waste disposal plan as per 01 74 11 to the Architect and obtain approval for the disposal plan in writing from the NSDOE, and the Architect prior to commencement of work at the site.

2.6 RESTORATION

- .1 Upon completion of work, remove debris, trim surfaces and leave work sites clean to a condition satisfactory to the Architect.
- .2 Reinstated areas must be considered safe by the Architect.
- .3 Reinstated areas in existing works outside area of demolition to conditions that existed prior to commencement of work.

2.7 HAZARDOUS MATERIAL

- .1 Dispose of all hazardous material as required identified in the hazardous material report issued Sept 1993 by Pinchin LeBlanc (attached after this section).
 - .1 Use appropriate removal and disposal procedures.
- .2 Materials not identified in report.
 - .1 Report to Architect immediately
 - .2 Handle materials as per instruction
 - .3 Expense to be paid by owner.

END OF SECTION

1 General

1.1 GENERAL CONDITIONS

- .1 The General Conditions of the contract as well as provisions of Division 1 at the beginning of these specifications shall be deemed to apply and be a part of this section of the specification.

1.2 WORK INCLUDED

- .1 To supply and install millwork as shown or specified and summarized but not restricted to the following:
 - .1 Work benches etc. as detailed on the drawings
 - .2 Shelving, cabinets, casework etc. as detailed on drawings
 - .3 All miscellaneous hardwood trim, millwork, etc. as required to complete the project.

1.3 REFERENCE STANDARDS

- .1 Do millwork to Quality Standards of Architectural Woodwork Manufacturers Association of Canada (AWMAC), current edition. Quality to be at **AWMAC custom Grade**. Unless otherwise noted
- .2 Particle board: ANSI A 208.1, 1993, grade M3, density 640-800 kg/m³.
- .3 Medium density fibreboard: ANSI A 208.2, 1994, grade MD, density 640-800 kg/m³.

1.4 SUBMITTALS

- .1 Provide shop drawings for cabinets and counter tops in accordance with Section 01 33 00.
 - .1 Clearly indicate details of construction, profiles, jointing, fastening.

1.5 SAMPLES

- .1 If requested, submit to the Architect for approval prior to fabrication, full size samples of any or all of the following, as selected by the Architect:
 - .1 Any or all counter top materials as supplied under this Section
 - .2 Any hardware items
 - .3 Samples of colours proposed for finishes.
- .2 Arrange and pay for the shipment of all samples requested to the job site.
- .3 Samples will be subject to testing at the discretion of the Architect within the limits of this specification. Samples undamaged by testing may be used to form part of the work.

1.6 PROTECTION

- .1 All materials shall be delivered to the project site properly protected.
- .2 Materials shall be stored flat and level in a fully enclosed space, preferably in the room in which they will be installed. Units shall be stored off the floor.
- .3 Care in handling shall be exercised to avoid damage. Do not allow material to become wet.
- .4 Protect the work of this section and be responsible for all damage incurred. Replace damaged work with perfect materials at no additional cost.
- .5 Protect work of all other sections from damage resulting from the work of this section. Arrange and pay for the restoration of any such damage incurred.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Installation shall be done only when the temperature and humidity closely approximates the interior conditions that will exist when the building is occupied.
- .2 The heating system shall be operating before, during, and after installation.
- .3 Prior to the start of installation, all wet trades' work must be completed, and thoroughly dry.
- .4 Do not install work in any area unless satisfied that work in place has dried out, and that no further installation of damp materials is contemplated.

1.8 EXAMINATION

- .1 Examine all work performed by other trades upon which the work of this section depends and be responsible for checking all dimensions at the site affecting this work.
- .2 Do not install the work of this section until all previous work which is to receive it and site conditions are satisfactory. Commencement of the work will indicate acceptance of the previous work and site conditions.

2 Products**2.1 GENERAL**

- .1 Include in Work of Section all hardware required for its execution.
- .2 Moisture content of wood at time of installation shall be kiln dried.
- .3 Use only adhesives and fastenings that develop sufficient strength for intended use, are non-staining, and are unaffected by the environment to which exposed.

2.2 MATERIALS

- .1 Wood and Plywood

- .1 Baltic Plywood to be Birch veneer. Thickness as indicated on drawings. Minimum B Grade. Inner plies to be minimum 1 mm-thick solid birch veneer.
 - .1 All plywood with exposed end grain to be Baltic Birch Plywood.
- .2 Hardwood plywood: to CSA 0115-M1982 of species and thickness indicated, flat cut book match veneer. Use veneer core with Type II bond. Select veneers to provide book match with a minimum variation of grains and colours from veneer to veneer and within units of cabinetry. Good grade where exposed to view and sound grade where not. Veneer to match Baltic Birch.
 - .1 All exposed plywood with concealed end grain to be hardwood Birch Veneer or Baltic Birch Plywood.
- .3 Canadian softwood plywood: to CSA 0151-1978. Sanded exterior grade, solid two sides where both sides are exposed to view and good one side where only one side exposed to view.
- .4 Douglas fir plywood: to CSA 0121-M1978, good two sides where both sides are exposed to view and good one side where only one side exposed to view.
- .5 Wood: Grade mark softwood and hardwood lumber by the appropriate association under authority of the National Lumber Grades Authority. Where not exposed to view, use wood of grades suitable for fabrication, utility and structural needs. Where exposed to view, use wood to meet requirements of AWMAC Custom Grade Standard. Hardwood to be Birch to match Baltic Birch Plywood.
- .2 General Materials
 - .1 Nails and Staples: CSA B111-1974 galvanized.
 - .2 Adjustable shelving to be supported with stainless steel recessed pilasters.
 - .3 Coat hooks to be Richelieu 4" Triple utility hooks - brushed nickel – NH2233031195
 - .4 Fastenings: Melamine screws.
 - .5 Grommets:
 - .1 Countersunk head BNP fasteners manufactured by MW Fasteners, plastic, coloured to match laminate.
 - .6 Sealant:
 - .1 Silicone sealant, Tremco "Proglaze".
 - .7 Draw Bolts & Splines: As recommended by fabricator.
 - .8 Adjustable shelving hardware to be recessed.

2.3 FABRICATION

- .1 Miscellaneous Millwork
 - .1 Workmanship to conform to AWMAC Custom requirements.
 - .2 All corner cuts/joints to be mitered where visible.
- .2 Fastening
 - .1 Fasten work with nails generally, but use screws or special fasteners at critical joints, and where required by specified quality grade standards.
 - .2 Glue built-up work as well as nailing and screwing.
 - .3 Blind nail unless impossible.
 - .4 Set finishing nails below finished surfaces to receive putty.
- .3 Finishing:
 - .1 Fine sand wood surfaces after installation to leave surfaces in true planes and free of machine or tool marks.
 - .2 All wood shall receive a catalyst type low voc synthetic varnish finish applied as follows:
 - .1 1 coat of sealer.
 - .2 2 coats of clear catalytic type low voc synthetic varnish.

3 EXECUTION

3.1 INSTALLATION

- .1 Set and secure materials and components in place, rigid plumb and square.
- .2 Provide heavy duty fixture attachments for wall mounted casework.
- .3 Apply water resistant building paper, (bituminous coating), over wood framing members in contact with masonry or cementitious construction.
- .4 Install work plumb, true and square, neatly scribed to adjoining
- .5 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
- .6 Use draw bolts and splines to countertop joints. Maximum spacing 16" o.c., 3" from edge. Make flush hairline joints.
- .7 Provide cutouts for inserts, sinks, outlet boxes, etc. Round internal corners, chamfer edges and seal exposed core.
- .8 Build work into construction as indicated on drawings or specified in other sections of this specification, or both.

- .9 Co-operate with other trades and proceed promptly with the work of this section as rapidly as job conditions permit.
- .10 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.
- .11 Touch up external and semi-exposed surfaces to provide complete finish. Remove all stickers and wipe down all surfaces. Trim and sand smooth all edges.
- .12 Wipe out interior surfaces, trim and sand smooth all edges.
- .13 Remove excess adhesive with recommended solvent.

3.2 ADJUSTMENT AND CLEANING

- .1 Adjust hinged doors to swing freely and easily, to remain stationery at any point of swing, to close evenly and tightly against stops with binding, and to latch positively when doors are closed with moderate force.
- .2 Adjust hardware so that latches, locks and drawers, etc., operate smoothly without binding, and closers act positively with the least possible resistant in use. Lubricate hardware if required by supplier's instructions.
- .3 Clean hardware after installation in accordance with supplier's instructions.
- .4 Sand clean woodwork to leave free from finish defects in any exposed part.
- .5 All work that cannot be successfully cleaned or repaired shall be removed and replaced.

3.3 CLEAN-UP

- .1 Promptly as the work proceeds and upon completion, clean up and remove from the premises all rubbish and surplus materials resulting from the work of this Section.

END OF SECTION

1 General

1.1 RELATED DOCUMENTS

- .1 Drawings and general provisions of Contract, including General and Supplementary conditions and Division 1 Specification Section, apply to work specified in this section.

1.2 DEFINITIONS

- .1 Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- .1 Only tested firestop systems shall be used in specific locations as follows:
 - .1 Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
 - .2 Gaps between edge of floor slabs and curtain walls.
 - .3 Openings between structurally separate sections of wall or floors.
 - .4 Gaps between the top of walls and ceilings or roof assemblies.
 - .5 Expansion joints in walls and floors.
 - .6 Openings and penetrations in fire-rated partitions or walls containing fire doors.
 - .7 Openings around structural members which penetrate floors or walls.

1.4 QUALITY ASSURANCE

- .1 A manufacturer's direct representatives (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.
- .2 Firestop System installation must meet requirements of CAN4-S115-M, ULC S-115-M OR UL 2079 tested assemblies that provide a fire rating as required.
- .3 Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- .4 Firestop Systems do not re-establish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

- .5 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgement drawings must follow requirements set forth by the International Firestop Council.

1.5 SUBMITTALS

- .1 Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of ULC or cUL firestop systems to be used and manufacturer's installation instructions to comply with Section 01300.
- .2 Shop Drawings: illustrate each type of firestopping required for the project and the materials, thicknesses, etc. to be provided for each type.
- .3 Manufacturer's engineering judgment identification number and drawing details when no ULC or cUL system is available for an application. Engineered judgment must include both project name and contractor's name who will install firestop system as described in drawing.
- .4 Submit material safety data sheets provided with product delivered to job site.

1.6 INSTALLER QUALIFICATIONS

- .1 Engage an experienced installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary experience, staff, and training to install manufacturer's products or specified requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials undamaged in manufacturer's clearly labelled, unopened containers, identified with brand, type, and ULC or cUL label where applicable.
- .2 Coordinate delivery of materials with scheduled installation date to allow minimum storage time on job site.
- .3 Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- .4 Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- .5 Do not use damaged or expired materials.

1.8 PROJECT CONDITIONS

- .1 Do not use materials that contain flammable solvents.
- .2 Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

- .3 Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- .4 Weather conditions: Do not proceed with the installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- .5 During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

2 Products

2.1 FIRESTOPPING, GENERAL

- .1 Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- .2 Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- .3 Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed". Provide cast-in-place firestop devices prior to concrete placement.

2.2 ACCEPTABLE MANUFACTURERS

- .1 Subject to compliance with through penetration firestop systems and joint systems listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory, provide products of the following manufacturers as identified below:
 - .1 Hilti (Canada) Limited, Mississauga, Ontario 1-800-363-4458
 - .2 Other manufacturers listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory.

2.3 UNRATED FIRE SEPARATIONS

- .1 Provide 45 minute fire rated fire stopping assemblies for all un-rated fire separations.

2.4 MATERIALS

- .1 Use only firestop products that have been ULC or cUL tested or specified fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

-
- .2 Cast-in place firestop devices for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:
 - .1 Hilti CP 680 Cast-in Place Firestop Device
 - .2 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - .3 Sealants or caulking materials for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
 - .1 Hilti FS-ONE Intumescent Firestop Sealant
 - .2 Hilti CP 604 Self Levelling Firestop Sealant
 - .3 Hilti CP 620 Fire Foam
 - .4 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - .4 Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
 - .1 Hilti CP 601s Elastomeric Firestop Sealant
 - .2 Hilti CP 606 Flexible Firestop Sealant
 - .3 Hilti FS-ONE Intumescent Firestop Sealant
 - .4 Hilti CP 604 Self Levelling Firestop Sealant
 - .5 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - .5 Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
 - .1 Hilti CP 672 Speed Spray
 - .2 Hilti CP 601s Elastomeric Firestop Sealant
 - .3 Hilti CP 606 Flexible Firestop Sealant
 - .4 Hilti CP 604 Self Levelling Firestop Sealant
 - .5 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - .6 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
 - .1 Hilti FS-ONE Intumescent Firestop Sealant

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- .2 Hilti CP 620 Fire Foam
 - .3 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - .7 Intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
 - .1 Hilti FS-ONE Intumescent Firestop Sealant
 - .2 Hilti CP 618 Firestop Putty Stick
 - .3 Hilti CP 620 Fire Foam
 - .4 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - .8 Non curing, re-penetrable intumescent sealants, caulking or putty materials for use with flexible cable or cable bundles, the following products are acceptable:
 - .1 Hilti CP 618 Fire Stop Putty Stick
 - .2 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - .9 Wall opening protective materials for use with U.L.C. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
 - .1 Hilti CP 617 Fire Stop Putty Pad
 - .2 Equivalent products listed in the UL Products Certified for Canada (cUL) Directory
 - .10 Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
 - .1 Hilti CP 642 Firestop Collar
 - .2 Hilti CP 643 Firestop Collar
 - .3 Hilti CP 645 Wrap Strips
 - .4 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
 - .11 Materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
 - .1 Hilti CP 637 Trowelable Firestop Compound
 - .2 Hilti FS 657 FIRE BLOCK
 - .3 Hilti CP 620 Fire Foam
 - .4 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory

- .12 Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
- .1 Hilti CP 657 FIRE BLOCK
 - .2 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
- .13 Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
- .1 Hilti CP 672 Speed Spray
 - .2 Hilti CP 601s Elastomeric Firestop Sealant
 - .3 Hilti CP 606 Flexible Firestop Sealant
 - .4 Hilti CP 604 Self Levelling Firestop Sealant
 - .5 Equivalent products listed in the U.L.C. Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory
- .14 For penetrations through a Fire Suppression provide a firestop system with an "F" Rating as determined by ULC or cUL as indicated below.

Fire Resistance Rating Required ULC or cUL "F" Rating of

Of Separation Firestopping Assembly

unrated separation 30 minutes

30 minutes 20 minutes

45 minutes 45 minutes

1 hour 45 minutes

1.5 hours 1 hour

2 hours 1.5 hours

3 hours 2 hours

4 hours 3 hours

For combustible pipe penetrations through a Fire Separation provide a firestop system with a "F" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

- .15 For penetrations through a Fire Wall or horizontal Fire Separation provide a firestop system with a “FT” Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.
- .16 For joints provide a firestop system with an Assembly Rating as determined by CAN4-S115-M, ULC-S115-M or UL 2079 which is equal to the fire resistance rating of the construction being penetrated.

3 Execution

3.1 PREPARATION

- .1 Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
- .2 Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
- .3 Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
- .4 Comply with manufacturer’s recommendations for temperature and humidity conditions before, during and after installation of firestopping.
- .5 Do not proceed until unsatisfactory conditions have been corrected.

3.2 COORDINATION

- .1 Coordinate location and proper selection of cast-in-place firestop devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- .2 Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interference.

3.3 INSTALLATION

- .1 Regulatory Requirements: Install firestop materials in accordance with ULC Fire Resistance Directory or UL Products Certified for Canada (cUL) Directory.
- .2 Manufacturer’s Instructions: Comply with manufacturer’s instructions for installation of through-penetration and construction joint materials.
 - .1 Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
- .3 Provide temporary forming as required. Remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool and trowel exposed surfaces to a neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

- .6 Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of ULC or CUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
- .7 Protect materials from damage on surfaces subjected to traffic.

3.4 FIELD QUALITY CONTROL

- .1 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- .2 Keep areas of work accessible until inspection by applicable code authorities.
- .3 Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- .4 Install a warning card that is clearly visible adjacent to all large and medium openings that may be re-penetrated. This card should contain the following information:
 - .1 Warning that the opening has been fire stop protected.
 - .2 Indicate the fire stop system used (ULC or cUL)
 - .3 F rating or FT rating
 - .4 Firestop products(s)
 - .5 Person to contact and phone number in case of modification or new penetration of firestop system.

3.5 ADJUSTING AND CLEANING

- .1 Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- .2 Clean all surfaces adjacent to holes and joints to be free of excess firestop materials and soiling as work progresses.

END OF SECTION

1 General

1.1 SECTION INCLUDES

- .1 Sealants and caulking.
- .2 Backer rods.
- .3 Flexible epoxy joint fillers.

1.2 WORK INCLUDED

- .1 To complete joint sealants as shown or specified and summarized but not restricted to the following:
 - .1 Caulking between door frames and adjacent material, interior and exterior.
 - .2 Caulking between members of aluminum frames and screens.
 - .3 Caulking between members of aluminum windows.
 - .4 Caulking in connection with roof flashing.
 - .5 Caulking of control joints.
 - .6 Caulking of metal flashing.
 - .7 Exposed joints, between dissimilar materials and not concealed from view.
 - .8 Miscellaneous construction joints.
 - .9 Exterior caulking as required.

1.3 REFERENCES

- .1 ASTM C 321-00 - Standard Test Method for Bond Strength of Chemical-Resistant Mortars.
- .2 ASTM C 834-05 - Standard Specification for Latex Sealants.
ASTM C 919-98 - Standard Practice for Use of Sealants in Acoustical Applications.
- .3 ASTM C 920-05 - Standard Specification for Elastomeric Joint Sealants.
- .4 ASTM C 1330-02 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- .5 ASTM C 882-05 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.

1.4 SUBMITTALS

- .1 Manufacturer's Technical Data Guides and application procedures.
- .2 Submit samples illustrating colors selected.

- .3 Submit laboratory tests or data validating product compliance with performance criteria specified. Include SWRI validation certificate where required.
- .4 Upon completion of the project the sealant applicator must submit copies of the
- .5 Manufacturer's Weather-seal and the Warranty Applicator's Workmanship Warranty.

1.5 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Company regularly engaged in manufacturing and marketing of products specified in this section.
- .2 Installer Qualifications: Qualified to perform work specified by reason of experience or training provided by the product manufacturer.
- .3 Installer must submit a reference list including a minimum of three projects of similar size and scope.
- .4 Mock-Ups: Include a minimum of 5 linear feet of sealant to show compatibility with substrate, proper adhesion to substrate and chosen color.
 - .1 Apply mock-up with specified joint filler types and with other components noted. Installer must provide both primed and un-primed mock up to assess whether a primer is required for the project.
 - .2 Locate where directed by architect.
 - .3 Mock-up may remain as part of work if acceptable to architect.
- .5 Adhesion pull tests: the number of adhesion pull tests is to be determined by the manufacturer's weatherseal warranty. Adhesion pull tests are to be conducted by or in the presence of the manufacturer's representative. The manufacturer is to supply the architect / owner with the results of the adhesion pull tests. The sealant installer is responsible for repairing areas where adhesion pull tests are conducted.
- .6 Access: Installer must coordinate with manufacturer's representative to provide access to completed work areas until such time as adhesion pull tests can be completed.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.
- .2 Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight in strict accordance with manufacturer's recommendations.
- .3 Condition products to approximately 60 to 70 degrees F (16 to 21 degrees C) for use in accordance with manufacturer's recommendations.

- .4 Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.

1.7 PROJECT CONDITIONS

- .1 Do not use products under conditions of precipitation or freezing weather. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.
- .2 Ensure substrate is dry.
- .3 Protect adjacent work from contamination due to mixing, handling, and application.

1.8 EXTENDED WARRANTY

- .1 Contractor hereby warrants that caulking work will not leak, crack, crumble, melt shrink, run, lose adhesion or stain adjacent surfaces for five (5) years after the date of completion certificate.
- .2 Provide an extended warrantee for the work of this section covering a period of four (4) years from date of Substantial Completion of the Contract.
 - .1 Defective work shall included, but not be restricted to: joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjoining or adjacent work or surfaces.

1.9 WARRANTY

- .1 Provide manufacturer's five year standard material warranty.
- .2 Include coverage for replacement of sealant materials which fail to achieve water tight seal, exhibit loss of adhesion or cohesion, or do not cure.
- .3 Warranty Exclusions: Failure resulting from concrete shrinkage, structural cracks or defects, faulty construction, faulty materials (other than sealant), misuse of structure, settlement, or accident, fire or other casualty or physical damage.

2 Products

2.1 MANUFACTURERS

- .1 Acceptable Manufacturers:
 - .1 BASF Building Systems
 - .2 Tremco Sealant and Waterproofing.
 - .3 Sika Canada Inc.
 - .4 Dow Corning
- .2 Provide all joint materials of the same type from a single manufacturer.

2.2 MATERIALS

- .1 Single Component, Non-Sag Polyurethane Sealant with plus or minus 25 percent movement capability for vertical joints; ASTM C 920, Type S, Grade NS, Class 25, uses NT, M, A, O & I; SWRI validated.
 - .1 Acceptable material:
 - .1 Sonolastic NP1 by BASF Building Systems
 - .2 Tremco Dymonic by Tremco Sealant & Waterproofing
 - .3 Sikaflex 1a by Sika Canada Inc.
 - .2 Single component texturized polyurethane sealant with plus or minus 25 percent joint movement capability for horizontal or vertical joints; ASTM C 920, Type S, Grade NS, Class 25, uses NT, M, A, O.
 - .1 Acceptable material:
 - .1 Sonolastic TX1 by BASF Building Systems
 - .2 Vulkem 116 by Tremco Sealant & Waterproofing
 - .3 Single component self-leveling polyurethane sealant with plus or minus 25 percent movement capability for horizontal joints; ASTM C 920, Type S, Grade P, Class 25 uses T & M.
 - .1 Acceptable materials:
 - .1 Sonolastic SL1 by BASF Building Systems
 - .2 Vulkem 45 by Tremco Sealant & Waterproofing
 - .3 Sikaflex 1C SL by Sika Canada Inc.
 4. Single component general purpose siliconized acrylic latex sealant; ASTM C 834 (interior use only except bathroom).

- .1 Acceptable material:
 - .1 Sonolac by BASF Building Systems
 - .2 Tremflex 834 by Tremco Sealant & Waterproofing
- .5 Single component mildew resistant silicone sealant +/- 25% movement capability; ASTM C 920, Type S, Grade NS, Class 25, Use NT, G and A for bathrooms.
 - .1 Acceptable material:
 - .1 Tremsil 200 by Tremco Sealant & Waterproofing
 - .2 Dow Corning 786
 - .3 OmniPlus by BASF Building Systems
 - .6 Single component synthetic rubber sealant purpose made for use in acoustical applications. Acceptable material:
 - .1 Tremco Acoustical Sealant

2.3 ACCESSORIES

- .1 Primer: Type recommended by the sealant manufacturer and compatible with joint forming materials.

NOTE: It must be assumed that all surfaces are to be primed for bidding purposes.

- .2 Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.
- .3 Soft Backer Rod: non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants.
 - .1 Comply with ASTM C 1330.
 - .2 Size required for joint design.
- .4 Closed-Cell Backer Rod: closed-cell polyethylene rod designed for use with cold-applied joint sealants for on-grade or below-grade applications.
 - .1 Comply with ASTM C 1330.
 - .2 Size required for joint design.
- .5 Joint Filler: closed-cell polyethylene joint filler designed for use in cold joints, construction joints, or isolation joints wider than 1/4 inch (6 mm).
 - .1 Size required for joint design.
- .6 Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

2.4 COLOR

- .1 Sealant Colors: Selected by architect/owner/engineer:
 - .1 Manufacturer's "Rainbow of Colors" ranges.
 - .2 Custom color matching submittal of job site substrate samples.

3 Execution

3.1 EXAMINATION

- .1 Inspect all areas involved in work to establish extent of work, access, and need for protection of surrounding construction.
- .2 Conduct preapplication inspection of site verification with an authorized manufacturer's representative.
- .3 Occupied areas: where high VOC materials are utilized investigate occupants to determine the measures to be taken to accommodate them.

3.2 PREPARATION

- .1 Remove loose materials and foreign matter which could impair adhesion of the sealant.
- .2 Clean joints and saw cuts by grinding, sandblasting, or wire brushing to expose a sound surface free of contamination and laitance.

- .3 Ensure structurally sound surfaces are, dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, membrane materials, and other foreign matter.
- .4 Where the possibility of sealants staining adjacent areas or materials exists, mask joints prior to application.
 - .1 Do not remove masking tape before joints have been tooled and initial cure of joint filler has taken place.
 - .2 Work stained due to failure of proper masking precautions will not be accepted.

3.3 INSTALLATION

- .1 Priming:
 - .1 Prime all surfaces to receive sealant with recommended primer unless the mock-up proves otherwise.
- .2 Back-Up Material:
 - .1 Install appropriate size backer rod, larger than joint where necessary according to manufacturer's recommendations.
 - .2 Install polyethylene joint filler in joints wider than 1/4 inch (6 mm) to back-up material per manufacturer's recommendations.
- .3 Bond Breaker:
 - .1 Install bond-breaker strip in joint to be sealed on top of back-up material to prevent adhesion of sealant to back-up material; install per manufacturer's recommendations.
- .4 Sealant:
 - .1 Prepare sealants that require mixing; follow manufacturer's recommended procedures, mixing thoroughly.
 - .2 Mix only as much material as can be applied within manufacturer's recommended application time period.
 - .3 Apply materials in accordance with manufacturer's recommendations; take care to produce beads of proper width and depth, tool as recommended by manufacturer, and immediately remove surplus sealant.
 - .4 Apply materials only within manufacturer's specified application life period. Discard sealant after application life is expired or if prescribed application period has elapsed.

3.4 CLEANING

- .1 Remove uncured sealant with Reducer 990, xylene, toluene, or MEK. Remove cured sealant by razor, scraping, or mechanically.

- .2 Remove all debris related to application of sealants from job site in accordance with all applicable regulations for hazardous waste disposal.

END OF SECTION

1 General

1.1 GENERAL CONDITIONS

- .1 The General Conditions of the contract as well as provisions of Division 1 at the beginning of these specifications shall be deemed to apply and be a part of this section of the specification.

1.2 WORK INCLUDED

- .1 Supply and install all suspended T-Bar grid systems to all areas indentified within the Room Finishes Schedule.

1.3 RELATED WORK

- .1 Acoustical Tile & Panels: Section 09 51 10.
- .2 Trim for recessed mechanical fixtures: See Mechanical.
- .3 Trim for recessed light fixtures: See Electrical.

1.4 REFERENCE STANDARDS

- .1 Installation to ASTM C636-76(1981) except where specified otherwise.

1.5 DESIGN CRITERIA

- .1 Maximum deflection: 1/360th of span to ASTM C635-78 deflection test.

2 Products

2.1 MATERIALS

- .1 Fire resistive T-bar. Armstrong Prelude fire Guard or approved equivalent.
- .2 24"x24" fire resistive ceiling tile.
- .3 Exposed tee bar grid components: two directional 24" x 24" shop painted satin sheen white. Components die cut. Main tee with double web, rectangular bulb and 1" rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
- .4 Colour White.
- .5 Hanger Wire: galvanized soft annealed steel wire, 9 ga.
- .6 Hanger Inserts: purpose made.
- .7 Accessories: splices, clips, wire ties, retainers and wall mounting flush reveal, to complement suspension system components, as recommended by system manufacturer.

3 Execution

3.1 INSTALLATION

- .1 Install hangers as per manufacturer's instructions.
- .2 Do not erect ceiling suspension system until work above ceiling has been inspected by Architect.
- .3 Lay out system according to reflected ceiling plans.
- .4 Ensure suspension system is co-ordinated with location of related components.
- .5 Install wall mould to provide correct ceiling height. Finished ceiling system to be level within 1:1000.
- .6 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers and grilles, speakers and radiant heating panels.
- .7 Support light fixtures and diffusers with additional ceiling suspension hangers within 6" of each corner and at maximum 24" around perimeter of fixture.
- .8 Interlock cross member to main runner to provide rigid assembly.
- .9 Install suspension system to manufacturer's instructions.
- .10 Frame at openings for light fixtures, air diffusers and at changes in ceiling heights.
- .11 Provide mouldings and trim as required for recessed radiant heating panels. See details on mechanical drawings. Note that both support for heating panels and ceiling trim is by this trade section.

3.2 CLEANING

- .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.
- .2 Final cleaning is specified in Section 01 77 00.

END OF SECTION

1 General

1.1 GENERAL CONDITIONS

- .1 The General Conditions of the contract as well as provisions of Division 1 at the beginning of these specifications shall be deemed to apply and be a part of this section of the specification.

1.2 WORK INCLUDED

- .1 To complete all gypsum board on walls and ceilings as shown or specified and summarized but not restricted to:
 - .2 Metal stud partitions.
 - .3 Suspended gypsum board ceilings and bulkheads.
 - .4 Furring systems and enclosures as described herein and indicated on drawings.
 - .5 Miscellaneous drywall as required to complete the project.

1.3 REFERENCE STANDARDS

- .1 Do work in accordance with CSA A82.31-M1980 except where specified otherwise.

2 Products

2.1 GYPSUM BOARD

- .1 Plain: to CSA A82.27-M1977 standard and Type X, thickness as noted on drawings, 4'-0" wide x maximum practical length, ends square cut, edges tapered.
- .2 Water resistant board: to CSA A82.27-M1977 Standard 5/8" thick, 4'-0" wide x maximum practical length.
- .3 Abuse resistant drywall to be Fiberock VHI, 5/8" thick.
- .4 Drywall for curved walls: 2 layers of 1/4" Flexroc by 9-P Gypsum Corporation or approved equal.

2.2 METAL FURRING AND SUSPENSION SYSTEMS

- .1 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30-M1980, galvanized.
- .2 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .3 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board, except 16 ga. for drywall secured to existing steel structure.

2.3 FASTENINGS AND TIES

- .1 Screws: to CSA A82.31-M1980. Self-drilling, self-tapping, case hardened, Philips head, drywall screws, with corrosion resistant finish.
- .2 Hangers: 9 ga. galvanized soft annealed steel wire.

2.4 ACCESSORIES

- .1 Casing beads, corner beads fill type: 0.5 mm base thickness commercial grade sheet steel with Z275 zinc finish to ASTM A525M-80, perforated flanges; one piece length per location.
- .2 Acoustic Sealant: to CGSB 19-GP-21M as manufactured by Tremco Manufacturing Co. or Inmont Presstite Ltd.
- .3 Acoustic Insulation:
- .4 Polyethylene: to Can 2-51.33-M80, 6 mil.
- .5 Joint Compound: to CSA A82.31-M1980, asbestos free.
- .6 Joint Tape: 2" x 0.012" thick, perforated paper with chamfered edges.
- .7 Control Joists: Crimped rolled-formed zinc, with flanges for tape reinforcement, or two casing beads, set with gap for movement and backed with flexible air seal membrane.
- .8 Special purpose made angles and channels as required and as detailed to support radiant heating panels.
- .9 Provide all blocking for installation of all accessories.
 - .1 blocking to be 3/4" plywood.

2.5 PARTITION SYSTEM

- .1 Interior Steel Studs: 25 ga. steel, galvanized, having knurled flanges 1 1/4" wide edges double back at least 3/16", with girts as required, and with service access holes. Sizes as indicated on drawings.
- .2 Partition Runners: as specified for studs, with flanges a minimum of 7/8" high, and to suit width of studs.
- .3 Bracing Channels: 18 ga. 1 1/2" x 3/4" cold rolled steel, wipe coated.
- .4 Hanger Devices: Zinc coated annealed steel wire; 9 ga. to support a maximum weight of 310 lbs. per hanger.

2.6 ACOUSTIC INSULATION

- .1 Type: Unfaced glass fiber acoustical insulation complying with ASTM C665, Type I.
- .2 Size 2 1/2" thick, 16" wide, 96" long.
- .3 Surface Buring Characteristics:

- .1 Maximum flame spread: 10
- .2 Maximum smoke developed: 10
- .4 Combustion Characteristics:
 - .1 Passes ASTM E 119 test.
- .5 Sound Transmission Class: STC 45.

3 Execution

3.1 METAL STUD SYSTEM

- .1 Align partition tracks at floor and ceiling and secure at 2'-0" o.c. maximum.
- .2 Install damproof course under stud shoe tracks of partitions on slabs on grade.
- .3 Place studs vertically at 16" o.c. and not more than 2" from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace studs as required to provide rigid installation to manufacturer's instructions.
- .4 Erect metal studding to tolerance of 1:1000.
- .5 Attach studs to bottom and ceiling track using screws.
- .6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 2" apart using column clips or other approved means of fastening place alongside frame anchor clips.
- .9 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .10 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .11 1 1/2" stud or furring channel secured between studs for attachment of fixtures behind laboratory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .12 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .13 Extend partitions from floor to underside of metal deck above except where noted otherwise on drawings.

- .14 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partition.

3.2 SUSPENDED AND FURRED CEILINGS

- .1 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with CSA A82.31-M1980 except where specified otherwise.
- .2 Support light fixtures by providing additional ceiling suspension hangers within 6" of each corner and at maximum 2'- 0" around perimeter of fixture.
- .3 Support heating panels as per mechanical details.
- .4 Install work level to tolerance of 1:1200.
- .5 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.
- .6 Install furring channels parallel to, and at exact locations of steel stud partition header tracks.
- .7 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.
- .8 Furr above suspended ceilings for gypsum board fire and sound stops as indicated.

3.3 WALL FURRING

- .1 Install wall furring for gypsum board wall finishes in accordance with CSA A82.31-M1980, except where specified otherwise.
- .2 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .3 Furr beams, duct shafts, columns, pipes and exposed services where indicated.

3.4 GYPSUM BOARD APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.
- .2 Apply gypsum board to metal furring or framing using screw fasteners. Maximum spacing of screws 12" o.c.
- .3 Extend all drywall to u/s of structural deck above except where noted otherwise on the drawings.
- .4 Where partitions call for acoustic insulation, apply 1/2" diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, etc., in partitions where perimeter sealed with acoustical sealant.

3.5 ACCESSORIES

- .1 Erect accessories straight, plum or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 6"o.c.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board or casing beads abutting metal window or exterior door frames, to provide thermal break.
- .5 Install acoustic insulation where indicated on drawings.

3.6 CONTROL JOINTS

- .1 Locate control joints in all gypsum board walls over 30' in length or height. Space joints at 30' on centre horizontally and vertically.
- .2 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
- .3 Provide continuous polyethylene dust barrier behind and across control joints.
- .4 Install control joints straight and true.

3.7 TRIM

- .1 Install trim as indicated.
- .2 Minimize joints; use corner pieces and splicers.

3.8 ACCESS DOORS

- .1 Install access doors to electrical and mechanical fixtures specified in respective Sections.
- .2 Rigidly secure frames to furring or framing systems.

3.9 ACOUSTIC INSULATION AND APPLICATION

- .1 Obtain installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.
- .2 Comply with manufacturer's instructions for particular conditions of installation in each case.
- .3 Sound Attenuation Batts may be friction-fit in place until the interior finish is applied. Install batts to fill entire stud cavity. If stud cavity is less than 96" in height, cut lengths to friction-fit against floor and ceiling tracks. Walls with penetrations require that insulation be carefully cut to fit around outlets, junction boxes and other irregularities.

- .4 Where walls are not finished on both sides of insulation does not fill the cavity depth, supplementary support must be provided to hold product in place.
- .5 Where insulation must extend higher than 8 feet, temporary support shall be provided to hold product in place until the finish material is applied.

3.10 INSTALLATION OF PRESSED STEEL FRAMES

- .1 Install hollow metal door frames supplied under Section 08111.
- .2 Set in place for building into masonry, and anchor frames to floor as provided for by anchor clips.
- .3 Brace frames in place to prevent displacement until anchored into masonry and remove spreaders at floor after frames are anchored.

3.11 TAPING AND FILLING

- .1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .2 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.
- .4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

4 ADJUSTMENT AND CLEANING

- .1 Remove droppings and excess of joint compound from Work of others, and from Work of this Section, before it sets.
- .2 Make good to cut-outs for services and other Work, fill in defective joints, holes and other depressions with joint compound.
- .3 Make good defective work, and ensure that surfaces are smooth, evenly textured and within specified tolerances to receive finish treatments.

END OF SECTION

1 General

1.1 GENERAL CONDITIONS

- .1 The general conditions of the contract as well as provisions of Division 1 at the beginning of these specifications shall be deemed to apply and be a part of this section of the specification.

1.2 WORK INCLUDED

- .1 Supply and install acoustic tile ceiling panels as specified and indicated on drawings.
- .2 Supply and install acoustic wall panels as specified and indicated on the drawings.

1.3 RELATED WORK

- .1 Section 09130: Suspension System for Acoustical Ceilings
- .2 Section 09250: Gypsum Board
- .3 Mechanical Services: See drawings.
- .4 Electrical Services: See drawings.

1.4 ENVIRONMENTAL CONDITIONS

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of 15°C and humidity of 20-40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

1.5 SAMPLES

- .1 Submit duplicate full size samples of ceiling tile in accordance with Section 01300.

1.6 EXTRA STOCK

- .1 Provide two sealed cartons each of acoustic tile and three additional acoustic wall panels. Deliver to Owner as directed.

1.7 EXTENDED WARRANTY

- .1 Provide an extended warrantee for the work of this section covering a period of four (4) years from date of Substantial Completion of the Contract. Warranty shall cover all defects in manufacture and installation.

2 Products

2.1 MATERIALS

- .1 Acoustical Ceiling Tile – Fire Rated in all locations
 - .1 Type: Armstrong Cirrus
 - .2 Composition: Mineral Fiber
 - .3 NRC min .70
 - .4 Colour: White
 - .5 Edge: SQ
 - .6 12. Dimensional Stability: HumiGuard Plus
 - .7 Size: 24" x 24" x 3/4"
 - .8 Recycled content – min 50%
 - .9 Style: Radar – CIRRUS, 574 No added formaldehyde as manufactured by Armstrong World Industries
 - .10 Acceptable alternate: Architect approved alternate.

3 Execution

3.1 INSTALLATION

- .1 Acoustical ceiling tiles:
 - .1 Do not install acoustical tiles until work above ceiling has been inspected by Architect and Mechanical and Electrical Engineers.
 - .2 Cut panels neatly to fit off-module grid and with sufficient clearances to ensure removal without damage.
 - .3 Coordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers and sprinkler heads to be built into acoustical ceiling components.
 - .4 Fill void between wall and acoustical wall panels with rigid fibreglass or mineral wool insulation.

4 ADJUSTMENT AND CLEANING

- .1 Replace acoustical tiles and panels which are visibly damaged, marred or discoloured.

END OF SECTION

1 General

1.1 SAMPLES

- .1 Submit samples of each specified flooring, base and stair material.
- .2 Submit full size tile of each colour specified.

1.2 MAINTENANCE DATA

- .1 Provide maintenance data for resilient flooring for incorporation into Operation and Maintenance Manual specified in Section 01700.

1.3 EXTRA STOCK

- .1 Deliver to Owner on completion of Work, and as he directs, 2% of the quantity of flooring installed of each material and colour (including base), in labelled packages.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 h before, and for 48 h after installation.

2 Products

2.1 MATERIALS

- .1 Vinyl composition tile: to CSA A126.1-1977 1/8" thick, 12" x 12" size.
- .2 Acceptable Manufacturers: Armstrong.
- .3 Floor Patterns: allow for patterns as follows:
 - .1 Provide a 12" wide border in an accent colour.
 - .2 Allow for a floor pattern to be designed at a later date. This pattern will require 10% of the floor to be in accent (premium) colours.
- .4 Colour field will be from manufacturer's standard colour selection. Border will be from premium colour selection.
- .5 Resilient base: top set coved rubber, minimum 4'-0" length and 4" high, including premoulded end stops and external corners. Colour to be selected from manufacturer's standard colours.
 - .1 Acceptable Material: Flextile; Johnsonite.
- .6 Accessories:
 - .1 Reducer Strips: Provide 1/8" thick vinyl reducer strips, in same colour as tile, where tile flooring terminates.
- .7 Primers and adhesives: recommended by flooring manufacturer for specific material on applicable substrate.

- .8 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
- .9 It is this responsibly of this section to ensure that sub floor is suitable to receive flooring no matter the amount or type of floor filler required.
- .10 Sealer: type recommended by flooring manufacturer.
- .11 Wax: type recommended by flooring manufacturer.

3 Execution

3.1 INSPECTION

- .1 Ensure floors are dry, by using test methods recommended by tile manufacturer, and exhibit negative alkalinity, carbonization or dusting.

3.2 SUB-FLOOR TREATMENT

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Prime concrete to flooring manufacturer's printed instructions.
- .3 Existing conditions:
 - .1 Some portions of existing floor is vinyl tile to be removed by the demolition section.
 - .2 Other portions of the floor are painted concrete.
 - .3 It is responsibly of this section to ensure that sub floor is suitable to receive tile flooring no matter the amount preparation or type/amount of floor filler required.
 - .4 Sandblast if required at discretion of architect.

3.3 TILE APPLICATION

- .1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .3 Install flooring to square grid pattern with all joints aligned with pattern grain alternating, all to Architect's approval.
- .4 Cut tile and fit neatly around fixed objects.
- .5 Terminate flooring at center line of door in openings where adjacent floor finish or colour is dissimilar.

3.4 BASE APPLICATION

- .1 Lay out base to keep number of joints at minimum.
- .2 Set base in full bed of adhesive, tightly against wall and floor surfaces.
- .3 Install straight and level to variation of 1:1000.
- .4 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .5 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.
- .6 Install toeless type base before installation of carpet on floors.

3.5 ACCESSORIES

- .1 Install reducer strips at terminations of resilient tile flooring where edges are exposed to view.
- .2 At door openings, install reducer strips and carpet adapters under doors.
- .3 Secure strips and adapters to subfloor with contact bond adhesive to ensure complete bond.

3.6 CLEANING AND WAXING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Thoroughly clean floor using a large heavy duty automated floor scrubber.
- .3 Seal floor and base surface. Provide 3 coats of sealer. Successive coats can be applied as soon as floor is dry. In carpeted areas, clean, seal and wax base surface before carpet installation.
- .4 Provide two coats of wax following the sealing of the floor.
- .5 Spray clean and buff floor and base surface for final inspection before building takeover by Owner.

3.7 PROTECTION OF FINISHED WORK

- .1 Prohibit traffic on floor for 48 hours after installation.
- .2 Final cleaning is specified in Section 01700.

END OF SECTION

1 General

1.1 SUBMITTALS

- .1 Submit product data, samples and installation instructions in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.
- .3 Submit cleaning and maintenance data for incorporation into Operation & Maintenance Manual specified in Section 01 70 00.
- .4 Extra Stock: Deliver to Owner on completion of work, and as he directs, 2% of the quantity of flooring installed of each material and colour, in labeled packages.

1.2 ENVIRONMENTAL REQUIREMENTS

- .1 Ensure air temperatures and structural base temperature at time of flooring installation are maintained above 20°C. for 48 hours before, during, and after installation.

2 Products

2.1 MATERIALS

- .1 Rubber Wall Base:
 - .1 Top set covered rubber, including pre-molded end stops and external corners, to be located as indicated on finish schedule.
 - .2 To be constructed of first quality raw materials and shall be smooth and free from any imperfections which detract from its appearance.
 - .3 Flame spread rating is to be less than 2.0.
 - .4 All rubber wall base shall be a height of 4" and a minimum length of 4'-0".
 - .5 Gauge to be 1/8", color to be approved by Architect.
 - .6 Acceptable Manufacturers: Amtico, Flextile, Johnsonite, or approved alternate.
- .3 Accessories:
 - .1 All accessories to be provided including, but not limited to: adapters, transitions, reducers, nosings, caps and coves. Color to match adjacent flooring.
- .4 Primus and adhesives: recommended by flooring manufacturer for specific material on applicable substrate.
- .5 Sub-floor filler: as recommended by flooring manufacturer for use with their product.

3 Execution

3.1 SUB-FLOOR TREATMENT

- .1 Clean and remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

3.2 WALL BASE APPLICATION

- .1 Layout base to keep number of joints at minimum.
- .2 Set base in full bed of adhesive, tightly against wall and floor surfaces.
- .3 Install straight and level to variance of 1:1000.
- .4 Scribe and fit to door frames and other obstructions. Use pre-molded end pieces at flush door frames.
- .5 Cope internal corners. Use pre-molded corner units for right angle external corners. Use formed straight base material for external corners of other angles.

3.3 ACCESSORIES

- .1 Secure strips and adaptors to sub-floor with contact band adhesive to ensure complete bond.

END OF SECTION

1 General

1.1 WORK INCLUDED:

- .1 All Painting as per finish schedule.

1.2 RELATED WORK

- .1 Gypsum board: Section 09 21 16

1.3 REFERENCE STANDARDS

- .1 The best practices specified or recommended in CAN2-85.100-M81 shall govern for materials, methods and procedures.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Do not apply paint finish in areas where dust is being generated.
- .2 Ensure that all areas in which paint is applied are well-ventilated and broom clean.
- .3 Do not apply paint unless a uniform minimum 50°F air temperature has been achieved in the installation area for 24 hours prior to and after application.

1.5 PROTECTION

- .1 Cover or mask surface adjacent to those receiving finish to protect work of others from damage and soil.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver to site each container sealed and labelled with manufacturer's name, catalogue number or brand name, colour, formulation type, reducing instructions, and reference standard specification number if applicable.
- .2 Store only acceptable project materials at site, and in an area specifically set aside for purpose that is locked, ventilated, maintained at a temperature of over 4°C, and protected from direct rays of sun. Ensure that health and fire regulations are complied with in storage area.

1.7 EXTRA STOCK

- .1 Deliver to Owner on completion of Work, and as he directs, sealed containers of each finish painting material applied, and in each colour. Label each container as for original, including mixing formula. Provide one litre of extra stock when less than 40 litres are used for project, 4 litres of extra stock when 40 to 50 litres are used, and 8 litres of extra stock when over 150 litres are used.

1.8 PAINT

- .1 All paints to be premium low order, zero VOC.

1.9 TECHNICAL REPRESENTATION

.1 Manufacturer's Obligations

- .1 The manufacturer shall play an active role in the application of his product during the period of this contract. The manufacturer shall be represented at all these meetings by a qualified technical representative, trained as a paint inspector with a minimum of 5 years experience. The technical representative shall be approved by the Architect.

.2 The project shall be subdivided into "Sectors of Work":

- .1 A minimum of three inspections per sector from the Manufacturer's representative must be made prior to and during application of this work to ensure proper application.
- .2 After each visit provide a written report to the Architect within 5 working days.
- .3 30 days prior to any painting, a prejob conference shall be held to confirm methods, materials, etc. for this contract. Items to be present: specifications, finish schedule, colour schedule, product data sheets - MSDS.

1.10 PREJOB CONFERENCE

- .1 After the award of this contract and prior to the preparation of a mock sample area, a pre-job conference shall be held with the following people present:
 - .1 The Architect
 - .2 The applicator and his designated inspectors and crew supervisors who will be working on site on this project
 - .3 The paint manufacturer's trained paint inspector.

2 Products

2.1 MATERIALS

- .1 Acceptable Manufacturers: Pittsburg, Glidden, Benjamin Moore, Sherwin Williams, provided the manufacturer can provide technical representation as per 1.8, and match product quality specified.
- .2 Stain and varnish finish on wood doors and millwork only flame retardant.
- .3 Paint materials: to Ecologo and CGSB Standards listed in Finishing Formulae.
- .4 Paint materials for each coating formulae to be products of a single manufacturer.

3 Execution

3.1 EXAMINATION

- .1 Ensure that surfaces to receive finishing materials are satisfactory for specified materials; have been provided as specified in the Work of other Sections; will not adversely affect execution, permanence, or quality of Work; and can be put into an acceptable condition by means of preparation specified in this section.
- .2 Defective painting and finishing Work resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the Work of this Section.

3.2 EXTENT OF WORK

- .1 All new work in finished areas is to be painted.
- .2 Where a room or surface is called to be painted, all work in the room or surface other than pre-finished work is to be painted.
- .3 In renovated areas, all patches, etc. are to be painted. If painting of patched work cannot be made to match adjacent work, the entire wall is to be re-painted.

3.3 PREPARATION OF SURFACES

- .1 General:
 - .1 Vacuum clean interior areas immediately before finishing work commences.
 - .2 Remove from surfaces: grease, oil, dirt, dust, ridges, and other soil and materials that would adversely affect the adhesion or appearance of finish coatings.
 - .3 Rust on surfaces primed under work of other Sections shall be removed and the areas reprimed under the Work of these Sections.
 - .4 Finish, patch and smooth surfaces to remove cracks, holes, ridges, and similar blemishes.
 - .5 Touch-up damaged prime coats on shop primed metals with same priming material. Feather out edges of shop coat and smooth repair coat into shop coat surfaces.
 - .6 Scrub mildewed surfaces with a solution of tri-sodium phosphate, bleach with a solution of one part sodium hypochlorite (Javex) to three parts water, and rinse with clear water.
- .2 Masonry:
 - .1 Fill minor holes and cracks in concrete and concrete masonry with Portland cement grout.
 - .2 Remove dirt, scale, loose mortar, and similar foreign matter by brushing.

- .3 Touch up shop paint primer on steel with CGSB 1-GP-40M to CGSB 85-GP-14M.
- .4 Prepare galvanized steel and zinc coated surfaces to CGSB 85-GP-16M.
- .5 Gypsum Board:
 - .1 Fill minor holes and depressions, caused by accidental damage, with drywall joint compound, and sand smooth when it is set, taking care not to raise nap of paper cover.
- .6 Wood:
 - .1 Sand finish surfaces smooth with No. 00 sandpaper.
 - .2 Clean soiled surfaces with an alcohol wash.
 - .3 Wipe off dust and other loose dirt, or vacuum clean before application of coatings.
 - .4 Seal knots, pitch, and sapwood with two coats of uncut orange shellac, or an application of special sealer. Use only sealer that is compatible with transparent finish.
 - .5 After prime coat is dry and sanded, fill nail and screw holes, and cracks with wood filler, or with putty for interior work and caulking compound for exterior work. Colour fillers to match wood or stain if surfaces are given clear final coatings. Smooth, sand and prime fillers when set.

3.4 APPLICATION

- .1 Consult with Architect before proceeding with application of finishes to surfaces for which a formula is given in specification.
- .2 Apply paint to concrete block by spray and back roll method.
- .3 Sand and dust between each coat to remove defects.
- .4 Finish bottoms, edges, tops and cutouts of doors after fitting as specified for door surfaces.
- .5 Finish closets and alcoves as specified for adjoining rooms.
- .6 Apply each coat only after preceding coat is dry and hard, or as otherwise directed by material manufacturer.
- .7 Priming and Back Priming:
 - .1 Verify, by review of other sections of this specification, the extent of surfaces primed under work of other sections. Priming of unprimed surfaces shall be included in Work of this Section.
 - .2 Backprime exterior and interior woodwork, frames, fitments and similar work as soon as it is delivered and before installed. Use exterior primer compatible to finish coat for exterior work, and enamel undercoater for

interior work to receive paint or enamel finishes. Prevent primer from running over faces.

- .3 Backprime exterior and interior woodwork receiving clear finishes with floss varnish reduced 25% by mineral spirits. Prime all exterior doors and frames.
- .4 Prime tops and bottoms of painted wood doors with enamel undercoater, and tops and bottoms of clear finished doors with gloss varnish. When doors are stained apply varnish after staining. Remove doors to prime and finish.
- .5 Brush out and force primers into grain of wood, and into crevices, cracks and joints in all materials.

3.5 MECHANICAL AND ELECTRICAL EQUIPMENT

- .1 Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas. Colour and texture to match adjacent surfaces, except as noted otherwise.
- .2 Paint all rooftop mechanical and electrical units and equipment, and exterior louvres, etc.
- .3 Keep sprinkler heads free from paint.
- .4 Paint both sides of plywood backboards for equipment before installation.

3.6 COLOURS

- .1 Colours of paints, including shades of stains, shall be applied to match approved samples.
- .2 Colours will be selected by the Architect.

3.7 INTERIOR FINISHES

- .1 Formula 7: for gypsum board walls other than epoxy finish, apply:
 - .1 one coat latex primer-sealer CGSB, 1-GP-119M-Amdt-Sep-80,
 - .2 two coats latex eggshell enamel. 9-411 Series min. 3 mils dry
 - .3 Mariner's Tale Semi CC-876. Benjamin Moore, Gloss Finish.
- .2 Formula 9: for gypsum board ceilings generally, apply:
 - .1 one coat primer sealer CGSB 1-GP-119M-Amdt-Sep-80
 - .2 one coat flat paint CGSB-1-GP-100
- .3 Formula 16: for primed ferrous metal surfaces apply:
 - .1 one coat enamel undercoat
 - .2 two coats gloss enamel PPG Pitt Tech

- .4 Formula 22: Interior metal door frames:
 - .1 spray two coats PPG Pitt Tech 90-474 in Pure White OC-64 Benjamin Moore, Semi Gloss.

END OF SECTION

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1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 01 are part of and to be read in conjunction with this Section.
- .2 This section covers items common to all sections of Division 20, 21, 22, 23, 24 and 25.

1.2 INTENT

- .1 It is the intent of these specifications to outline the method, materials, and quality of equipment to be furnished and installed hereinafter specified and/or shown on the drawings.
- .2 The Mechanical Contractor shall be responsible for the installation of all equipment, materials, and accessories, and the labour required for the completion of this contract to the full satisfaction and acceptance of the Consultant. Misinterpretation of either the drawings or the specifications will not relieve the Contractor of responsibility.

1.3 DEFINITIONS

- .1 "CONCEALED" - mechanical services and equipment in hung ceiling spaces and non-accessible chases and furred spaces.
- .2 "EXPOSED" - will mean "not concealed" as defined herein.
- .3 "Domestic Water" includes domestic cold water and domestic hot water.
- .4 "Provide" will mean "Supply and install".

1.4 REFERENCE STANDARDS

- .1 The most stringent requirements of local municipal by-laws, provincial codes and following codes and standards shall be followed.
- .2 In no instance shall the Standard established by the contract documents be reduced by the application of any other codes.
- .3 General
 - .1 Nova Scotia Building Code Regulations Effective April 1, 2017.
 - .2 National Building Code of Canada - 2015.
 - .3 National Fire Code of Canada - 2015.
 - .4 National Plumbing Code of Canada - 2015.
 - .5 National Energy Code of Canada for Buildings 2015.
 - .6 ANSI/ASHRAE Standard 135, BACnet®.

- .7 The following standards/codes are referenced in the above codes:
 - .1 ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .2 ASTM A795/A795M Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use
- .8 SMACNA Round Industrial Duct Construction Standards
 - .3SMACNA HVAC Duct Construction Standards - Metal and Flexible.
 - .4ULC-S505, Fusible Links for Fire Protection Service.

1.5 EQUIPMENT INSTALLATION

- .1 Unions or flanges: provide for ease of maintenance and disassembly.
- .2 Space for servicing, disassembly and removal of equipment and components: provide as recommended by manufacturer or as indicated.
- .3 Equipment drains pipe to floor drains.
- .4 Install equipment, rectangular cleanouts, and similar items parallel to or perpendicular to building lines.

1.6 ANCHOR BOLTS AND TEMPLATES

- .1 Supply anchor bolts and templates for installation by other divisions.

1.7 ELECTRICAL

- .1 Electrical work to conform to Electrical Contract including the following:
 - .1 Supplier and installer responsibility is indicated in Motor, Control and Equipment Schedule on electrical drawings and related mechanical responsibility is indicated on Mechanical Equipment Schedule on mechanical drawings.
 - .2 Control wiring and conduit is specified in Electrical Contract except for conduit, wiring and connections which are related to mechanical control systems specified in Mechanical Contractor. Refer to Electrical Contract for quality of materials and workmanship.
- .2 Coordinate with Electrical Contractor to ensure that all controlled equipment is correctly connected for operation in accordance with plans and specifications, including supplying all necessary electrical interconnection information and location to Electrical Contractor.

1.8 EXISTING SYSTEMS

- .1 Connections into existing systems to be made at time approved by Consultant. Request written approval of time when connections can be made.

- .2 Be responsible for damage to existing plant by this work.
- .3 Ensure that all plumbing, heating, ventilation and other mechanical systems and services remain operational during the course of the renovation of the existing building and, if necessary, this Contractor shall be responsible for providing such temporary services by cutting off, altering, adapting, relocating and connecting existing services and disconnecting and removing such temporary or existing services upon providing new permanent services as detailed on all drawings. The site shall be examined to determine the extent of the temporary services and all co-ordination shall be made with the Owner's Representative. All costs shall be included in the Tender Price.
- .4 Existing equipment, piping, ducting, etc. not being re-used under new schemes, shall be removed whether shown on drawings or not. The General Contractor shall repair all openings resulting from the removal of existing mechanical equipment and services. All costs shall be included in the Tender Price.

1.9 CUTTING AND PATCHING

- .1 Refer to Division 01.

1.10 DRAWINGS

- .1 The drawings accompanying this specification are to be considered as diagrammatic only and do not show all the structural and construction details. Any information involving measurements of the building shall be taken from the architectural and structural drawings, and at the building site. Make without additional charge any necessary changes or additions to the runs to accommodate structural conditions.
- .2 The Mechanical drawings are not to be scaled.
- .3 The drawings and the specifications shall be considered an integral part of the contract documents. Neither the drawings nor the specifications shall be used alone. Misinterpretation of any requirements of either plans or specifications shall not change the requirements of the specifications for proper completion of the work to the full approval of the Consultant.
- .4 Except where dimensioned, indicate general Mechanical layouts only. Because of the small scale of Mechanical drawings, it is not possible to show all offsets, fittings and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves and accessories which are required to meet the conditions.
- .5 The drawings indicate the general location and route to be followed by the pipes, ducts, conduits, etc., which are installed under this contract. Where the required conduit work, piping, ductwork, etc., is not shown on the plans or only shown diagrammatically, these shall be installed as tight as possible to structural members, concrete, ceilings, and walls to interfere as little as possible with the free use of the space through which they pass.

- .6 The drawings and specifications are intended to supplement each other so that any details shown on the drawings are not mentioned in the specifications, or vice versa, shall be executed in the same manner as if contained in the specifications and shown on the drawings.
- .7 Should any discrepancy appear between these specifications and the drawings to cause doubt as to the true meaning and intent of the drawing's ad specifications, a ruling shall be obtained from the Consultant before submitting the tender. If this is not done it will be assumed that the more expensive alternative has been included in the contract.
- .8 Layouts on the Mechanical drawings are based on the specified equipment, including mechanical and electrical connections and physical dimensions. Alternate equipment and systems proposed by the Contractor for use on this project, which necessitates changes in service connections to perform the specified functions may be considered by the Consultant, however, any required modifications or additions shall be done at no additional cost to the Owner. Furthermore, if it is found that the provisions made regarding space conditions and code required clearances are not met, the right is reserved by the Consultant to require installation of the equipment specified.

1.11 CONTRACT DOCUMENTS

- .1 Before submitting tender for his work, each Contractor shall examine the contract documents (entire specifications, electrical drawings, structural drawings and architectural drawings) to ascertain that the work can be carried out as shown on these drawings and herein specified. No extra will subsequently be allowed to cover any omission and/or oversight for not having made a thorough inspection of the contract documents.

1.12 EXAMINE THE SITE AND CONDITIONS

- .1 Each Contractor shall visit and examine the site and the local conditions affecting this work. No allowance will be made later for any expenses occurred through failure to make these examinations.

1.13 LOW VOC MATERIALS

- .1 All site applied coatings; adhesives & sealants must conform to low VOC content requirements.
- .2 Provide Material Safety Data Sheets for all products and materials of these types incorporated into the work.

1.14 OWNER SUPPLIED EQUIPMENT

- .1 Perform all work as if equipment purchased by this contractor

- .2 Handle and store products in manner to prevent damage, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .3 Obtain written installation instructions directly from manufacturers.
- .4 Upon completion of installation, engage manufacturer's representative as required for start-up and verification.
- .5 Provide copies of start-up and verification reports
- .6 During warranty period, preform all work as if equipment purchased by this contractor.

2 Products

2.1 MATERIAL

- .1 For the purpose of uniformity similar materials shall be by one manufacturer.
- .2 Standard of Acceptance and/or Acceptable Material:
 - .1 Means that item named and specified by manufacturer and/or catalogue number forms part of specification and sets standard regarding performance, quality of material and workmanship and when used in conjunction with a referenced standard, shall be deemed to supplement the standard.
- .3 Acceptable Manufacturer:
 - .1 Means that item manufactured by named and specified manufacturer, meeting the specification and referenced standard regarding performance, space constraints, electrical requirements, quality of material and workmanship shall be deemed acceptable.
- .4 Refer to "Instruction to Bidders" for method of applying for Alternatives Products/Systems prior to close of tender.

2.2 ELECTRICAL DEVICES AND PANELS.

- .1 All electrical equipment and devices to be CSA certified and manufactured to standard quoted.
- .2 The assembly of combinations of electrical components, such as, relays, current transformers, BAS devices, transformers, fuse blocks, transducers or other certified components in an enclosure to form an overall electrical assembly shall be CSA certified.
- .3 Where field modifications are made to certified electrical equipment, arrange and pay for field certification by CSA.

2.3 MOTORS

- .1 Provide motors for mechanical equipment as specified.

- .2 If delivery of specified motor will delay delivery or installation of any equipment, install motor approved by Consultant for temporary use. Final acceptance of equipment will not occur until specified motor is installed.
- .3 Motors under 370 Watts (1/2 HP): speed as indicated, continuous duty, built-in overload protection, resilient mount, single phase, 120 V, 60 Hertz, unless otherwise specified or indicated.
- .4 Motors 370 Watts (1/2 HP) and larger: EEMAC Class B, squirrel cage induction, speed as indicated, continuous duty, drip proof, ball bearing, 3 phase, 208 V, 60 Hertz, maximum temperature rise 40° C, unless otherwise specified or indicated.
- .5 Service factor 1.15.

2.4 EQUIPMENT SUPPORTS

- .1 Equipment supports supplied by equipment manufacturer: specified elsewhere in Mechanical Contractor.
- .2 Equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel.
- .3 Exterior supports to be hot dipped galvanized. Touch up field welds and bolt holes with cold galvanized paint
- .4 Mount interior base mounted equipment on chamfered edge housekeeping pads, supplied by General Contractor.
 - .1 Nominal 100 mm (4") high and minimum 100 mm (4") larger all around than equipment.
 - .2 Slabs to be pinned to floor by General Contractor.
 - .3 Provide detailed drawing to Others showing location of pads.
 - .4 Ensure bases are level prior to placement of equipment.

2.5 PAINT

- .1 Apply at least one coat of primer paint to ferrous supports, pipe hangers and site fabricated work.
- .2 Primer to be The Master Painters Institute MPI #23 with VOC < 351 grains/L

2.6 PIPE PENETRATION THROUGH WALLS

- .1 Do not grout or bond sprinkler piping, drainage waste and vent piping, domestic water solid to walls.

- .2 For all sprinkler piping, drainage waste piping, plumbing vent piping, domestic water and control conduits through all masonry walls, provide cylindrical sleeves. Maintain a minimum uniform 1/4" (6 mm) clearance all around or as required for smoke seal, acoustic seal and/or fire stopping.
- .3 For all sprinkler piping, drainage waste piping, plumbing vent piping, domestic water and control conduits through all drywall walls, coordinate with other trades to ensure there is minimum uniform 6 mm clearance all around or as required for smoke seal, acoustic seal and/or fire stopping.
- .4 Insulation on domestic cold water piping to be continuous through Walls .
- .5 Ensure no contact between copper tube / pipe and ferrous sleeve or concrete.
- .6 Coat exposed exterior surface of ferrous sleeves with heavy application of zinc rich paint to CAN/CGSB-1.181-92 coating, zinc-rich organic, ready mixed.

2.7 PIPE SLEEVES

- .1 For walls, provide 1.6 mm (16 Ga.) galvanized round sleeves with tack welded longitudinal joints.
- .2 Center sleeves on centerline of pipe.

2.8 DUCT SLEEVES

- .1 Refer to Section 24 33 16 Dampers-Fire and details on drawings for sleeves at fire dampers.
 - .1 Clearance between wall and sleeve shall not exceed requirements.

2.9 SMOKE SEAL AND/OR ACOUSTIC SEAL

- .1 Firestop all pipe penetration through fire rated walls and fire rated floor.
 - .1 Refer to Section 20 05 04 Firestopping for Mechanical
- .2 Where nonrated walls extend from floor to floor or floor to roof deck and non-rated floors.
 - .1 Smoke seal and/or acoustic seal all pipes, both sides of wall/floor.
 - .2 Smoke seal and/or acoustic seal between duct and wall, both sides of wall/floor.

2.10 FIRESTOPPING

- .1 Firestopping material and installation within annular space between pipes, ducts, insulation and adjacent fire separation
 - .1 Refer to Section 20 05 04 Firestopping for Mechanical

2.11 ESCUTCHEONS

- .1 Chrome or nickel-plated brass or Type 302 stainless steel, split piece type.
 - .1 Standard of Acceptance:
 - .1 Grinnell Fig 2 and 13.
- .2 Outside diameter to cover opening or sleeve.
- .3 Inside diameter to fit around finished pipe.

2.12 ACCESS DOORS

- .1 Supply access doors to concealed mechanical equipment for operating, inspecting, adjusting and servicing.
- .2 Size:
 - .1 Sized to access concealed services
 - .2 Minimum 600 x 600 mm (24" x 24") for body entry
 - .3 Minimum 300 x 300 mm (12" x 12") for hand entry
 - .4 Minimum 150 mm (6") larger than access door in ductwork.
 - .5 Unless otherwise noted.
- .3 Door flush with frame.
- .4 For unrated construction
 - .1 Allen Key lock(es)
 - .2 Flat door type
 - .1 Rounded safety corners
 - .2 One piece outer flange welded to mounting frame
 - .3 One piece concealed hinge
 - .3 Formed door type
- .5 For fire rated construction
 - .1 Pull ring or raised knurled knob operated latch bolt
 - .2 Interior latch release
 - .3 Automatic closer
 - .4 Hinged door
 - .5 Flanged frame
 - .6 For walls:
 - .1 1- 1/2 hour 'B' label
 - .7 For ceiling membrane:
 - .1 1 hour label
- .6 Material:
 - .1 Special areas such as tiled or marble surfaces: use stainless steel with brushed satin or polished finish as directed by Consultant.
 - .2 Remaining areas: use prime coated steel.

- .7 Installation:
 - .1 Locate so that concealed items are accessible.
 - .2 Locate so that hand or body entry (as applicable) is achieved.
 - .3 Install in accordance with manufacturer's recommendation

- .8 Acceptable material:

	Unrated Walls	Fire Rated Walls	Fire Rated Ceilings
Acudor	EB-2002 or UF-5000	FB-5050	FW-5050
Cendrex	AHD	PFI	
Mifab	UA	MPFR	MPFR

2.13 DIELECTRIC COUPLINGS

- .1 Lead Free
- .2 Compatible with and to suit pressure rating of piping system.
- .3 Where pipes of dissimilar metals are jointed.
- .4 Pipes NPS 2 and under: isolating unions.
 - .1 Acceptable material:
 - .1 Watts LF3000 Series
- .5 Pipes NPS 2-1/2 and over: isolating flanges.

2.14 DRAINS VALVES

- .1 In accordance with Section 23 05 23 Valves.

2.15 HANGERS AND SUPPORTS

- .1 As per Section 23 05 29 Hangers and Supports.

2.16 IDENTIFICATION

- .1 As per Section 23 05 53 Mechanical Identification.

2.17 INSULATION

- .1 As per Section 23 07 00 Mechanical Thermal Insulation.

3 Execution

3.1 INSTALLATION

- .1 Install all work in accordance with authorities having jurisdiction and manufacturer's requirements. In case of conflicting requirements, the more stringent shall apply.

3.2 PROTECTION OF OPENINGS

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.
- .2 No fans to be started until the project has been cleaned to the satisfaction of the Consultant.

3.3 TESTS

- .1 Give 4 working days written notice of date for tests.
- .2 Insulate or conceal work only after testing by contractor and review by Consultant.
- .3 Conduct tests in presence of Consultant or representative authorized by the Consultant.
- .4 Bear costs including retesting and making good.
- .5 Test drainage, waste, and vent piping for leakage in accordance with National Plumbing Code of Canada and authorities having jurisdiction. Maintain test pressure without loss for a minimum of 1 hour for water test and 2 hours for air test otherwise specified.
- .6 Equipment: test as specified in relevant sections.
- .7 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures of test medium.
- .8 Provide signed copies of all tests within 2 weeks of completion of each test.

3.4 PAINTING

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged too extensively to be merely primed and touched up.
- .3 Paint the balancing damper handles where concealed.

3.5 CEILING MOUNTED EQUIPMENT.

- .1 Locate ceiling space mounted equipment (e.g. exhaust fans, heat pumps, motorized dampers) within 900 mm (36") of the finished ceiling for safe access.
- .2 Locate ceiling space mounted equipment (e.g. exhaust fans, heat pumps, motorized dampers) with minimum 600 mm (24") access on service side.
- .3 Locate valves mounted in ceiling space valves, within 450 mm (18") of the finished ceiling for safe access.

END OF SECTION

1 General

1.1 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 In accordance with Division 01
- .2 Shop Drawings to be Project Specific
- .3 Prior to submitting shop drawings, the Mechanical Contractor to review the shop drawing to ensure that they meet the requirements of the contract documents in all respects, that they are clear and legible, all options are being provided are clearly indicated and that the dimensions, weights, power requirements, quantities and capacity are consistent with the requirements of the contract documents.
- .4 Assembled in groups by **Specification Section** and bound in sets.
- .5 On cover/front page indicate total number of pages in submission.
- .6 Consecutively number each page.
- .7 Shop Drawings to list components that are shipped loose.
- .8 Shop Drawings to include **Project Specific** wiring diagrams.
- .9 Shop Drawings for items with BACnet® control to include **Project Specific** list of BACnet® read/write variables. Also refer to Section 21 05 01 Mechanical General Requirements and Section 25 05 02 BAS: Submittals
- .10 Attach a Mechanical Contractor's Shop Drawing Review Confirmation to each shop drawing confirming the following:
 - .1 The mechanical shop drawings have been reviewed by the Mechanical Contractor and all items are in conformance with the contract documents Yes No
 - .2 Project specific model numbers and/or options are indicated Yes No
 - .3 Mechanical Contractor: _____
 - .4 Mechanical Contractor Project Representative: _____
 - .5 Mechanical Contractor Signature: _____
 - .6 Item: _____
 - .7 Specification Section and item number: _____
 - .8 Drawing reference: _____
- .11 Where specified in Division 01, submit electronic copies of shop drawings. In addition to the electronic shop drawing, submit one hard copy to the office of the mechanical consultant.

- .12 Section 21 05 04 Firestopping for Mechanical
 - .1 Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of ULC or cUL firestop systems to be used and manufacturer's installation instructions to comply with Division 01.
 - .2 Provide data showing firestopping method for mechanical services
 - .3 Name of qualified installer.
 - .4 Manufacturer's engineering judgment identification number and drawing details when no ULC or cUL system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in drawing.
 - .5 Submit material safety data sheets provided with product delivered to job-site.
- .13 Section 22 42 01 Plumbing Specialties.
 - .1 Water Hammer Arrestors.
 - .2 Sediment Interceptors.
- .14 Section 22 42 03 Plumbing Fixtures.
 - .1 Label each sheet as to fixture type.
 - .2 Indicate roughing-in dimensions incorporating dimensions indicated on drawings.
- .15 Section 24 34 25 Package Exhausters.
 - .1 Fan curves and sound rating data showing point of operation.
- .16 Section 24 37 13 Air Terminals

1.3 OPERATING AND MAINTENANCE (O&M) MANUAL

- .1 Operating and maintenance manual to be reviewed by the Consultant and final copies deposited with Consultant before application for substantial performance certificate
- .2 Organize by specification section.
- .3 O&M Manuals to be custom designed and contain material pertinent to this project only and to provide full and complete coverage of subjects referred to in this section.
- .4 Customize O&M data from manufacturer's to suit this project.
 - .1 Provide site specific manual or
 - .2 Neatly cross out non applicable generic information in the manual.
 - .3 In Manufacturer's literature, highlight model supplied for this project.
- .5 Conform to requirements of Division 01, supplemented and modified by requirements specified in this section.
- .6 Project records and O&M manuals specified in this section are to be completely separate entity from those specified in Division 01.

- .7 Operation data to include:
 - .1 Control schematics for each system including environmental controls.
 - .2 Description of each system and its controls.
 - .3 Description of operation of each system at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for each system and each component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule.
 - .7 Color coding chart.
- .8 Maintenance data shall include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .9 Submittals:
 - .1 Include a copy of all reviewed mechanical shop drawings.
 - .2 Submit a copy of the complete O&M Manual to Consultant for Review.
 - .3 Submission of individual data will not be accepted unless so directed by Consultant.
 - .4 Make changes as required and re-submit as directed by Consultant.
 - .5 Refer to Division 01 for quantity of Manuals (minimum 2).
 - .6 Hard-back, 50 mm (2") 3 ring, D-ring binders.
 - .7 Binders to be 2/3 maximum full.
 - .8 Provide index to full volume in each binder.
 - .9 Identify contents of each manual on cover and spine.
 - .10 Include names, addresses, telephone numbers of each sub-contractor having installed equipment, local representative for each item of equipment, each system.
 - .11 Provide full Table of Contents in each manual. Assemble each manual to conform to Table of Contents with tab sheets placed before instructions covering subject.
- .10 Provide maintenance data for the following:
 - .1 Section 24 34 00 Packaged Fans
- .11 Prepare and insert into operation and maintenance manual, additional data when need for same becomes apparent during demonstrations and instructions specified above.

1.4 AS BUILT DRAWINGS

- .1 In accordance with Division 01.
- .2 Site Records:
 - .1 Make available for reference purposes and inspection at all times. Provide sets of white prints as required for each phase of the work. Mark thereon all changes as work progresses and as changes occur. This shall include change orders, site instructions, and changes to existing mechanical systems, control systems and low voltage control wiring.

- .2 Obtain AutoCAD drawing files from the consultant. The Contractor to update at his own expense the AutoCAD files to show the as-built conditions.
 - .3 On a regular basis, transfer information to the AutoCAD files, revising drawings to show all work as actually installed. These AutoCAD files will at their completion, become the as-built drawings for this project.
 - .4 Ensure that the modifications follow the same standard as the original file, that is, layer control, line weights, line types, etc.
 - .5 Make available for reference purposes and inspection at all times.
- .3 As Built Drawings:
- .1 Prior to start of Testing, Adjusting and Balancing (TAB), finalize production of As Built Drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 13 mm (1/2") high as follows: -"AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).
 - .3 Include on the As Built Drawings the identification number off all terminal units and as installed location.
 - .4 Include on the As Built Drawings as installed location of all temperature sensors and/or thermostats
 - .5 Submit to Consultant for approval and make corrections as directed.
 - .6 TAB to be performed using as-built drawings.
 - .7 Submit completed hard copy of as-built drawings with Operating and Maintenance Manuals.
 - .8 Submit computer disk with the AutoCAD files to the consultant at the time specified in Division 01.
 - .9 Include all sections shown on interference drawings.
- .4 Where products are specified by manufacturer and/or model, update AutoCAD file to show installed manufacturer and model.
- 2 Products N/A**
- 3 Execution N/A**

END OF SECTION

1 General

1.1 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Common Work Results for Mechanical.

1.2 SUBMITTALS

- .1 Start-up Report.
 - .1 Provide start-up reports as listed below.
 - .2 Reports to show model number, serial number, voltage and rated amperes.
 - .3 If during start up there is an operation concern, repeat start-up after operation concern has been corrected.
- .2 Section 24 05 93 Balancing (TAB) of Mechanical Systems.
 - .1 TAB Report.

2 Products N/A

3 Execution

3.1 CLEANING

- .1 Clean mechanical (building) systems in accordance with Division 01.
- .2 In preparation for final acceptance, clean and refurbish all equipment and leave in operating condition including replacement of all filters in all air and piping systems.

END OF SECTION

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 DEFINITIONS

- .1 Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.4 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

- .1 Penetrations for the passage of duct, piping, and other mechanical equipment through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

1.5 QUALITY ASSURANCE

- .1 A manufacturer's direct representative to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.
- .2 Firestop System installation must meet requirements of CAN4-S115-M or ULC S-115-M tested assemblies.
- .3 Firestop materials and methods: conform to applicable governing codes having local jurisdiction.
- .4 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.

1.6 INSTALLER QUALIFICATIONS

- .1 Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and ULC or cUL label where applicable.
- .2 Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- .3 Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements.
- .4 Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- .5 Do not use damaged or expired materials.

1.8 PROJECT CONDITIONS

- .1 Do not use materials that contain flammable solvents.
- .2 Scheduling
 - .1 Schedule installation of Cast In Place firestop devices after completion of floor formwork, metal form deck, or composite deck but before placement of concrete.
 - .2 Schedule installation of other firestopping materials after completion of penetrating item installation but prior to covering or concealing of openings.
 - .3 Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
 - .4 Weather conditions: Install of firestop materials when temperatures are within the manufacturer's recommended limitations for installation printed on product label and product data sheet.
 - .5 During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

2 Products

2.1 FIRESTOPPING, GENERAL

- .1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

- .2 Provide firestopping composed of components that are compatible with each other, the substrates forming openings and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- .3 Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

2.2 ACCEPTABLE MANUFACTURERS

- .1 Subject to compliance with through penetration firestop systems listed in U.L.C Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory, provide products of the following manufacturers as identified below:
 - .1 Hilti (Canada) Limited.
 - .2 Other manufacturers listed in the U.L.C Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory

2.3 MATERIALS

- .1 Cast-in place firestop devices are installed prior to concrete placement for use with non-combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors.
 - .1 Standard of Acceptance:
 - .1 Hilti CP 680 Cast-In Place Firestop Device
- .2 Sealants or caulking materials for use with non-combustible items including steel pipe, copper pipe and electrical metallic tubing (EMT).
 - .1 Standard of Acceptance:
 - .1 Hilti FS-ONE Intumescent Firestop Sealant, Hilti CP 604 Self Leveling Firestop Sealant, Hilti CP 620 Fire Foam
- .3 Sealants or caulking materials for use with sheet metal ducts.
 - .1 Standard of Acceptance:
 - .2 Hilti CP 601s Elastomeric Firestop Sealant, Hilti CP 606 Flexible Firestop Sealant, Hilti FS-ONE Intumescent Firestop Sealant, Hilti CP 604 Self Leveling Firestop Sealant.
- .4 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed or cable bundles and plastic pipe.
 - .1 Standard of Acceptance:
 - .1 Hilti FS-ONE Intumescent Firestop Sealant, Hilti CP 620 Fire Foam
- .5 Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems) tested to 50 Pa. differential.
 - .1 Standard of Acceptance:

- .1 Hilti CP 642 Firestop Collar, Hilti CP 643 Firestop Collar, Hilti CP 645 Wrap Strips
- .6 Materials used for large size/complex penetrations made to accommodate multiple steel and copper pipes.
 - .1 Standard of Acceptance:
 - .1 Hilti FS 635 Trowel able Firestop Compound, Hilti FS 657 FIRE BLOCK, Hilti CP 620 Fire Foam
- .7 Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate multiple steel and copper pipes.
 - .1 Standard of Acceptance:
 - .1 Hilti FS 657 FIRE BLOCK

Fire Resistance Rating of Separation	Required ULC or cUL "F" Rating of Firestopping Assembly
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

- .8 For combustible pipe penetrations through a Fire Separation provide a firestop system with a "F" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.
- .9 For penetrations through a Fire Wall or horizontal Fire Separation provide a firestop system with a "FT" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

3 Execution

3.1 PREPARATION

- .1 Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
- .2 Verify penetrations are properly sized and in suitable condition for application of materials.
- .3 Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

- .4 Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
- .5 Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
- .6 Do not proceed until unsatisfactory conditions have been corrected.

3.2 FIRE STOPPING

- .1 Firestopping to include all Mechanical services including but not limited to the following:
 - .1 PVC, cast iron or copper piping to floor drains above grade.

3.3 COORDINATION

- .1 Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.
- .2 Responsible trade to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

3.4 INSTALLATION

- .1 Regulatory Requirements: Install firestop materials in accordance with ULC Fire Resistance Directory or UL Products Certified for Canada (cUL) Directory.
- .2 Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
- .3 Consult with mechanical consultant, project manager and damper manufacturer prior to installation of ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
- .4 Protect materials from damage on surfaces subjected to traffic.

3.5 FIELD QUALITY CONTROL

- .1 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- .2 Keep areas of work accessible until inspection by applicable code authorities.
- .3 Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- .4 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

- .5 Keep areas of work accessible until inspection by applicable code authorities.
- .6 Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- .7 Install a warning card that is clearly visible adjacent to all openings. This card should contain the following information:
 - .1 Warning that the opening has being fire stop protected
 - .2 Indicate the fire stop system used (ULC or cUL)
 - .3 F rating or FT rating
 - .4 Fire stop product(s) used
 - .5 Person to contact and phone number in case of modification or new penetration of fire stop system

3.6 ADJUSTING AND CLEANING

- .1 Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- .2 Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

.1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 SUBMITTAALS

.1 In accordance with Section 20 05 02 Mechanical Submittals.

1.4 PRODUCTS/SYSTEMS

- .1 Products/Systems: as per listed and described below.
- .2 Refer to “Instruction to Bidders” for method of applying for Alternatives Products/Systems prior to close of tender.

1.5 ENGINEERING DESIGN CRITERIA

- .1 Design drawings to suit existing conditions and be complete as per NFPA 13.
- .2 No alterations to layout shown without written instruction except for minor co-ordination items.

1.6 COORDINATION

.1 In accordance with Section 20 05 01 Mechanical General Requirements.

2 Products

2.1 PIPE AND FITTINGS

- .1 All pipe to be stamped as per NFPA 13 and listed for Fire Service.
- .2 Steel Pipe to ASTM A-53/A-135/A-795 as per NFPA 13.
 - .1 Application:
 - .1 Mains
 - .2 Branch lines
 - .3 Branch pipe to heads.
 - .2 NPS 2 and Smaller Pipe Joints:
 - .1 Schedule 40: Screwed or Roll Grooved Couplings.
 - .2 Schedule 10: Roll Grooved Couplings.

- .3 NPS 2½ up to NPS 8 Pipe Joints:
 - .1 Schedule 40: Welded, Flanged, Roll Grooved Couplings.
 - .2 Schedule 10: Roll Grooved Couplings.

- .3 Pipe fittings, screwed, flanged or welded:
 - .1 Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250 to ASME B16.1
 - .2 Malleable Iron Threaded Fittings: Classes 150 and 300 to ASME B16.3.
 - .3 Gray Iron Threaded Fittings: Classes 125 and 250 to ASME B16.4
 - .4 Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard to ASME B16.5
 - .5 Factory-Made Wrought Buttwelding Fittings to ASME B16.9
 - .6 Forged Fittings, Socket-Welding and Threaded to ASME B16.1
 - .7 Buttwelding Ends to ASME B16.25

- .4 Dry system: Schedule 40 galvanized piping and fittings.

- .5 Braided Flexible Hose Assembly Fittings are not acceptable.

- .6 Threadable thinwall not acceptable

2.2 ROLL GROOVED COUPLINGS AND FITTINGS

- .1 Where rolled grooved couplings and fittings are used, they shall be of the same manufacturer.

- .2 Ductile iron to ASTM A-536 or malleable iron to ASTM A-47 coupling housings painted with alkyd enamel.

- .3 Gaskets.
 - .1 Grade “E” EPDM Type A.
 - .2 -34° C to +110° C temperature range.
 - .3 ULC listed for sprinkler systems.

- .4 Ductile iron to ASTM A-536 or malleable iron to ASTM A-47 fittings painted with alkyd enamel.

- .5 Coupling Bolts/Nuts:
 - .1 Heat treated carbon steel, track head to ASTM A-183 minimum tensile 110,000 psi.

- .6 Standard of Acceptance:
 - .1 Victaulic Co. of Canada couplings and grooved-end fittings with Grade “EHP” EPDM gaskets

- .7 Acceptable Manufacturers:
 - .1 Anvil Gruvlok

2.3 SPRINKLER HEADS

- .1 In accordance with NFPA 13 and ULC listed for fire service.
- .2 Chrome in finished areas.
- .3 Bronze in service areas and concealed areas.
- .4 Sprinkler heads in showers, coolers, freezers, located outside, etc. are to be corrosion resistant.
- .5 Concealed heads in areas adjacent operable walls and folding partitions including storage pockets.

2.4 HANGERS AND SUPPORTS

- .1 ULC listed for Fire Protection.
- .2 As per Section 23 05 29 Hangers and Supports and NFPA 13, whichever is more stringent.

2.5 IDENTIFICATION

- .1 As per Section 23 05 53 Mechanical Identification.
- .2 In accordance with NFPA 13.

2.6 SIGNS

- .1 Signs for control drain and test valves: to NFPA 13.

2.7 SLEEVES AND PIPE PENETRATIONS THROUGH WALLS AND FLOORS

- .1 As per Section 20 05 01 Mechanical General Requirements.

3 Execution

3.1 INSTALLATION

- .1 Install in accordance with NFPA 13, contract documents and local authority having jurisdiction, whichever is more stringent
- .2 Install pipes close to building structure to minimize furring, conserve headroom and space.
- .3 Run piping parallel to building lines. Elevation offsets using industry standard screwed or grooved fittings. Building angle offsets using swing joints (with auxiliary drains where required)

- .4 Test to acceptance in accordance with NFPA 13.
- .5 Testing to be witnessed by authorities having jurisdiction.
- .6 Where applicable, allow ample clearance between sprinkler piping in ceiling spaces and top of light fixtures for relocation of fixtures under future renovations.
- .7 Locate ceiling space mounted equipment (e.g. valves, drains, etc.) within 900 mm (36") of the finished ceiling for safe access.
- .8 Allow for extra sprinkler heads, fittings, all associated piping and associated labor in Mechanical Rooms, for air handling equipment and large ducts and in areas where large ducts may be located exposed under ceiling, to maintain adequate coverage.
- .9 Allow for 15 extra sprinkler heads, fittings, all associated piping and associated labor in addition to those required for underside of ducts etc. in Mechanical Rooms.

3.2 COORDINATION

- .1 Closely coordinate design and installation of Sprinkler System piping and equipment with Mechanical Contractor and Electrical contractor.

3.3 SPRINKLER HEADS

- .1 Pendent sprinklers with piping concealed above the ceiling are to be located as follows:
 - .1 Aligned symmetrically with normal fabrication and installation tolerances utilizing rigid pipe.
 - .2 Center sprinkler head in center 610 x 610 mm (2x2) or center in half of 610 x1220 (2x4) suspended ceiling tile.
 - .3 Located minimum 150 mm from T-bar.
- .2 Extended escutcheons where head is obstructed by surface mounted light.

3.4 ACCESS DOORS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 LEAD FREE

- .1 In accordance with NSF/ANSI 372 Drinking water system components – Lead Content or California Health and Safety Code (Section 116875; commonly known as AB1953) or Vermont Bill S.152

2 Products

2.1 PIPING

- .1 Domestic hot, tempered, cold and recirculation tubing, within building.
 - .1 Buried: copper tube, soft annealed, type K: to ASTM B88. In long lengths and with no buried joints.
 - .2 Above ground: copper tube, hard drawn, type L to ASTM B88.

2.2 FITTINGS FOR COPPER

- .1 ASME/ANSI B16 Series
- .2 Brass or bronze flanges and flanged fittings.
- .3 Cast brass or bronze threaded fittings, Class 125 & 250.
- .4 Cast bronze or wrought copper and bronze.
 - .1 NPS 2 and under: Lead free solder to ASTM B32.
 - .2 NPS 2 1/2 and over: Roll Grooved or Silfos.
- .5 Press Fitting:
 - .1 Copper and copper alloy press fittings conforming to material requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117.
 - .2 EPDM sealing elements for press fittings.
 - .3 Factory installed sealing elements.
 - .4 Press ends with leakage path feature that assures leakage of liquids from inside the system past the sealing element of an unpressed connection. The function of this feature is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.

- .5 Acceptable Material: Viega Copper ProPress fittings.

2.3 JOINTS FOR COPPER

- .1 Solder/brazing: lead free to ASTM B32.
- .2 Press connections: Copper and copper alloy press connections in accordance with the manufacturer's installation instructions.

2.4 HANGERS AND SUPPORTS

- .1 Support as per manufacturer's requirements and National Plumbing Code of Canada.
- .2 Copper: As per Section 23 05 29 Hangers and Supports.

2.5 ROLL GROOVED COUPLINGS AND FITTINGS

- .1 Where rolled grooved couplings and fittings are used, they shall be of the same manufacturer.
- .2 Sized to copper-tube dimensions.
- .3 Ductile iron coupling housings to ASTM A-536 with a copper alkyd enamel paint.
- .4 Rigid Grooved type Couplings: Housings cast with offsetting angle-pattern bolt pads to provide rigidity and system support.
- .5 Flush Seal Gaskets:
.1 Molded EPDM Compound to ASTM D-2000 -34° C to 110° C temperature range.
.2 Suitable for domestic cold water, domestic hot water, domestic hot water recirculation.
.3 Classified in accordance with ANSI/NSF-61 for potable water service
- .6 Fittings: NPS 2 to 4 Copper per ASTM B-75. NPS 6 Bronze Sand Casting per ASTM B-584.
- .7 Coupling Bolts/Nuts: Heat treated carbon steel, track head to ASTM A-183 minimum tensile 110,000 psi.
- .8 Fittings: NPS 2 and larger: roll grooved to CSA B242. Cast bronze to ANSI/ASME B16.18 or wrought copper ANSI/ASME B16.22.
- .9 Standard of Acceptance:
.1 Victaulic Co. of Canada Style 606 Rigid Couplings with Grade E Flush Seal Gasket, Style 641 Flange Adapters and Copper Connection Fittings.
.2 Victaulic Co. of Canada Style 607 Quick-Vic Rigid Couplings with EHP gasket for direct stab installation without field disassembly.

- .10 Acceptable Material: Anvil Gruvlok

2.6 MECHANICALLY FORMED TEE CONNECTIONS

- .1 Mechanically extracted collars formed in a continuous operation, consisting of drilling a pilot hole and drawing out the tube surface to form a collar having a height of not less than three times the thickness of the tube wall.
- .2 Mechanically Formed Tee Connections can be used on NPS 1 and larger pipe. Use only where branch is a minimum of one size smaller than run pipe.
- .3 Branch notched to conform with the inner curve of the run tube, dimpled to insure penetration of the branch tube into the collar is of sufficient depth for brazing and that the branch tube does not obstruct the flow in the main line tube.
- .4 Brazed joints.

2.7 VALVES

- .1 As per Section 23 05 23 Valves.

2.8 INSULATION

- .1 As per Section 23 07 00 Mechanical Thermal Insulation

3 Execution

3.1 INSTALLATION

- .1 Connect to fixtures and equipment in accordance with manufacturer's instructions unless otherwise indicated.
- .2 Install pipes close to building structure to minimize furring, conserve headroom and space. Run piping parallel to walls. Group piping wherever possible.
- .3 Install groups of piping parallel to each other, spaced to permit application of insulation, identification, and service access, on individual hangers or trapeze hangers.
- .4 Cut square, ream and clean tubing and tube ends, clean recesses of fittings and assemble without binding.
- .5 Wipe all pipes of soldering flux as the joint is completed.
- .6 Assemble all piping using fittings manufactured to ANSI standards.
- .7 Install DCW piping below and away from DHW and DHWR and all other hot piping so as to maintain temperature of cold water as low as possible.

- .8 Where pipe sizes differ from connection sizes of equipment, install reducing couplings close to equipment. Reducing bushings are not permitted.
- .9 Lay copper tubing so that it is not in contact with dissimilar metal and will not be kinked or collapsed.
- .10 Use non-corrosive lubricant or Teflon tape applied to male thread.
- .11 Provide di-electric couplings wherever piping of dissimilar metals are joined.
- .12 Install swing or swivel joints to connect risers to mains.

3.2 ROLL GROOVED CONNECTIONS

- .1 In accordance with manufacturer's recommendations.
- .2 Cut ends of roll grooved pipe square, with seating surface clean and free from indent and score marks.

3.3 PRESS CONNECTION INSTALLATION

- .1 In accordance with the manufacturer's installation instructions.
- .2 Fully inserted tubing into the fitting and the tubing marked at the shoulder of the fitting.
- .3 Check the fitting alignment against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting.
- .4 Pressed the joints using the tool(s) approved by the manufacturer.

3.4 MECHANICALLY FORMED TEE CONNECTIONS

- .1 Mechanically Formed Tee Connections can be used on NPS 1 and larger pipe. Use only where branch is a minimum of one size smaller than run pipe.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

2 Products

2.1 PIPING, FITTINGS AND JOINTS

- .1 NPS 1 ¼ and larger: Type DWV Copper to ASTM B306.
 - .1 Fittings:
 - .1 Cast brass: to CSA B158.1.
 - .2 Wrought copper: to ANSI B16.29.
 - .2 Solder/brazing: Lead free to ASTM B32.
- .2 PVC to CAN/CSA-B181.2, CAN/CSA-B182.1 and CAN/CSA-B182.2
 - .1 PVC DWV 25-50: with solvent weld joints with flame spread not more than 25 and smoke developed classification not more than 50.
 - .1 Pipe and fittings by one manufacturer.
 - .2 Acceptable material:
 - .1 IPEX System XFR™ 15-50
 - .2 PVC DWV: with solvent weld joints

	Copper	PVC DWV	PVC DWV 25 -50
Below Grade Sanitary & Vent	N/A	Y	Y
Above Grade Sanitary & Vent	Y	N	Y

2.2 RELIEF VALVE PIPING AND DRAINS

- .1 All sizes: copper tube, hard drawn, type L to ASTM B88
 - .1 Applications: relief valve piping, etc.
- .2 NPS 1 ¼ and larger: Copper DWV or PVC DWV 25-50 as described above
 - .1 Applications: air handling drains, plenums, A/C drains, etc.
- .3 Boiler relief valves: Refer to Section 23 21 13 Hydronic Systems Piping and Fittings

2.3 HANGERS SUPPORTS

- .1 As per Section 23 05 29 Hangers and Supports.

2.4 INSULATION

- .1 As per Section 23 07 00 Mechanical Thermal Insulation

3 Execution

3.1 INSTALLATION

- .1 Install piping parallel to building lines and close to walls and ceilings to conserve headroom and space and to grade indicated.
- .2 Locate underground piping to accommodate a minimum of 300 mm (12") of backfill below slab over the pipe.
- .3 For NPS 4 or less pipe, use double 45° fittings to make 90° change in direction

3.2 CLEANOUTS

- .1 For stack cleanouts with access door, locate centerline of cleanout a minimum of 300mm (12") AFF.

3.3 RELIEF VALVE PIPING AND DRAINS

- .1 Turn down at floor drain.
- .2 Cut end of discharge pipe at 45°.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

.1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 LEAD FREE

.1 In accordance with NSF/ANSI 372 Drinking water system components – Lead Content or California Health and Safety Code (Section 116875; commonly known as AB1953) or Vermont Bill S.152

2 Products

2.1 WATER HAMMER ARRESTORS

.1 WHA: Stainless steel construction, bellows type: to Plumbing and Drainage Institute Standard PDI-WH 201-77.

.2 Acceptable Material:

- .1 Jay R. Smith 5000
- .2 Watts Drainage SG-SS
- .3 Zurn Z-1700

2.2 INTERCEPTORS

.1 Sediment Interceptor

- .1 Acid Resistant Composite construction with perforated stainless steel sediment basket, gasketed cover.
- .2 NPS 2 NPT connections.

.2 Acceptable material:

	Jay R. Smith	Watts Drainage	Zurn
Sediment	8710	SI-742-L	Z1180

3 Execution

3.1 SEDIMENT INTERCEPTORS

.1 Allow sufficient room to remove basket.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 FIXTURES AND TRIM

- .1 All plumbing fixtures of same type to be by one Manufacturer.
- .2 All vitreous china plumbing fixtures in any one washroom or location to be the product of one manufacturer.
- .3 Trim of same type to be product of one manufacturer.
- .4 Exposed plumbing brass to be chrome plated.

1.4 LEAD FREE

- .1 In accordance with NSF/ANSI 372 Drinking water system components – Lead Content or California Health and Safety Code (Section 116875; commonly known as AB1953) or Vermont Bill S.152

2 Products

2.1 SINK TRIM

- .1 T-1 Lead Free Trim: wall mounted chrome plated brass pre-rinse unit with add-on faucet, coupling nuts, spring action type gooseneck, low flo spray valve with squeeze handle, spring check valves, wall bracket, lever handles, hose hook. Check valves and isolation valves as per Section 23 05 23 Valves on cold and hot water branches to faucet. Provide thin wall trim kit where faucet mounted on stainless steel backsplash.
 - .1 Acceptable Material:
 - .1 Delta Commercial Cambridge Brass 55C1583 with check valves and isolation valves as per Section 23 05 23 Valves on cold and hot water branches.
 - .2 Chicago Faucet AB510-LWSLCP-613-ACP-81LCP with check valves and isolation valves as per Section 23 05 23 Valves on cold and hot water branches.

- .3 T & S Brass & Bronze Works Inc. Model B-0133-ADF8-BC with check valves and isolation valves as per Section 23 05 23 Valves on cold and hot water branches and B-0230-K installation kit.
 - .4 Zurn Z-842X1XL-AF-HCT-LSI
- .2 T-2 Lead Free Trim: wall mounted chrome plated brass faucet, swing spout, vandal resistant laminar flow 8.3 L/min outlet, coupling nuts, 62 mm lever handles with vandal resistant screws, integral stops.
- .1 Acceptable Material:
 - .1 Delta Commercial Cambridge Brass 28C6223 with 8.3 L/min outlet.
 - .2 Chicago Faucet AB540R-LD-L9-E29VP.
 - .3 Kohler K-7853-CP with K-16010-4, loose key stops and outlet as noted above.
 - .4 Zurn Z842F1XL-18F-LS1

2.2 P- TRAP

- .1 ST-1: sediment interceptor as per Section 22 42 01 Plumbing Specialties and Accessories.

2.3 SINKS

- .1 SSC-1: double compartment, min. 1.2 mm, Type 304 stainless steel, rolled/marine rim, galvanized legs with adjustable bullet feet, corner crump cup waste assembly per bowl, backlash drilled for a 8" centerset faucet per bowl, coved front and back. See drawings
 - .1 Nominal Bowl Size: Left bowl 36" x 20" x 14" deep. Right bowl 36" x 20" x 5" deep.
 - .2 Acceptable Material:
 - .1 Kindred Commercial DL2416 x 14/2416x 5-1.

- .2 Sink Schedule

Symbol	Sink	Trim	Trap
CS-1	SSC-1	T-1 on left / T-2 on right	ST-1

2.4 SERVICE SINKS

- .1 MS-1 Sink: Polypropylene ribbed construction on 4 legs, 1 1/2" waste.
 - .1 Nominal Size OD: 635 mm D x 585 mm W x 800 mm H (25" D x 23" W x 32" H)
 - .2 Acceptable Material:
 - .1 Spartan Poly Pro SS.
 - .2 Bow Aqua-Tub.
 - .3 Zurn MS2620F with legs
 - .3 Support: 16 Ga. x 38 mm strap around tub, bolted to wall.
 - .4 Trim: chrome plated brass, 100 mm deckmount centerset supply fitting, swing spout, vandal resistant vandal resistant laminar flow 5.7 L/min outlet, 62 mm lever handles with vandal resistant screws, NPS 1/2 IPS male inlets and coupling nuts.

- .1 Acceptable Material:
 - .1 Delta Commercial Cambridge Brass 27T4823
 - .2 Chicago Faucets 1895 E29VP
 - .3 Kohler K-7305-K with K16010-4 and outlet as per above
 - .4 Zurn Z-812A1-4F
- .5 Waste: Cast brass trap with cleanout and removable trap dip.

2.5 WASHER SUPPLY

- .1 WS: Combination shutoff and NPS 2 drain 1150mm (45") AFF to handle.
 - .1 Acceptable Material:
 - .1 Symmons W-602.
 - .2 Watts 2M2 DMB
 - .3 Zurn Z-2961-34

2.6 FIXTURE TRAPS

- .1 P-traps complete with cleanouts on all fixtures which do not have built-in traps.
- .2 Separate cleanout in stack is required where two or more sinks or lavatories connect to common stack using double sanitary tee.
- .3 Running traps where indicated on drawing.

2.7 ROUGHING-IN OF FIXTURES

- .1 For equipment supplied by others, provide rough-in complete with valved supplies, wastes and vents, capped.

3 Execution

3.1 FIXTURE INSTALLATION

- .1 Connect fixtures complete with supplies and drains, trapped, supported level and square.
- .2 Hot water faucets shall be on left.
- .3 Provide key for vandal resistant outlets.
- .4 In accordance with National Building Code and National Plumbing Code of Canada.
- .5 Service fixtures as follows:

Fixture	Waste NPS	Vent NPS	Cold Water NPS	Hot Water NPS
Sinks	1 1/2	1 1/4	1/2	1/2

3.2 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments.
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .3 Checks.
 - .1 Outlets: operation, cleanliness.
- .4 Thermostatic controls.
 - .1 Verify temperature settings, operation of control, limit and safety controls.
- .5 Manufacturer's representative to visit the site and test each water closet and urinal to confirm that the fixture flushes with the specified volume of water.

3.3 BRASS TRAPS, SUPPLIES AND ASSOCIATED PIPE

- .1 Where exposed to view, paint with aluminum paint.

END OF SECTION

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 MANUFACTURED ITEMS

- .1 All valves of one type to be by one manufacturer.

1.4 LEAD FREE

- .1 In accordance with NSF/ANSI 372 Drinking water system components – Lead Content or California Health and Safety Code (Section 116875; commonly known as AB1953) or Vermont Bill S.152

2 Products

2.1 VALVES NPS 2 AND UNDER

- .1 Lead Free Ball Valves NPS 2 and under soldered and screwed:
 - .1 Application
 - .1 Section 22 11 16 Domestic Water Piping
 - .2 Quarter-turn: 4130 kPa (600 psi) W.O.G., bronze, large port.
- .2 Lead Free Swing Check Valves NPS 2 and under, soldered and screwed:
 - .1 Application
 - .1 Section 22 11 16 Domestic Water Piping
 - .2 1380 kPa (200 psi) W.O.G., bronze body, bronze swing disc, screw in cap, regrindable seat.
- .3 Acceptable material:

NPS 2 and under	Lead Free Ball	Lead Free Check
Apollo	77CLF-100/77CLF-200	161S-LF/161T-LF
Crane	LF9201/LF9202	LF37/LF1340
Milwaukee	UPBA150/ UPBA100	UP1509/UP509
Apollo	77CLF-100/77CLF-200	161S-LF/161T-LF
Nibco	S-685-80-LF / T -685-80-LF	S-413-Y-LF / T-413-Y-LF
Kitz	868/869	822T/823T
Watts	LFB6080/ LFB6081	LFCV/LFCVS

2.2 DRAIN VALVES

- .1 Lead Free Drain Valves
 - .1 Locate at low points of mains, branches and risers.
 - .2 Minimum NPS 1/2 unless otherwise specified.
 - .3 Ball valve with hose end male thread and cap with chain.

- .2 Acceptable material:

Drain valves	
Apollo	77CLF-100-HC/77CLF-200-HC
Kitz	868/869 w/cap and chain.
Nibco	S-685-80-LF-HC /T -685-80-LF-HC
Watts	LFB6080/ LFB6081 w/cap and chain
Milwaukee	UPBA150/ UPBA100 w/cap and chain

3 Execution

3.1 GENERAL

- .1 Install valves with stems upright or horizontal unless approved otherwise.
- .2 Line size.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

2 Products

2.1 GENERAL

- .1 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.

2.2 UPPER ATTACHMENTS

- .1 Preformed metal supports with 3 fasteners per side
 - .1 Steel Deck
 - .2 Galvanized.
 - .3 Min 45 kg Static Load
 - .4 Application:
 - .1 NPS ½ or ¾ domestic water piping or heating piping.
 - .2 Up to NPS 2 Plumbing vent.
 - .3 Maximum size duct: 400 mm (16").
 - .5 Acceptable material: Brak-It
- .2 Caddy clip for 6 mm (¼") rod Min 90 kg Static Load.
 - .1 Steel beam, channel, joist or angle.
 - .2 Application: Ductwork.
- .3 Steel washer plate with double locking nuts.
 - .1 Steel Joist.
 - .2 Application: Cold and hot, plumbing and hydronic piping, any size and ductwork.
- .4 Universal C-Clamp.
 - .1 Top of steel beam, top of channel, top of joist or angle.
 - .2 Application: Cold and hot, plumbing and hydronic piping, NPS 6 and under and ductwork.

.5 Acceptable material:

	CCTF/Hunt	E. Myatt & Co	Taylor Pipe Supports	Anvil	Carpenter and Paterson Pipe Hangers Ltd.
Steel washer plate	560	545	80	60	260
Universal C-Clamp	56/56N/56NW		406/407	92/93/94	
C-Clamp	57	586	301	86	238

.6 Universal C-Clamp to NFPA 13 Requirements.

- .1 Top of steel beam, top of channel, top of joist or angle.
- .2 Application: Sprinkler.
- .3 Acceptable Material:
 - .1 CCTF/Hunt Fig. 56N/56NW.
 - .2 Anvil Fig. 92/93.
 - .3 Tolco Fig. 65/66.

.7 For pipes and ducts parallel to steel structure:

- .1 Insert into floor slab above or
- .2 Steel member from structural member to structural member.
- .3 Double locking nuts.

.8 Concrete:

- .1 Inserts for cast-in-place concrete: galvanized steel wedge to MSS-SP-58, type 18. ULC listed for pipe NPS 3/4 through NPS 8.

2.3 MIDDLE ATTACHMENT (ROD)

.1 Cadmium plated steel threaded rod:

- .1 Acceptable Material:
 - .1 Carpenter & Paterson Pipe Hangers Ltd. Fig. 94.
 - .2 CCTF/Hunt Fig. 99P.
 - .3 Anvil Fig. 146.

2.4 PIPE ATTACHMENT

.1 Protecting Shield:

- .1 Minimum 1.3 x 300 mm (18 Ga. x 12") long for NPS 6 and under.
- .2 Minimum 1.6 x 450 mm (16 Ga. x 18") long for over NPS 6.
- .3 Shop fabricated or as per table below

.2 Adjustable clevis hanger: to MSS-SP69, type 1, ULC listed.

.3 Long adjustable clevis hanger: to MSS-SP69, Type 1 ULC listed.

.4 Copper plated or epoxy coated adjustable clevis hanger:

- .5 Adjustable steel yoke pipe roll: to MSS-SP69, Type 43.
- .6 Adjustable clevis hanger for cast iron pipe:
 - .1 Application: Insulated and uninsulated cast iron pipe. All sizes.
- .7 Black carbon steel riser clamp to MSS-SP69, Type 8, ULC listed.
 - .1 Application: Steel pipes and Cast iron pipe.
- .8 Copper plated carbon steel to MSS-SP69, Type 8, ULC listed:
 - .1 Application: Copper pipes.
- .9 Acceptable material:

	CCTF/ Hunt	E. Myatt & Co	Taylor Pipe Supports	Anvil	Carpenter and Paterson Pipe Hangers Ltd.
Adjustable clevis hanger	32N	124	24Z	260	100
Copper plated or epoxy coated clevis hanger	30C/E	151CT or 56	52	CT65	100CT
Black carbon steel riser clamp	40	183	82	261	126
Copper plated riser clamp	42C	150CT	85	CT121	126CT

- .10 Double hook with double locking nut.
 - .1 Application: Insulated and uninsulated cast iron pipe: NPS 6 and under.
 - .2 Acceptable Material:
 - .1 Bibby Ste. Croix 6602 to 6606
- .11 Cast iron support hanger saddle.
 - .1 Application: Insulated and uninsulated cast iron pipe: NPS 8 and 10.
 - .2 Acceptable Material:
 - .1 Bibby St. Croix 6606 to 6610
- .12 Adjustable swivel ring hanger: to MSS-SP69, Type 10, ULC listed, tapped per NFPA 13 Standard.
 - .1 Application: Sprinkler piping.
 - .2 Acceptable Material:
 - .1 CCTF/Hunt Fig. 20.
 - .2 Anvil Fig. 69.
 - .3 Tolco Fig. 2.

3 Execution

3.1 PIPE SUPPORT SPACING

- .1 Plumbing and Hydronic: Spacing and middle attachment (rod) diameter as specified in paragraphs below or as in table below, whichever is more stringent
 - .1 Plumbing piping: to National Plumbing Code of Canada.

- .2 Authority having jurisdiction.
- .3 Flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints and not less than one hanger per pipe length over 1200 mm (4'0").
- .4 Within 300 mm (12") of each elbow.
- .5 Risers at each floor.
- .6 Minimum hanger rod size as per full size manufacturer's recommendation and table below, whichever is greater.

Pipe Size: NPS	Rod Diameter	Maximum Spacing Steel	Maximum Spacing Copper
up to 3/4	10 mm (3/8")	2100 mm (7'0")	1500 mm (5'0")
1 to 1-1/4	10 mm (3/8")	2100 mm (7'0")	1800 mm (6'0")
1-1/2	10 mm (3/8")	2750 mm (9'0")	2400 mm (8'0")
2	10 mm (3/8")	3000 mm (10'0")	2750 mm (9'0")
2-1/2	10 mm (3/8")	3350 mm (11'0")	3000 mm (9'10")
3	13 mm (1/2")	3650 mm (12'0")	3000 mm (9'10")
4	13 mm (1/2")	4250 mm (14'0")	3000 mm (9'10")

Pipe Size: NPS	Rod Diameter	Maximum Spacing Cast Iron	Maximum Spacing PVC
Up to 4	10 mm (3/8")	3000 mm (9'10")	1200 mm (4'0")
Over 4	13 mm (1/2")	3000 mm (9'10")	1200 mm (4'0")

- .7 PEX: Support horizontal pipe at National Plumbing Code of Canada and manufacturer's requirements.

- .2 Sprinkler Piping: Spacing and middle attachment (rod) diameter as specified in paragraphs below or as in table below, whichever is more stringent

- .1 To NFPA 13.
- .2 Authority having jurisdiction.
- .3 Within 300 mm (12") of each elbow.
- .4 Risers at each floor.
- .5 Where roll grooved pipe is used, any piece 1200 mm (48") or longer shall have a minimum of one support.
- .6 Minimum hanger rod size as per full size manufacturer's recommendation, NFPA 13 and table below, whichever is greater.

Pipe Size: NPS	Rod Diameter	Maximum Spacing Steel
up to 1-1/4	10 mm (3/8")	2100 mm (7'0")
1-1/2	10 mm (3/8")	2750 mm (9'0")
2	10 mm (3/8")	3000 mm (10'0")
2-1/2	10 mm (3/8")	3350 mm (11'0")
3	13 mm (1/2")	3650 mm (12'0")
4	13 mm (1/2")	4250 mm (14'0")
6	20 mm (3/4")	4570 mm (15'0")
Over 8	22 mm (7/8")	4570 mm (15'0")

- .3 At Steel Joists
 - .1 Locate hangers at panel points of OWSJ for piping perpendicular to OWSJ.
 - .2 Locate steel support members at panel points of OWSJ for piping parallel to OWSJ.
 - .3 For parallel runs of piping NPS 2 ½ and over.
 - .1 Where perpendicular to OWSJ support on alternating OWSJ.

3.2 PLUMBING ATTACHEMENT APPLICATIONS

- .1 Upper Attachment as noted above.
- .2 Middle attachment as noted above.
- .3 Pipe Attachment Application
 - .1 Uninsulated copper pipe: All sizes.
 - .1 Copper plated or epoxy coated adjustable clevis hanger.
 - .2 Hot Insulated plumbing copper pipe: All sizes
 - .1 Copper plated or epoxy coated adjustable clevis hanger.
 - .3 Cold Insulated plumbing copper pipe: All sizes
 - .1 Copper plated or epoxy coated adjustable clevis hanger.

3.3 SPRINKLER PIPE ATTACHMENT APPLICATION

- .1 Upper Attachment as noted above.
- .2 Middle attachment as noted above.
- .3 Pipe Attachment Application, All sizes.
 - .1 Adjustable swivel ring hanger.

3.4 DUCT HANGERS

- .1 In accordance with Section 24 31 13 Metal Ducts - Low Pressure to 500 Pa

3.5 MIDDLE ATTACHMENT (ROD)

- .1 Trim excess threaded rod off within 13 mm (1/2") of attachment nut.

3.6 HANGER INSTALLATION

- .1 Offset hanger so that rod is vertical in operating position.
- .2 Adjust hangers to equalize load.
- .3 Provide double nuts at middle attachment (rod) top and bottom.

- .4 Where building structural members or inserts are not suitably located provide supplementary steel channels or angles, support these channels and angles only from the top of structural members. Drill holes in the channels and angles for insertion of hanger rods. If the holes are cut out with a torch, provide a back-up steel plates with drilled holes for inserting hanger rods. Secure each hanger rod to the channels and angles using a steel back-up plate where applicable and steel washers and a lock-nut system. All channels, angles and hanger rod upper supports shall have a load capacity of five (5) times the load to be supported from them.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

2 Products

2.1 MANUFACTURERS NAMEPLATES

- .1 Provide metal nameplate on each piece of equipment, mechanically fastened complete with raised or recessed letters. Locate nameplates so that they are easily read. Do not insulate or paint over nameplates.
- .2 Include registration plates (e.g. Pressure vessel, Underwriters' Laboratories and CSA Approval). Indicate size, equipment model, manufacturer's name, serial number, voltage, cycle, phase and power of motors.

2.2 SYSTEM NAMEPLATES

- .1 Color:
 - .1 Hazardous: white letters, red background
 - .2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).
- .2 Construction:
 - .1 2.4 mm (3/32") thick, laminated plastic or white anodized aluminum, matte finish, square corners, letters accurately aligned and machine engraved into core.
- .3 Minimum Sizes:
 - .1 Conform to following table:

Size 3	16 mm x 75 mm (3/4" x 3")	2 line	5 mm (0.2") high letters
--------	---------------------------	--------	--------------------------
 - .2 Equipment type, number and service or area or zone of building it serves to be identified.
 - .3 Use average of 25 letters/numbers (maximum) per nameplate.
 - .4 Use Size 3.
 - .1 Packaged fans.
- .4 Mechanically fasten nameplates.

2.3 EQUIPMENT CONCEALED IN CEILING

- .1 At valves, balancing dampers, air vents, drains and electrical components located above T-bar ceiling or access doors, provide self-adhering color disc as near as possible to where item is located.
- .2 Where valves, balancing dampers, air vents, drains or electrical component has primary and secondary color, provide a 20 mm (3/4") primary color disc with a 10mm (3/8") secondary color disc centered on the primary disc.
- .3 Where primary color only, provide a 20 mm (3/4") primary color disc.
- .4 In addition to the System Nameplates noted above provide a second size 2 identical plate on the underside of the ceiling grid or access door frame as close as possible to the location of the following:
 - .1 Packaged fans less than 560 watts (3/4 HP)
- .5 Mechanically fasten nameplates to equipment.
- .6 Fasten nameplates to ceiling grid or access door frame with contact cement.

2.4 PIPE IDENTIFICATION

- .1 General: Identify medium by lettered legend, classification by primary and secondary colors, direction of flow by arrows.
- .2 Primary color bands: 50 mm (2") wide.
- .3 Secondary color bands: 50 mm (2") wide, 75 mm (3") in from one end of primary color band.

- .4 Legend: block capitals to following table:

<u>Outside Diameter of Pipe or Insulation</u>	<u>Size of Letters</u>
Up to 1 1/4"	1/2"
1 1/2" to 2"	3/4"
2 1/2" to 6"	1 1/2"
Over 6"	2"

<u>Outside Diameter of Pipe or Insulation</u>	<u>Size of Letters</u>
Up to 30 mm	13 mm
38 mm to 50mm	20 mm
63 mm to 150 mm	38 mm
Over 150 mm	50 mm

- .5 Arrows:
- .1 Outside diameter of pipe/insulation 75 mm (3") and greater: 150 mm long x 50 mm high. (6" long x 2" high.)
 - .2 Outside diameter of pipe/insulation less than 75 mm (3"): 100 mm long x 50 high (4" long x 2" high.)
 - .1 Use double headed arrows where flow is reversible.
- .6 Material:
- .1 Paint for Stencil: Low VOC and environmentally friendly
 - .2 Color bands:
 - .1 Plastic coated cloth material with protective overcoating and waterproof contact adhesive undercoating, suitable for 100% RH and continuous operating temperature of 150° C and intermittent temperature of 200° C. Apply to prepared surfaces. Wrap tape around pipe or pipe covering with ends overlapping one (1) pipe diameter. Cut band to length, don't tear off.
 - .2 Acceptable Manufacturer:
 - .1 WH Brady Inc.
 - .2 Seton Name Plate Corp.
- .7 Colors:
- .1 Where not covered by table below, submit legend, primary and secondary classification colors to Consultant for approval.
- .8 Table: Pipe and valve identification.
- | Pipe Marker
<u>Legend</u> | Valve
<u>Legend</u> | Tag Primary
<u>Color</u> | Secondary
<u>Color</u> |
|------------------------------|------------------------|-----------------------------|---------------------------|
| Dom. Cold Water | DCW | Green | None |
| Dom. Hot Water | DHW | Green | None |
- .9 Legend and arrows:
- .1 Black or white to contrast with primary color.

2.5 DUCTWORK

- .1 50 mm (2") high black stenciled letters and directional flow arrows 150 mm long x 50 mm high (6" long x 2" high).
- .2 Indicate "Supply", "Exhaust", with directional arrow and "Fan System No."

2.6 VALVE TAGS

- .1 38 mm (1 1/2") square laminated plastic with corner hole.
- .2 Horizontal 13 mm (1/2") letters accurately aligned and machine engraved into core.
- .3 Face color to match primary color of piping identification.
- .4 Core color to match secondary color of piping identification.

2.7 CEILING COLOR DISCS

- .1 At valves, balancing dampers, air vents, drains and electrical components located above T-bar ceiling or access doors, provide self-adhering color disc as near as possible to where item is located.
- .2 Where valves, balancing dampers, air vents, drains or electrical component has primary and secondary color, provide a 20 mm (3/4") primary color disc with a 10mm (3/8") secondary color disc centered on the primary disc.
- .3 Where primary color only, provide a 20 mm (3/4") primary color disc.

3 Execution

3.1 GENERAL

- .1 Provide ULC and CSA registration plates as required by Respective agency.

3.2 MANUFACTURERS NAMEPLATES

- .1 Locate nameplates so that they are easily read.
- .2 Do not insulate or paint over plates.

3.3 SYSTEM NAMEPLATES

- .1 In conspicuous location to facilitate easy reading from operating floor to properly identify equipment and/or system.
- .2 Provide stand-offs for nameplates on hot surfaces and insulated surfaces.

3.4 LOCATION OF PIPING AND DUCTWORK IDENTIFICATION

- .1 On long straight runs in open areas in boiler rooms and equipment rooms, so that at least one is clearly visible from any one viewpoint in operating areas or walking isles and not at more than 50' intervals.
- .2 In addition to above, label Non Potable Cold Water not at not more than 7.5 meter (25') intervals.
- .3 Adjacent to all changes in direction.
- .4 At least once in each small room through which piping passes.
- .5 Both sides of visual obstruction or where run is difficult to follow.

- .6 On both sides of any separation such as walls, floors and partitions.
- .7 Where piping or ductwork is concealed in service chase, or other confined space, at entry and leaving points and adjacent to each access opening and not more than 15 meter (50') intervals.
- .8 At beginning and end points of each run and at each piece of equipment in run.
- .9 At point immediately upstream of major manually operated or automatically controlled valves or damper. Where this is not possible, place identification as close to valve or damper as possible, preferably on upstream side.
- .10 Legend to be easily and accurately readable from usual operating areas and all readily accessible points.
- .11 Plane of legend to be approximately at right angles to most convenient line of sight with consideration of operating positions, lighting conditions, reduced visibility of color or legends caused by dust and dirt and risk of physical damage.
- .12 Stencil over final finish only.
- .13 Beside each access door.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 DEFINITIONS

- .1 Refer to Section 20 05 01 Mechanical General Requirements.
- .2 Legend
 - .1 ASJ: All Service Jacket
 - .2 SSL: Self-Sealing Lap
 - .3 FSK: Foil-Scrim-Kraft; jacketing
 - .4 PSK: Poly-Scrim-Kraft; jacketing
 - .5 PVC: Polyvinyl Chloride

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain ambient conditions required by manufacturers of tapes, adhesives, mastics, cements and insulation materials.
- .2 Follow manufacturer's recommended handling practices.

2 Products

2.1 GENERAL

- .1 Components of insulation system to have maximum flame spread rating of 25 and maximum smoke developed rating of 50 in accordance with CAN/ULC-S102.
- .2 Materials to be tested in accordance with ASTM C411.

2.2 PIPE INSULATION

- .1 P-2 Formed Mineral Fiber with ASJ Vapour Barrier to 454° C
 - .1 Application for piping, valves and fittings on:
 - .1 Domestic water piping
 - .2 Where indicated.

- .2 Material:
 - .1 CAN/CGSB 51.9 Mineral Fiber Thermal Insulation for Piping
 - .2 CGSB 51-GP-52 Vapour Barrier Jacket and Facing Material.
 - .3 Self-seal lap closure including ASJ butt strips.
- .3 Thermal Conductivity "k" shall not exceed 0.034 W/m° C at 24° C mean temperature when tested in accordance with ASTM C335.
- .4 Thickness:
 - .1 Domestic Cold Water
 - .1 13 mm (1/2") on NPS 1/2 pipe.
 - .2 25 mm (1") on NPS 3/4 and over.
 - .2 Domestic Hot Water, Tempered Domestic Hot Water and Domestic Hot Water Recirculation.
 - .1 13 mm (1/2") on NPS 1/2 pipe

.2 Acceptable Material:

	Owens-Corning	Manson Insulation Inc.	Knauf Fiber Glass	Johns Manville Insulations
P-2	Fiberglas SSL-II	Alley K-APT	ASJ-SSL	Micro Lok AP-T

2.3 DUCT INSULATION

- .1 D-2 Mineral Fiber Blanket with ASJ Vapour Barrier 4° to 120° C
 - .1 Application: on concealed cold or dual temperature ducting.
 - .1 All exhaust air ducting
 - .2 Where indicated.
 - .2 Material
 - .1 CAN/CGSB 51.11 Mineral Fiber Blanket.
 - .2 CGSB 51-GP-52 Vapour Barrier Jacket and Facing Material.
 - .3 Thickness:
 - .1 One layer of duct insulation for exhaust air ducting
- .2 D-4 Mineral Fiber Rigid with ASJ Vapour Barrier to 4° to 120° C
 - .1 Application: on exposed cold or dual temperature ducting.
 - .1 Blanked off louvers. Seal between insulation and wall.
 - .2 Blanked off louvers used for exhaust ducts. Seal between insulation and wall.
 - .3 All exhaust air ducting
 - .4 Where indicated.
 - .2 Material:
 - .1 CAN/CGSB 51.11 Rigid Mineral Fiberboard.
 - .2 CGSB 51-GP-52 Vapour Barrier, Jacket and Facing Material.
 - .3 Thickness:
 - .1 One 25 mm (1") layer for duct.
 - .2 One 51 mm (2") layer for louvers

.3 Acceptable Material:

	Owens-Corning	Manson Insulation Inc.	Knauf Fiber Glass	Johns Manville Insulations
D-2	All Service Faced Duct Wrap	Alley Wrap FSK	Duct Wrap - FSK	Microlite Fiber Glass Duct Wrap Insulation.
D-4	Vapor Seal Duct Insulation AF-530	AK Board FSK	Insulation Board FSK	814 Spin Glass

2.4 FASTENINGS

- .1 Tape: self-adhesive, 100 mm (4") wide. ULC labeled for less than 25 flame spread and less than 50 smoke developed.
 - .1 Standard of Acceptance:
 - .1 S. Fattal Insultape.
- .2 Fire resistive lap seal adhesive: quick-setting for joints and lap sealing of vapour barriers.
 - .1 Standard of Acceptance:
 - .1 Monsey Bakor Inc. 230-39.
- .3 Fire resistive lagging adhesive: for cementing canvas lagging cloths to pipe insulation.
 - .1 Standard of Acceptance:
 - .1 Monsey Bakor Inc. 120-09.
- .4 Fire restrictive contact adhesive: quick setting.
 - .1 Standard of Acceptance:
 - .1 Monsey Bakor 230-38.
- .5 Pins:
 - .1 Weld pins 4 mm (5/32") diameter, with 32 mm (1 1/4") diameter head for installation through the insulation. Length to suit thickness of insulation.
 - .2 Standard of Acceptance:
 - .1 Duro Dyne, Clip-Pin
 - .3 Weld pins 4 mm (5/32") diameter, for installation prior to applying insulation. Length to suit thickness of insulation. Nylon retain clips 32 mm (1 1/4") round.
 - .4 Standard of Acceptance:
 - .1 Duro Dyne Spotter Pins with Spotter-Clips.

2.5 JACKETS

- .1 Canvas.
 - .1 Plain weave, cotton fabric at 6.5 oz/yd² (220 g/m²).
 - .2 ULC label every 600 mm (2 ft.)
 - .3 Standard of Acceptance:
 - .1 S. Fattal Thermocanvas

- .2 Application:
 - .1 Exposed insulated piping
 - .2 Exposed insulated ductwork

3 Execution

3.1 APPLICATION

- .1 Apply insulation after required tests have been completed and approved by Consultant.
- .2 Verify that all piping, equipment, and ductwork are tested and approved prior to insulation installation.
- .3 Verify that all surfaces are clean, dry and without foreign material before applying insulation materials.
- .4 Surfaces shall be clean and dry when installed and during application of insulation and finishes.
- .5 Apply insulation materials, accessories and finishes in accordance with manufacturer's recommendations and as specified herein.
- .6 All surface finishes shall be extended in such a manner as to protect all raw edges, ends and surfaces of insulation.
- .7 On piping with insulation and vapour barrier, maintain integrity of vapour barrier over full length of pipe without interruption at sleeves, fittings and supports.
- .8 On ductwork with insulation and vapour barrier, maintain integrity of vapour barrier over full length of duct or surface, without penetration for hangers, standing duct seams and without interruption at sleeves. Do not break continuity of insulation vapour barrier with hangers or rods. Insulate strap hangers 100 mm (4") beyond insulated duct.

3.2 PIPE INSULATION INSTALLATION

- .1 Performed: sectional up to NPS 12, sectional or curved segmented above NPS 12.
- .2 Multi-layered: staggered butt joint construction.
- .3 Vertical pipe over NPS 3: insulation supports welded or bolted to pipe directly above lowest pipe fitting. Thereafter, locate on 15' centers.
- .4 Expansion joints in insulation: terminate single layer and each layer of multiple layers in straight cut at intervals recommended by manufacturer. Leave void of 25 mm (1") between terminations. Pack void tightly with P-3 flexible mineral insulation.

- .5 Seal and finish exposed ends and other terminations with insulating cement.
- .6 Insulation on roof drain body to be held in place with 100% coverage of adhesive. If the Roof Drain Body above the roof deck foam in place the cavity around the body.
- .7 Provide P-5 insulation at pipe shields. Refer to Section 23 05 29 Hangers and Supports.
- .8 Expansion joints in piping: provide for adequate movement of expansion joint without damage to insulator or finishes.
- .9 Insulation is not required for:
 - .1 Chrome plated piping, valves and fittings.
- .10 Insulation on heating pipes to up fed radiation to terminate below floor.
- .11 Fastenings
 - .1 Secure pipe insulation by tape at each end and center of each section, but not greater than 900 mm (36") on centers.

3.3 DUCT INSULATION INSTALLATION

- .1 General:
 - .1 Adhere and seal vapour barrier using vapour seal adhesives.
 - .2 Stagger longitudinal and horizontal joints, on multilayered insulation.
- .2 Board Insulation fastenings:
 - .1 On rectangular ducts, use 50% coverage of insulating cement and weld pins at 1 pin per square foot, but not less than 2 rows per side and bottom.
 - .2 Secured with speed washers.
 - .3 All joints, breaks and punctures sealed with appropriate pressure-sensitive foil tape or glass fabric and vapor barrier mastic.
 - .4 Apply 20 gauge galvanized sheet metal corners to all duct work in mechanical rooms.
 - .5 Seal duct insulation vapor barrier to air handling unit.
 - .6 At exterior wall, Seal duct insulation vapor barrier to building envelope air barrier.
- .3 Flexible Blanket Insulation fastenings:
 - .1 Firmly butt all joints.
 - .2 The longitudinal seam of the vapor barrier must be overlapped a minimum of 50 mm (2").
 - .3 All penetrations and damage to the facing shall be repaired using pressure-sensitive foil tape, or mastic prior to system startup.
 - .4 Pressure-sensitive foil tapes shall be a minimum 75 mm (3") wide and shall be applied with moving pressure using a squeegee or other appropriate sealing tool.

- .5 Secured to the bottom of rectangular ductwork over 600 mm (24") wide using mechanical fasteners on 450 mm (36") centers. Care should be exercised to avoid over-compression of the insulation during installation.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 GENERAL

- .1 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do all other work as specified in this section.
- .2 Standard: TAB to be to most stringent of this section or TAB standards of AABC NEBB, SMACNA and ASHRAE.
- .3 TAB of all systems, equipment, components and controls specified Mechanical Contractor.

1.4 PURPOSE OF TAB

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads
- .2 Adjust and regulate equipment and systems so as to meet specified performance requirements and to achieve specified interaction with all other related systems under all normal and emergency loads and operating conditions.
- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.

1.5 EXCEPTIONS

- .1 TAB of systems and equipment regulated by codes, standards to be to satisfaction of authority having jurisdiction.

1.6 CO-ORDINATION

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule so as to ensure completion before acceptance of project.
- .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.

1.7 PRE-TAB REVIEW

- .1 Review contract documents before project construction is started and confirm in writing to Consultant adequacy of provisions for TAB and all other aspects of design and installation pertinent to success of TAB.
- .2 Review specified standards and report to Consultant in writing all proposed procedures which vary from standard.
- .3 During construction, coordinate location and installation of all TAB devices, equipment, accessories, measurement ports and fittings.

1.8 START-UP

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in Mechanical Contractor.

1.9 OPERATION OF SYSTEMS DURING TAB

- .1 Operate systems for length of time required for TAB and as required by Consultant for verification of TAB reports.

1.10 START OF TAB

- .1 Notify Consultant 7 days prior to start of TAB.
- .2 Start TAB only when building is essentially completed, including:
 - .1 Installation of ceilings, doors, windows, other construction affecting TAB.
 - .2 Application of weather-stripping, sealing, caulking.
 - .3 All pressure, leakage, other tests specified elsewhere Mechanical Contractor.
 - .4 All provisions for TAB installed and operational.
 - .5 Start-up, verification for proper, normal and safe operation of all mechanical and associated electrical and control systems affecting TAB including but not limited to:
 - .1 Proper thermal overload protection in place for electrical equipment.
 - .2 Air systems:
 - .1 Filters in place, clean.
 - .2 Duct systems clean.
 - .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
 - .4 Correct fan rotation.
 - .5 Access doors, installed, closed.
 - .6 All outlets installed; volume control dampers open.

1.11 APPLICATION TOLERANCES

- .1 Do TAB to following tolerances of design values:
 - .1 HVAC systems plus 10%, minus 5%.

1.12 ACCURACY TOLERANCES

- .1 Measured values to be accurate to within plus or minus 2% of actual values.

1.13 INSTRUMENTS

- .1 Prior to TAB, submit to Consultant list of instruments to be used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within 3 months of TAB. Provide certificate of calibration to Consultant.

1.14 TAB REPORT

- .1 Format to be in accordance with reference standard.
- .2 TAB report to show all results in units specified on drawings and to include:
 - .1 System schematics.
- .3 Submit 3 copies of TAB Report to Consultant for verification and approval, in D-ring binders, complete with index tabs.

1.15 VERIFICATION

- .1 All reported results subject to verification by Consultant.
- .2 Provide manpower and instrumentation to verify up to 30% of all reported results.
- .3 Number and location of verified results to be at discretion of Consultant.
- .4 Bear costs to repeat TAB as required to satisfaction of Consultant.

1.16 SETTINGS

- .1 After TAB is completed to satisfaction of Consultant, replace drive guards, close all access doors, lock all devices in set positions, ensure sensors are at required settings.
- .2 Permanently mark all settings to allow restoration at any time during life of facility. Markings not to be eradicated or covered in any way.

1.17 COMPLETION OF TAB

- .1 TAB to be considered complete only when final TAB Report received and approved by Consultant.

1.18 AIR SYSTEMS

- .1 TAB all systems, equipment, components, controls specified Mechanical Contractor.
- .2 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls:
 - .1 Air velocity.
 - .2 Static pressure.
 - .3 Velocity pressure.
 - .4 Air flow rate.
 - .5 Cross sectional area
 - .6 RPM: Fan and Motor
 - .7 Electrical power:
 - .1 Voltage
 - .2 Current draw
- .3 Locations of equipment measurements: To include, but not be limited to, following as appropriate:
 - .1 Inlet and Outlet of each:
 - .1 Fan
 - .2 Coil
 - .3 Filter
 - .4 Damper
 - .5 Other auxiliary equipment
- .4 Locations of systems measurements to include, but not be limited to, following as appropriate:
 - .1 Main ducts
 - .2 Main branch ducts
 - .3 Sub-branch ducts
 - .4 Each supply, exhaust and return air inlet and outlet
 - .5 Other auxiliary equipment
 - .6 All areas served by system

2 Products (N/A)

3 Execution

3.1 TAB AGENCIES:

- .1 Acceptable Agencies
 - .1 Atlantic Indoor Air Audit Co.

- .2 Barrington Air Balance Service
- .3 Griffin Air Balance Limited
- .4 Scotia Air Balance 1996 Limited
- .5 System Balance Limited

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

2 Products

2.1 SEAL CLASSIFICATION

- .1 Ductwork classification as follows:

Maximum Pressure	SMACNA Seal Class
500 Pa	C

- .2 Class C: transverse joints and connections made air tight with gaskets, sealant and tape or combination thereof. Longitudinal seams unsealed.

2.2 GALVANIZED STEEL

- .1 Lock forming quality: to ASTM A653, Z90 zinc coating.
- .2 Thickness, fabrication and reinforcement: to ASHRAE and SMACNA or as indicated.
- .3 Minimum 26 gauge
- .4 Satin coat for all exposed ductwork outside mechanical rooms and where noted.
- .5 Use oil free material and take all necessary measures to prevent contamination
- .6 Joints: to ASHRAE and SMACNA and/or proprietary manufactured duct joint.
 - .1 Acceptable Material: for proprietary joints:
 - .1 Ductmate Canada Ltd.
 - .2 Exanno Nexus

2.3 RECTANGULAR DUCTWORK

- .1 Cross break ducts 450 mm (18") and larger for stiffening.
- .2 Same gauge on all sides and based on the greater cross sectional dimension.
- .3 Reinforce flat slip joints of ducts over 450 mm (18").

2.4 ROUND DUCTWORK

- .1 Factory fabricated conduit consisting helically wound galvanized steel straps with spiral lock seams.
- .2 For concealed branch ductwork up to 350 mm (14") diameter, longitudinal seams.
- .3 Rectangular ductwork may be convert to equivalent size round provided that the project space limitations are properly addressed.
- .4 Use conical "T"s for 90⁰ Branch takeoff
- .5 Use long radius elbows where space permits.
- .6 Galvanized steel of the following minimum gauges:

Duct Diameter	Straight Lengths of Spiral Duct Gauge	Round Duct fittings	Plain Duct Gauge
8" and smaller	26	24	24
9"-14"	26	24	24
15"-26"	24	20	N/A
27"-36"	22	20	N/A
37"-50"	20	20	N/A

2.5 FITTINGS

- .1 Fabrication: to SMACNA.
- .2 Radiused elbows:
 - .1 Rectangular: Standard radius (Centerline radius 1.5 times width of duct) or short radius with single thickness turning vanes.
 - .2 Round: Smooth radius or 5 pieces. Centerline radius is 1.5 times diameter.
- .3 Mitered elbows, rectangular:
 - .1 To and including 400 mm: Single thickness turning vanes.
 - .2 Over 400 mm: Double thickness turning vanes.
- .4 Branch Ducts
 - .1 Rectangular: Refer to Details on drawings.
 - .2 Round: Conical T as per SMACNA
- .5 Main supply duct branches without splitter damper. Provide branch and main duct balancing dampers.
- .6 Sub branch duct with 45° entry and balancing damper on branch.

- .7 Transitions:
 - .1 Diverging: 20° maximum included angle.
 - .2 Converging: 30° maximum included angle.
- .8 Offsets: square elbows and/or full radiused elbows as indicated.
- .9 Obstruction deflectors: maintain full cross-sectional area. Maximum included angles as for transitions.

2.6 FIRESTOPPING

- .1 Retaining angles all around duct, on both sides of fire separation.
- .2 Firestopping material and installation must not distort duct.

2.7 SEALANT

- .1 Sealant: non-flammable, water base duct sealant.
- .2 Temperature range of -30° C to +93° C.
- .3 Flame spread rating of not more than 25.
- .4 Smoke developed classification of not more than 50.
- .5 Standard of Acceptance:
 - .1 Duro Dyne DSW

2.8 TAPE

- .1 Poly-vinyl treated, open weave fiberglass tape.
- .2 50 mm (2") wide.
- .3 Standard of Acceptance:
 - .1 Duro Dyne FT-2.

2.9 HANGERS AND SUPPORTS

- .1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct.
- .2 Maximum size rectangular and round duct supported by strap hanger: 500 mm (20").
- .3 Rectangular Hangers: angle iron with steel rods to ASHRAE and SMACNA following table:

Duct Size	Angle Size	Rod Size	Spacing
up to 30"	1" x 1" x 1/8"	1/4"	8'

- .4 Round Hangers: strap/band with steel rods to ASHRAE and SMACNA following table:
- | Duct Size | Strap Size | Rod Size | Spacing |
|---------------|--------------|----------|---------|
| up to 610 mm | 25 x 0.85 mm | 6 mm | 2400 mm |
| 611 to 900 mm | 25 x 1 mm | 10 mm | 2400 mm |
- .5 Upper attachment:
- .1 As per Section 23 05 29 Hangers and Supports
- .6 Middle attachment (Rod):
- .1 As per Section 23 05 29 Hangers and Supports

3 Execution

3.1 GENERAL

- .1 Install ducts in accordance with ASHRAE and SMACNA.
- .2 Support risers in accordance with ASHRAE and SMACNA.
- .3 Install breakaway joints in ductwork on each side of fire separation.
- .4 Seal between ducts and walls of mechanical room.

3.2 HANGERS

- .1 Strap hangers: install in accordance with SMACNA.
- .1 Minimum 25 mm (1") wide extending down 2 sides and 50 mm (2") under duct.
- .2 Fasten to sides and bottom of duct.
- .2 Angle hangers: complete with locking nuts and washers.
- .1 Rod attached to angle within 50 mm (2") of the duct sides.

3.3 SEALING & TAPING

- .1 Apply sealant to outside of joint to manufacturer's recommendations.
- .2 Bed Tape in sealant and recoat with minimum of 1 coat of seal and to manufacturer's recommendation.

3.4 PROTECTION AND CLEANING

- .1 Seal and protect open ends of ductwork continuously during construction.
- .2 Wash down inside of intake duct and plenum from louver to unit prior to starting units.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

2 Products

2.1 FLEXIBLE CONNECTIONS

- .1 Frame: galvanized sheet metal frame 1.6 mm (16 Ga.) thick with fabric clenched by means of double locked seams.
- .2 Material: Fire resistant, self-extinguishing, neoprene coated glass fabric, temperature rated at -40° to +90° C, density of 1.3 kg/m².

2.2 BALANCING DAMPERS

- .1 Standoffs for insulated ducts.
- .2 Splitter Dampers
 - .1 Single thickness construction of same material as duct but one sheet metal thickness heavier.
 - .2 Control rod with locking device.
 - .3 Bend end of rod to prevent end from entering duct.
 - .4 Pivot: piano hinge.
- .3 Single Blade Dampers
 - .1 Of same material as duct, but one sheet metal thickness heavier. V-groove stiffened.
 - .2 Size and configuration to SMACNA, except maximum height 250 mm (10").
 - .3 Locking quadrant.
 - .4 Inside and outside end bearings.
- .4 Multi-Bladed Dampers
 - .1 Factory manufactured of material compatible with duct.
 - .2 Opposed blade: configuration to SMACNA.
 - .3 Maximum blade height: 100 mm (4").
 - .4 Bearings: pin in bronze bushings.
 - .5 Linkage: shaft extension with locking quadrant.
 - .6 Channel frame of same material as adjacent duct, complete with angle stop.

2.3 NON-METALLIC ACOUSTIC INSULATED FLEXIBLE DUCTWORK

- .1 Pressure drop coefficients listed below are based on relative sheet metal duct pressure drop coefficient of 1.00.
- .2 Flame spread rating not to exceed 25. Smoke developed rating not to exceed 50.
- .3 Factory Fabricated, non-collapsible, coated mineral base perforated fabric type helically supported by steel wire with factory applied flexible glass fiber acoustic insulation with vapour barrier.
- .4 Performance: Working pressure: -125 Pa to 1500 Pa (-1/2" to + 6" WG.), R = 4.2
- .5 Acceptable material:
 - .1 Thermaflex M-KE.
 - .2 Dundas Jafine SPC

3 Execution

3.1 INSTALLATION

- .1 Install in accordance with recommendations of SMACNA
- .2 Flexible connections.
 - .1 Length of connection: 150 mm (6").
 - .2 Minimum distance between metal parts when system in operation: 75 mm (3").

3.2 FLEXIBLE DUCT INSTALLATION

- .1 Install in accordance with SMACNA.
- .2 Maximum 15° change in direction in flexible ductwork. For changes in direction of more than 15°, use rigid ductwork for the change.
- .3 Fasten flexible duct to rigid duct with sheet metal screws adjacent to the flexible duct wire and tape flexible duct ends.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

2 Products

2.1 FANS GENERAL

- .1 Capacity: airflow, static pressure, rpm, bhp, motor, model, size, sound power data and as indicated on schedule.
- .2 Fans: statically and dynamically balanced, constructed in conformity with AMCA 99.
- .3 Sound ratings: comply with AMCA (Air Moving and Conditioning Association) 301, tested to AMCA 300.
- .4 Performance ratings: based on tests performed in accordance with ANSI/AMCA 210, and ANSI/ASHRAE 51.
- .5 Motors: In accordance with Section 20 05 01 Common Work Results for Mechanical General.
- .6 Factory primed before assembly in colour standard to manufacturer.
- .7 Bearing lubrication systems plus extension lubrication tubes where bearings are not easily accessible.

2.2 CENTRIFUGAL FANS

- .1 Fan wheels:
 - .1 Welded steel construction.
 - .2 Maximum operating speed of centrifugal fans not more than 50% of first critical speed.
 - .3 Air foil, forward curved, backward inclined blades, as indicated.
- .2 Bearings: split pillow-block grease lubricated ball or roller self-aligning type with oil retaining, dust excluding seals and a certified minimum rated life of 200,000 h in accordance with (Anti-Friction Bearing Manufacturers Association) AFBMA L-10 life standard. Bearings to be rated and selected in accordance with AFBMA 9 and AFBMA 11.

- .3 Housings:
 - .1 Volute with inlet cones: fabricated steel for wheels 300 mm or greater, steel for smaller wheels, braced, and with welded supports.

2.3 FAN SELECTIONS

- .1 Based on Manufacturer named as Standard of Acceptance. The approval of equipment of other manufacturers named in the acceptable materials list shall be subject to meeting the performance and sound power levels. The fan manufacturer shall also be responsible for all electrical changes caused by the change in motor size.

3 Execution

3.1 FAN INSTALLATION

- .1 Install fans as indicated, complete with resilient mountings
- .2 Access doors and access panels to be easily accessible.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

2 Products

2.1 FANS GENERAL

- .1 In accordance with Section 24 34 00 HVAC Fans.
- .2 Motors:
 - .1 In accordance with Section 21 05 01 Common Work Results for Mechanical - General and as per this section.
 - .2 In accordance with Section 24 34 00 HVAC Fans and as per this section.
- .3 Capacity: airflow/static pressure rpm, motor, model and size and sound ratings as per schedule on drawings.
- .4 Statically and dynamically balanced.
- .5 Bear AMCA Certified Air Performance Rating Seal.
- .6 Bearings: sealed lifetime bearings or of self-aligning type with oil retaining, duct excluding seals and a certified minimum rated life of 80,000 h in accordance with AFBMA L10 life standard. Bearings to be rated and selected in accordance with AFBMA9 and AFBMA 11.

2.2 CENTRIFUGAL CABINET FAN

- .1 Centrifugal direct drive.
- .2 Back draft damper.
- .3 Galvanized steel housing.
- .4 Disconnect within fan housing.
- .5 Inlet grille or inlet collar as indicated.

- .6 Acoustically lined housing.
- .7 Standard of Acceptance:
 - .1 Loren Cook Co. as per schedule on drawings.
- .8 Acceptable Manufacturer:
 - .1 Acme
 - .2 PennBarry
 - .3 Greenheck.
 - .4 Jenco Fan Inc.

3 Execution

3.1 INSTALLATION

- .1 Coordinate wall openings with other trades.

END OF SECTION

1 General

1.1 GENERAL

The General Conditions of the contract as well as provisions of Division 1 and Section 20 05 01 Mechanical General Requirements, Section 20 05 02 Mechanical Submittals and Section 20 05 03 Mechanical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE STANDARDS

- .1 In accordance with Section 20 05 01 Mechanical General Requirements.

1.3 MANUFACTURED ITEMS

- .1 Product of one manufacturer for generic type, i.e. grilles and registers by one, diffusers by one, or same.

2 Products

2.1 GENERAL

- .1 Capacity: As per schedule on drawing.
- .2 Provide standard product to meet capacity, throw, noise level, throat and outlet velocity.
- .3 Frames:
 - .1 Steel: standard with exposed welded joints and mitered corners.
 - .2 Aluminum: extruded with mechanical fasteners and mitered corners.
- .4 Finish: Off white baked enamel.
- .5 Diffusers
 - .1 Square type.
 - .2 Fixed pattern.
 - .3 Adjustable pattern where noted.
 - .4 Plaster frame where installed in drywall ceilings.
- .6 Standard of Acceptance:
 - .1 E. H. Price as per schedule.
- .7 Acceptable Manufacturer:
 - .1 Krueger
 - .2 Titus
 - .3 Nailor Industries

2.2 FIRE STOP FLAPS & BLANKET

- .1 ULC listed and labeled.

- .2 Construct of minimum 1.6 mm (16 Ga.) thick sheet steel with 1.6 mm (1/16") thick non-asbestos ULC listed insulation and corrosion-resistant pins and hinges.
- .3 Flaps to be held open with fusible link conforming to ULC-S505-1974 and close at 75° C or as indicated.
- .4 Thermal Blanket:
 - .1 Non-asbestos ceramic thermal blanket.
 - .2 Follow slope of diffusers.
- .5 Acceptable Material:
 - .1 E. H. Price CK-2000-1 3.2 mm (1/8")
 - .2 Nailor Industries 0725
 - .3 Ruskin K-H
 - .4 AMI CTB and AMI-55CRD

3 Execution

3.1 INSTALLATION

- .1 Install with flat head cadmium plated screws in countersunk holes where fastenings are visible.

3.2 FIRE STOP FLAPS & BLANKET

- .1 Provide Fire Stop Flaps & Blanket for all ceiling grilles, registers and diffusers.

END OF SECTION

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26 29 10	Motor Starters to 600 V	4
26 52 00	Emergency Lighting	3
26 91 13	Electrical Systems Testing	9

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 INTENT

- .1 It is the intent of these specifications to outline the method, materials, and quality of equipment to be furnished and installed hereinafter specified and/or shown on the drawings.

1.3 DEFINITIONS

- .1 "CONCEALED" - electrical services and equipment in hung ceiling spaces and non-accessible chases and furred spaces.
- .2 "EXPOSED" - will mean "not concealed" as defined herein.
- .3 "PROVIDE"- means supply and install. Wherever in the Contract Documents the word "provide" is used in any form, it shall mean that the Work concerned shall include both supply and installation of the products required for completion of that part of the Work.

2 CODES AND STANDARDS

- .1 Do complete installation in accordance with CSA C22.1-18 except where specified otherwise.
- .2 Ensure that all electrical equipment is field marked to warn persons of the potential electric shock and arc flash hazards, as per CSA C22.1-18, Rule 2-306.
- .3 CSA Z462-15 Workplace Electrical Safety Standard.
- .4 Comply with CSA Certification Standards and Electrical Bulletins in force at time of tender submission.
- .5 Abbreviations for electrical terms: to CSA Z85-1983.

3 CARE, OPERATION AND START-UP

- .1 Instruct operating personnel in the operation, care, and maintenance of equipment.
- .2 Arrange and pay for the services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance, and calibrate components.

- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation and ensure that operating personnel are conversant with aspects of its care and operation.

4 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235-83.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard
Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

5 PERMITS, FEES, CONTRIBUTION TO CONSTRUCTION FEES AND UTILITY INSPECTION SERVICES

- .1 Electrical Permits
 - .1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
 - .2 Pay associated fees.
 - .3 Provide the Engineer with a copy of the permit (s).
 - .4 Furnish Certificates of Acceptance from Inspection Department and authorities having jurisdiction on completion of work.

6 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance Division 1.
- .2 Equipment and material to be CSA certified, and manufactured to standard quoted.
- .3 Factory assembled control panels and component assemblies.
- .4 Arrange and pay for field certification by CSA, as may be required.

7 ELECTRIC MOTORS EQUIPMENT AND CONTROLS

- .1 Supplier and installer responsibility is indicated on the drawings.
- .2 Control wiring and conduit is the responsibility of the electrical contractor, except for conduit, wiring and connections which are related to control systems specified in the mechanical contract documents and shown on mechanical drawings.

8 FINISHES

- .1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning, application of rust resistant primer inside and outside, and at least two coats of finish enamel.

- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean, prime, and paint exposed hangers, racks, fastenings to prevent rusting.

9 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.
- .2 Panel boards are to be equipped in the factory with proper sized lugs to suit the conductor size.
- .3 All stranded conductors (including phase, neutrals, grounds and bonds) prior to terminating under device bolts, i.e. light switches, receptacles etc., are to be twisted together so as to form a single conductor.
- .4 Ensure all bonding conductors entering electrical enclosures, such as panel tubs, splitters, junction and pull boxes 150 mm x 150 mm (6 in. x 6 in.) and larger, etc. are terminated on terminal strips which are electrically continuous and fastened to the metal non-current carrying portion of the enclosure with a minimum of two bolts, c/w lock washers.

10 MANUFACTURER'S AND CSA LABELS

- .1 Visible and legible after equipment is installed.

11 WARNING SIGNS

- .1 Provide warning signs, as specified and/or to meet requirements of Inspection Department.

12 OUTLETS

- .1 Locate outlets in accordance with Division 1.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm (6 in.) horizontal clearance between boxes.
- .3 All outlets shall have brushed stainless steel coverplates regardless of the system involved, including light switches, receptacles, communication outlets, etc.
- .4 Change location of outlets at no extra cost or credit, providing distance does not exceed 3 metres (10 feet), and information is given before installation.
- .5 Locate light switches on latch side of doors. Locate disconnect devices in mechanical rooms on latch side of door.

13 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 Verify mounting height of equipment before proceeding with installation.
- .3 Confirm with Architectural elevations prior to mounting exterior electrical devices, lights, public address, etc.
- .4 Install electrical equipment at the following heights unless indicated otherwise. Refer to device mounting height details on drawings.
 - .1 Local switches: As indicated.
 - .2 Wall receptacles:
 - .1 General: As Indicated.
 - .2 Above top of continuous baseboard heater: 178 mm (7 in.).
 - .3 Above top of counters or splash back: 178 mm (7 in.).
 - .3 Emergency Lights – 2286 mm AFF (90 in.).
 - .4 Emergency Remote Heads – 2286 mm AFF (90 in.) .

14 PROTECTION

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark live parts "LIVE 120 VOLTS", or with appropriate voltage.
- .3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

15 LOAD BALANCE

- .1 Measure phase current to panelboards with normal loads and lighting operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Test and record phase and neutral currents on panelboards, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

16 CONDUIT AND CABLE INSTALLATION

- .1 Install cables, conduits, and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.
- .2 Any conduit which is to be installed under the ground floor slab and penetrates the ground floor slab must be sealed. Use appropriate bedding material for conduits.

- .3 Where conduits cross building expansion joints, provide conduit expansion joints with telescoping sleeve and insulated bushings.
- .4 Install conduit and cables vertically from a device box to the ceiling space. Do not install in a horizontal manner through walls and partitions.
- .5 Integrity of Exits
 - .1 Do not install electrical services, conduits, wire, etc. in an exit stair that do not serve the exit, as per NBCC 3.4.4.4.
 - .2 All conduits to devices in exits shall not continue on to feed other devices outside of the exit.

17 SLEEVES AND FIRESTOPPING

- .1 Where conduits and cables pass through assemblies, provide firestopping. Refer to Architectural Drawings for location of assemblies.
- .2 Terminate sleeves flush with floor except in mechanical rooms, where sleeves will terminate 50 mm (2 in.) above finished floor.

18 FIELD QUALITY CONTROL

- .1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.
- .2 Conduct and pay for tests of the following:
 - .1 Power distribution system including phasing, voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
 - .4 Motors, heaters, and associated control equipment including sequenced operation of system where applicable.
 - .5 Polarity check on all receptacles.
 - .6 Fire Alarm System.
 - .7 Structured wiring system.
 - .8 Emergency lighting system.
- .3 Furnish Manufacturer's, certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .4 Provide instruments, meters, equipment, and personnel required to conduct tests during and at conclusion of project.
- .5 Submit test results for Engineer's review.

19 DISTRIBUTION SYSTEM EQUIPMENT STARTUP CHECKS

- .1 Panelboards.
 - .1 Review the installation of all panel boards. Include the cost of measuring phase currents and voltages. Clean all panel board tubs. Re-torque all connections within panel boards. Provide written report.

20 MOTOR OVERLOAD OVERCURRENT PROTECTION

- .1 Set and record all motor overload devices in accordance with nameplate information, manufacturer's recommendations and the 2018 edition of the CEC. Ensure proper overcurrent devices are installed. Include these records in the Project Maintenance Manual.

21 SUPPLY CONDUCTOR INSULATION

- .1 Ensure that the insulation rating on branch circuits feeding all electrical loads comply with the 2018 edition of the CEC, and the manufacturer's recommendations.

22 DRAWINGS

- .1 Electrical drawings are not intended to show structural details or architectural features.
- .2 The electrical drawings are not to be scaled.
- .3 Electrical drawings, except where dimensioned, indicate general layouts only. Investigate structural and finish conditions and the work of all other trades affecting this work and arrange work accordingly.
- .4 Coordinate the elevation of all outlet boxes with architectural drawings and report any conflicts to Engineer prior to installation.
- .5 All electrical junction boxes must be accessible at the completion of the project. Coordinate the location of each junction box with the proposed location of mechanical services prior to installation.
- .6 Layouts on the electrical drawings are based on the specified equipment (Standard of Acceptance), including electrical power connections, number of conductors and conduit sizes, and physical dimensions. Alternate equipment and systems proposed by the Contractor for use on this project (Acceptable Manufacturers) which necessitate changes in service connections, numbers of conductors and conduit sizes to perform the specified functions may be considered by the Engineer, however, any required modifications or additions to the electrical contract or the work of other trade contractors shall be done at no additional cost to the Owner. Furthermore, if it is found that the provisions made regarding space conditions and code required clearances are not met, the right is reserved by the Consultant to require installation of the equipment specified (Standard of Acceptance).

23 CONTRACT DOCUMENTS

- .1 Before submitting tender for his work, each Contractor shall examine the contract documents (mechanical drawings, structural drawings, and architectural drawings and specifications) to ascertain that the work can be carried out as shown on these drawings and herein specified. No extra will subsequently be allowed to cover any omission and/or oversight for not having made a thorough inspection of the contract documents.

24 ACCESS DOORS

- .1 The electrical contractor is to provide access doors to concealed electrical junction boxes, pull boxes and miscellaneous equipment for operating, inspecting, adjusting and servicing. Access doors are to be supplied which meet or exceed the fire resistance rating of the partition or ceiling in which they are being installed.
- .2 Do not use access doors provided by other trade contractors for accessing concealed electrical services.
- .3 Flush mounted 600 mm x 600 mm (24 in. x 24 in.) for body entry and 300 mm x 300 mm (12 in. x 12 in.) for hand entry unless otherwise noted. Doors to open 180 degrees, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .4 Material:
 - .1 Special areas such as tiled or marble surfaces: use stainless steel with brushed satin or polished finish as directed by Consultant.
 - .2 Remaining areas: use prime coated steel.
 - .3 Fire rated where installed in fire rated construction.
 - .4 Provide panels in glazed tile walls of 2.5mm (12 gauge) 304 stainless steel #4 finish, with recessed frames secured with counter-sunk flush-head screws.
 - .5 Provide panels in plaster surfaces with recessed doors with welded metal lath ready to accept plaster and with a plaster grommet for door key access.
 - .6 Provide other access doors of 2.5mm (12 gauge), flush with concealed hinges, anchor strap and lock, all factory prime coated.
 - .7 Supply details of doors prior to installation.
 - .8 Mark all lay-in tiles that are used for access in a manner approved by the Consultant.
- .5 Installation:
 - .1 Locate so that concealed items are accessible.
 - .2 Locate so that hand or body entry (as applicable) is achieved.
 - .3 Installation is specified in applicable sections.

- .6 Acceptable Manufactures/material:

	Unrated Walls	Fire Rated Walls	Fire Rated Ceilings
Acudor	EB-2002 or UF-5000	FB-5050	FW-5050

Cendrex	AHD	PFI	
Mifab	UA	MPFR	MPFR

25 CONNECTION OF EQUIPMENT

- .1 Provide all connections required by the equipment supplied by this Division.
- .2 Provide all connections required by equipment supplied by the Owner or by other Divisions. Examine all Drawings and Specifications and identify all requirements.
- .3 Provide all necessary accessories to make connections, including flexible connectors, etc.

26 SPRINKLER PROOF HOODS

- .1 All distribution equipment within ventilated enclosures (panelboards, etc.) located in the building shall be protected from the direct spray from sprinkler heads to the satisfaction of the Inspection Authority by the use of non-combustible hoods.
- .2 Distribution conduits exiting or entering equipment enclosures equipped with sprinkler hoods shall be installed with raintight EMT connectors equipped with a rubber "O" Ring gasket.

27 CO-ORDINATION

- .1 Co-ordinate the Work of this Division with all other Divisions for locations of openings, spaces, services, sleeves, ducts, pipes, supports, connections, etc. Where conflicts occur, reroute conduits, cable troughs, outlets, lighting, equipment, etc. as required. Advise Engineer of proposed changes, and obtain written authorization, prior to proceeding.
- .2 Contractor is to review Architectural millwork drawings and advise the Engineer of any conflicts with lighting and/or electrical outlets. This review is to take place prior to electrical rough-in in all affected areas.
- .3 Coordinate with Mechanical Contractor to ensure that all mechanical equipment is correctly supplied with electrical connections in accordance with plans and specifications.

28 INSTALLATION REQUIREMENTS

- .1 Install all products and services to follow building planes. Installation shall permit free use of space and maximum headroom to the satisfaction of the Consultant.
- .2 Confirm the exact location of fixtures, outlets and connections. Confirm location of connection points for equipment supplied under other Divisions.
- .3 Install all equipment and appurtenances to allow free access for adjustment, maintenance and/or replacement.

- .4 Provide all hangers, supports and fasteners such that no undue stresses are imposed on the structure and systems. Ensure that the load onto structures does not exceed the maximum loading per square metre as shown on structural drawings. Equipment supports not supplied by equipment manufacturer are to be fabricated using structural grade steel.
- .5 Exterior supports are to be galvanized, unless noted otherwise.
- .6 Install all products and services in accordance with the respective manufacturer's recommendations.
- .7 High velocity explosive activated tools shall not be used. Only low velocity system types are permitted.
- .8 Provide caps and seal all open ends of installed conduits to prevent the entrance of foreign substances.
- .9 Install all services capped for future possible use such that easy access is provided for future connections.

29 FIELD REVIEW

- .1 The Consultant and Owner shall have access to the site at all times for review of the work.
- .2 Correct any deficiencies as they are reported during the performance of the Work.

30 UNIFORMITY

- .1 All equipment and materials which serve a similar function shall be from one manufacturer and one product line (i.e.: panelboards, starters, major systems, etc.).

31 CUTTING AND PATCHING

- .1 It is the responsibility of the Electrical Contractor to provide all required cutting and patching associated with the installation of electrical systems, devices, conduit, wire, etc., unless noted otherwise. Refer to Division 1 for more information.
- .2 Restore all surfaces to a finish acceptable to the Owner.

32 MATERIAL

- .1 Standard of Acceptance:
 - .1 Means that item named and specified by manufacturer and/or catalogue number forms part of specification and sets standard regarding performance, quality of material and workmanship and when used in conjunction with a referenced standard, shall be deemed to supplement the standard.
- .2 Acceptable Manufacturer:
 - .1 Means that item, manufactured by named and specified manufacturer, shall be deemed acceptable provided it meets the specification and referenced standard regarding performance and quality of material and workmanship, as outlined under

Standard of Acceptance (above).

- .3 Refer to Instructions to Bidders for requirements of additional Acceptable Manufacturers or Acceptable Material.

33 TORQUES FOR WIRE TERMINATIONS

- .1 For proper termination of conductors, it is very important that field connections be made properly tight.
- .2 Where possible, obtain and comply with Manufacturer's instructions on the equipment.
- .3 In the absence of Manufacturer's instructions, make terminations in conformance with the values given in Tables D6 and D7 of the 2018 CEC.

34 CABLE TIES AND TYE WRAPS

- .1 Cable ties and tye wraps are only permitted to be used to provide limited support for bundling purposes only. These devices are not intended to provide the primary support for conduits or cables.
- .2 Cable Ties are not to be used for the support of cable or conductor runs between boxes and fittings.

35 WORKING SPACE ABOUT ELECTRICAL EQUIPMENT

- .1 Arrange installation as required to maintain minimum working space around electrical equipment in conformance with CSA C22.1-18.

36 LOW V. O. C. MATERIALS

- .1 All site applied coatings; adhesives & sealants must be low VOC content.
- .2 Provide Material Safety Data Sheets for all products & materials of these types incorporated into the work.

2 EXISTING SERVICES

- .1 The Electrical Contractor shall ensure that all light, power, heat, fire alarm, telephone public address system and other electrical systems and services remain operational during the course of the work in the existing building, and if necessary, this Contractor shall be responsible for providing such temporary services by cutting off, altering, adapting, relocating and connecting existing services and disconnecting and removing such temporary or existing services upon providing new permanent services as detailed on all drawings. The site shall be examined to determine the extent of the temporary services and all co-ordination shall be made with the Owner's Representative. All costs shall be included in the Tender Price.
- .2 Existing redundant equipment, wiring etc. not being re-used under new schemes, shall be removed whether shown on drawings or not. This contractor shall repair all openings

resulting from the removal of existing electrical equipment and services. All unused outlet boxes (where it is not practical to remove same) shall be blanked with stainless steel cover plates. All costs shall be included in the Tender.

3 PROJECT PHASING AND HOURS OF WORK

- .1 Work within occupied areas and work causing a disruption to school operations will be performed outside regular business hours as determined by the Owner.

*****END OF SECTION*****

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 ELECTRICAL PERMITS AND RCDD CERTIFICATES

- .1 Prior to submitting the first progress claim, provide the following permits and certificates: .1
As per Section 26 05 00 provide copies of the following electrical permit:
.1 Electrical Wiring Permit.

1.3 HOURLY LABOUR RATE

- .1 Submit the proposed hourly labour rate for review in a timely manner after contract award.
.2 Refer to General Conditions of Contract.
.3 The hourly labour rate will be based on the following components:

Base Rate	\$
Holiday and Vacation Pay	\$
Sub-Total	\$
EI	\$
WCB	\$
Group Insurance	\$
CPP	\$
Group Pension	\$
Other Payroll Burdens	\$
IIF & Con Fund	\$
Training and Education	\$
ISO Program	\$
Safety Program	\$
Sub-Total	\$
Total Payroll Hourly Cost	\$
Small Tools	\$
Site Supervision	\$
Total Hourly Labour Cost	\$

1.4 EQUIPMENT IDENTIFICATION

- .1 As per 26 05 03 submit proposed nomenclature for all lamicoïd plates for engineer's approval.

1.5 SHOP DRAWINGS

- .1 In accordance with Division 1.
- .2 All Shop Drawings to be Metric.
- .3 Assembled in groups and bound in sets.
- .4 On cover/front page indicate total number of pages in submission.
- .5 Consecutively number each page.
- .6 Where specified in Division 1, submit electronic copies of shop drawings. In addition to the electronic shop drawing, submit one hard copy to the office of the electrical consultant.
- .7 Provide shop drawings for the following:
 - .1 Through-Penetration Firestopping for Electrical Systems.
 - .2 Wiring Devices.
 - .3 Motor Starters to 600 V.
 - .4 Molded Case Circuit Breakers.
 - .5 Disconnect Switches Fused and Non-Fused.
 - .6 Unit Equipment for Emergency Lighting.
 - .7 Structured Cabling for Communications Systems.
 - .8 Fire Alarm System.

1.6 PROGRESS CLAIMS

- .1 Material on Site.
 - .1 Refer to General Conditions of Contract.
 - .2 All claims for material on site must be supported by supplier's invoices showing supplier's unit prices including taxes.
 - .3 Material on site shall not be claimed under the "work complete" portion of the claim.
 - .4 Material eligible to be claimed as "material on site" must be large, project specific equipment.
 - .5 General material, which is not considered project specific such as conduit, connectors, fittings, wire, small tools, etc., are not eligible to be claimed as "material on site."
 - .6 Project specific equipment may be claimed as "material on site" subject to the following:
 - .1 Claim to show previous material on site and deduct the amount of previously claimed material that was incorporated into the work during the current month.
 - .2 Claim to show material brought on site this month supported by a copy of the supplier's invoices showing supplier's unit prices including taxes.
 - .7 Invoices submitted for a "material on site" claim will not be considered by the engineer unless they are examined and initialed by both the Electrical Contractor and the General Contractor.

1.7 OPERATING AND MAINTENANCE MANUAL

- .1 Operation and maintenance manual to be approved by, and final copies deposited with Consultant before final inspection.
- .2 Operation data to include:
 - .1 Schematics for each system.
 - .2 Description of each system and its controls.
 - .3 Description of operation of each system.
 - .4 Operation instruction for each system and each component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Colour coding chart.
- .3 Maintenance data shall include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .4 Performance data to include:
 - .1 Equipment manufacturer's performance data sheets with point of operation as left after system verification is complete.
 - .2 Equipment performance verification test results.
 - .3 Insulation resistance testing and panelboard phase current measurement records.
 - .4 Special performance data as specified elsewhere.
- .5 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Consultant for approval. Submission of individual data will not be accepted unless so directed by Consultant.
 - .2 Make changes as required and re-submit as directed by Consultant.
- .6 Provide maintenance data for the following:
 - .1 Wiring Devices.
 - .2 Motor Starters to 600 V.
 - .3 Molded Case Circuit Breakers.
 - .4 Disconnect Switches Fused and Non-Fused.
 - .5 Unit Equipment for Emergency Lighting.
 - .6 Structured Cabling for Communications Systems.
- .7 Provide one copy of all approved shop drawings for each maintenance manual.

1.8 RECORD DRAWINGS

- .1 Site records:
 - .1 Provide sets of white prints as required for each phase of the work. Mark thereon all changes as work progresses and as changes occur.
 - .2 This shall include change orders, site instructions and changes to electrical system.
 - .3 Make available for reference purposes and inspection at all times.
 - .4 Produce record drawings in accordance with Division 1.

- .2 Where products are specified by manufacturer and/or model, update AutoCAD file to show installed manufacturer and model.

- .3 Record Drawings:
 - .1 Prior to start of Testing and System verification finalize production of as-built drawings.
 - .2 Identify each drawing in lower right-hand corner in letters at least 1/2" (13 mm) high as follows: -"RECORD DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW ELECTRICAL SYSTEMS AS INSTALLED" (DATE).
 - .3 Submit to Consultant for approval and make corrections as directed.
 - .4 Submit computer disk with the AutoCAD files and a 4 mil. Reproducible film hard copy to the consultant at the time specified in Division 1.

*****END OF SECTION *****

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 CLOSEOUT DOCUMENTATION

- .1 Common Work Results for Electrical
 - .1 Copy of electrical permits from Utility.
 - .2 Final Inspection certificate(s) from Inspection Authority.
- .2 Electrical Submittals:
 - .1 Shop drawing and product data.
 - .2 Operating and Maintenance Manual.
 - .3 Spare parts.
 - .4 Record drawings.
- .3 Identification.
 - .1 Submission of proposed equipment identification lamicoid plates for approval.
- .4 Wiring Devices.
 - .1 Written confirmation of receptacle polarity check.
- .5 Unit Equipment for Emergency Lighting.
 - .1 Written Guarantee.
- .6 Structured Cabling for Communications Systems.
 - .1 Testing and Verification Report & Certificate.
- .7 Fire Alarm System.
 - .1 Fire Alarm Verification Report and Certificate.

1.3 EXTENDED WARRANTIES

- .1 Section 27 10 05, Structured Cabling for Communications Systems
 - .1 The minimum warranty requirement will be 25 years for the network passive components. Upon completion of the project, a certificate stating the warranty of the system must be supplied to the end user.

1.4 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTIONS

- .1 Supply tools, equipment, and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, troubleshooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

- .2 Use operation and maintenance manual, as-built drawings, audio visual aids, etc. as part of instruction materials.
- .3 Following the completion of each training and demonstration session, the contractor is to obtain an attendance sheet signed off by those personnel who have received training.

2 Products N/A

3 Execution N/A

*******END OF SECTION *******

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 IDENTIFICATION REQUIREMENTS

- .1 All electrical equipment shall be identified by the use of Lamicoid plates. This includes all distribution equipment (For example: Branch Circuit Wiring Panels, etc.).
- .2 All equipment and enclosures receiving connections to the building power distribution system shall have their panel and circuit number identified by the use of Lamicoid plates. This includes equipment supplied by the electrical contractor, the mechanical contractor and all other divisions.
- .3 All electrical junction, pull boxes, cabinets and splitters installed in areas with drop ceilings shall be colour coded inside and out with appropriate coloured paint. **All paint is to be applied prior to installation and not with-in the confines of the building.**
- .4 All electrical junction, pull boxes, cabinets and splitters installed in areas without drop ceilings (exposed) shall be colour coded on the inside only with appropriate coloured paint. **All paint is to be applied prior to installation and not with-in the confines of the building.** Install an appropriately coloured dot on the exterior of the cover plate to indicate box function.
- .5 All conduit couplings installed in areas with drop ceilings shall be colour coded with appropriate coloured paint. **All paint is to be applied prior to installation and not with-in the confines of the building.**
- .6 Where conduits are installed in a room where no conduit couplings are visible, appropriate colour bands are required to identify the conduit function.
- .7 All junction boxes installed in areas with drop ceilings shall have the panel and circuit numbers contained with-in, identified on the exterior of the cover plate.
- .8 All junction boxes installed in areas without drop ceilings (exposed structure) shall have the panel and circuit numbers contained with-in, identified on the interior of the cover plate.
- .9 All junction and/or pull boxes sized 150 mm x 150 mm (6" x 6") and larger shall be identified through the use of lamicoid nameplates.
- .10 All wiring installed under this contract shall be identified through the use of self-laminating labels.
- .11 All receptacles installed under this contract shall be identified through the use of Lamicoid

plates.

- .12 All voice, data outlets installed under this contract shall be identified through the use of Lamicoid plates.
- .13 Permanently identify voice and data horizontal cabling at each end. The identification must be mechanically generated, not handwritten. Indicate the originating Telecommunications Room (TR) and the consecutively numbered jack for voice and data. This labeling is to be identical on the originating end and in the outlet box. This same information is to appear on the patch panel and outlet jack location.
- .14 All control panels and time clocks shall be identified through the use of Lamicoid plates.
- .15 All emergency lighting battery packs shall be identified through the use of Lamicoid plates.
- .16 All addressable fire alarm system devices shall be identified through the use of Lamicoid plates.
- .17 All electrical devices (receptacles, communication outlets, multi-media outlets, relay panels and electrical equipment in concealed ceiling spaces shall be identified with two (2) Lamicoid plates, one on the device and electrical equipment and one on the ceiling below.

2 Products

2.1 IDENTIFICATION NAMEPLATES

.1 Lamicoid identification plates.

- .1 Lamicoid 1.5 mm thick plastic engraving sheet for all electrical systems, complete with rounded upper corners. Lamicoid characteristics are to be as follows, unless noted otherwise:
 - .1 Electrical equipment enclosures to have black face with white core Lamicoid plates.
 - .2 Receptacles to have white face with black core Lamicoid plates.
 - .3 Information outlets to have white face with black core Lamicoid plates.
 - .4 All ceiling mounted plates to have white face with black core.

.2 Nameplate Sizes

Size 1	10 mm x 50 mm (3/8" x 2")	1 line	5 mm (0.2") high letters
Size 2	13 mm x 75 mm (1/2" x 3")	1 line	6 mm (0.25") high letters
Size 3	16 mm x 75 mm (3/4" x 3")	2 line	5 mm (0.2") high letters
Size 4	19 mm x 90 mm (3/4" x 3.5")	1 line	10 mm (3/8") high letters
Size 5	38 mm x 90 mm (1.5" x 3.5")	2 line	13 mm (1/2") high letters
Size 6	25 mm x 100 mm (1" x 4")	1 line	13 mm (1/2") high letters
Size 7	25 mm x 100 mm (1" x 4")	2 line	6 mm (1/4") high letters
Size 8	50 mm x 150 mm (2" x 6")	2 line	13 mm (1/2") high letters
Size 9	75 mm x 150 mm (3" x 6")	3-line	13 mm (1/2") high letters

- .3 Identification to be in English.

2.2 COLOUR CODING OF ELECTRICAL BOXES

- .1 The colour coding of splitters, junction boxes, pull boxes and outlet boxes will follow the schedule as listed:

System	Primary Colour	Secondary Colour
0volts to 50volts	VIOLET	-
51 volts to 240 volts	YELLOW	-
Fire Alarm	RED	-
P/A and Intercom	BLUE	
Security Systems	BROWN	
Ground or Bond	GREEN	
DC	YELLOW	BLACK
Energy Management	RED	WHITE
Data	BLUE	WHITE

- .2 All various systems junction and/or pull boxes etc., where located above grid system, shall have location identified on underside or room side of t-bar spline, with (19 mm) or (6 mm on 19 mm) self adhering colour coded circular shaped discs, affixed directly to spline in close proximity to where concealed box is located. The same type of discs to be installed on ceiling or wall access cover plates.
- .1 6 mm (1/4") discs are all white in colour.
 - .2 19 mm (3/4") discs are coloured as indicated.
 - .3 6 mm (1/4") to be affixed to center or middle of 19 mm (3/4") discs as system colours dictates.
- .3 All junction boxes and/or pull boxes, conduit fittings (and respective covers), complete with their respective cover plates as per the following:
- .1 Inside and out where one colour is required, with cover plate painted completely.
 - .2 Inside where two colours are required, with cover plate painted diagonally with both colours.
- .4 All junction boxes and/or pull boxes, where not concealed, are to have discs fastened to the outside of the box when architectural painting is complete.

2.3 WIRING IDENTIFICATION

- .1 Wiring Labels:
- .1 Write on self-laminating labels.
 - .2 Panduit No's PLD-1, PLD-2.

3 Execution

3.1 EQUIPMENT IDENTIFICATION

- .1 Submit description of proposed equipment identification plates for engineer's approval.
- .2 Do not manufacture Lamicoid plates prior to receiving written approval from the engineer.
- .3 Lamicoid nameplates shall be applied to all electrical equipment including but not limited to the following:
 - .1 All electrical equipment enclosures for starters, disconnect switches, relay panels, panelboards, splitter troughs, thermal overload switches, etc.
 - .2 Where electrical equipment that could have identical types of removable covers are grouped together, their lamicoid nameplates are to be installed on the wall adjacent to these devices, rather than directly to their covers (this is to avoid the possibility of cover mix-up occurring), for example: magnetic starters, magnetic contactors, manual T.O.L. switches, and relays.
- .4 Lamicoid nameplate fastening method shall be as follows:
 - .1 Concrete or concrete block:
 - .1 Contact type cement (Note: Peel off type not acceptable). Contact type cement is to be applied (battered) to complete rear side of plate, as opposed to several points or locations on same.
 - .2 Plasterboard.
 - .1 Contact type cement (Note: Peel off type not acceptable). Contact type cement is to be applied (battered) to complete rear side of plate, as opposed to several points or locations on same.
 - .3 Equipment enclosures.
 - .1 Pop rivets. (Note: Screws not acceptable).
 - .4 Ceiling and T-Bar spline.
 - .1 Contact type cement (Note: Peel off type not acceptable). Contact type cement is to be applied (battered) to complete rear side of plate, as opposed to several points or locations on same.
- .5 Identify equipment as follows:
 - .1 Lamicoid nameplates installed on distribution panelboards, motor control centres, splitter troughs, shall indicate the following:
 - .1 Designated name of equipment.
 - .2 Amperage of overcurrent protection device.
 - .3 Voltages, number of phases and wires.
 - .4 Designation of power source.
 - .5 Size 9

EXAMPLE:

***PANEL 1101 - 400 AMPS
120/208V - 3PH - 4W
FED FROM SPLITTER***

- .6 Lamicoid nameplates installed on combination starters, magnetic starters, manual starter

and all various systems controls, control panels, disconnect switches, shall contain the following information:

- .1 Designated name of equipment.
- .2 Designated name of power source.
- .3 Branch circuit breaker number(s) where possible.
- .4 Voltage(s).
- .5 Size 8

Example:

***EXHAUST FAN NO. 5
PANEL 1101 - CCT. NO. 17
120V - 1 PH***

- .7 Lamicaid nameplates installed on fusible type disconnect switches are to also indicate maximum fuse size.

3.2 RECEPTACLE IDENTIFICATION

- .1 Submit description of proposed equipment identification plates for engineer's approval.
- .2 Do not manufacture Lamicaid plates prior to receiving written approval from the engineer.
- .3 Lamicaid nameplates are to be installed above all types of receptacles and abutted directly to tops of their respective device plates. Plates are to be the same width as the finish device plate. All relevant information is to be contained on a single lamicaid for each receptacle. Do not manufacture multiple lamicaid plates for a receptacle.
- .4 Identification is to indicate respective panel source c/w associated circuit breaker number(s) as per the following:

EXAMPLE:

1101 - 20

- .5 Lamicaid nameplates installed above 120-volt receptacles protected by GFCI circuit breakers, or GFCI type receptacles (where their use is permitted) are to be identified as per the following:

EXAMPLE:

GFCI PROTECTED

1101 - 22

3.3 TELLECOMMUNICATIONS IDENTIFICATION

- .1 All ITS termination hardware within the telecommunications space requires a unique component identifier as part of the administration system. Identifiers must be self-adhesive thermal transfer type and placed appropriately to indicate all ports.
- .2 All horizontal cabling shall be uniquely identified with a wrap type self-laminating adhesive label with mechanically generated (not handwritten) identifier.
- .3 Horizontal cable identifiers shall denote basic information transport system application and originating telecommunications space termination equipment port as shown;

EXAMPLE:

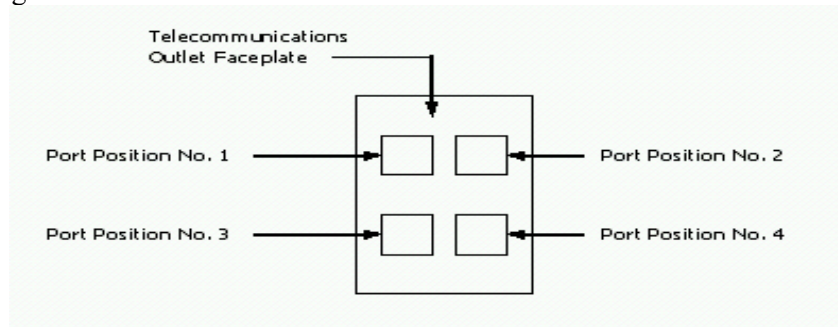
D-024

D = DATA

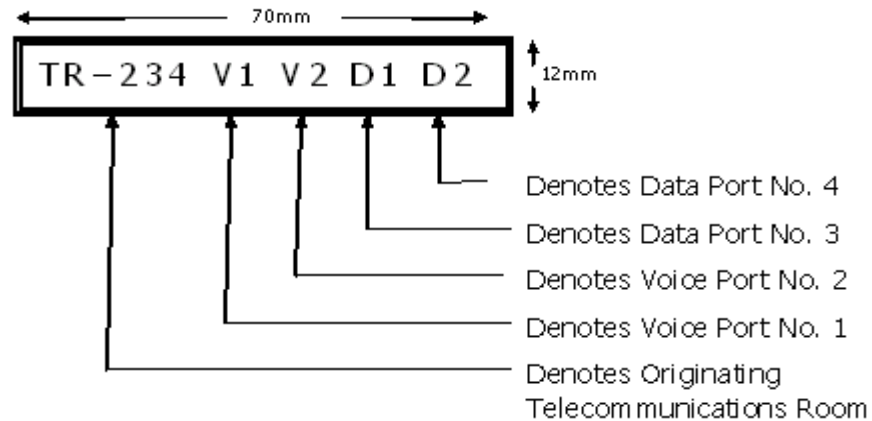
V = VOICE

DB = DATA BACKBONE

- .4 All telecommunications outlet faceplates shall be standard four port configuration with port assignments as shown:



- .5 All telecommunications outlet locations require a unique component identifier as part of the administration system by a “lamicoid” nameplate, minimum 120mm H X 70mm L and secured to the wall-space centered and above (min. 12mm) the telecommunications outlet faceplate. Telecommunications work area outlet identifiers must denote basic information transport system application, originating telecommunications space and termination equipment port as shown:



3.4 EMERGENCY LIGHTING BATTERY PACK IDENTIFICATION

- .1 Submit description of proposed equipment identification plates for engineer's approval.
- .2 Do not manufacture Lamicoid plates prior to receiving written approval from the engineer.

- .3 Lamicoïd nameplate for each emergency lighting battery pack and Exit sign shall be installed adjacent each unit. Identification is to indicate panel number and circuit number, as per the following:

EXAMPLE: *1101 – 20*

3.5 MECHANICAL EQUIPMENT CONNECTED TO THE ELECTRICAL DISTRIBUTION SYSTEM

- .1 Lamicoïd nameplate for each item of mechanical equipment (speed drives, humidifiers, trap primers, fans, pumps, etc.) fed from the electrical distribution system, shall contain the following information:
- .1 Designated name of equipment.
 - .2 Designated name of power source.
 - .3 Branch circuit breaker number(s) where possible.
 - .4 Voltage(s).
 - .5 Size 8

Example:
TRAP PRIMER
PANEL 1101 - CCT. NO. 17
120V - 1 PH

3.6 IDENTIFICATION OF JUNCTION BOXES, PULL BOXES, SPLITTER TROUGHS AND OUTLET BOXES

- .1 Colour Coding
- .1 Identification of electrical junction boxes, pull boxes, splitter troughs.
 - .1 Colour code as per 2.2.
 - .2 Apply colour coding prior to pulling conductors into boxes.
 - .3 Where primary colour only is indicated:
 - .1 Colour inside and outside of box.
 - .2 Colour all cover plates.
 - .4 Where primary and secondary colours are indicated:
 - .1 Paint inside and outside of box with the primary colour.
 - .2 Diagonally apply to each half of the cover plate the primary and secondary colours.
 - .3 Provide a legend of colour coding used under Plexiglas.
Locate in main electrical room.
- .2 Voltage and Originating Source Identification
- .1 Identification of electrical junction boxes, pull boxes, splitter troughs: smaller than 150 mm x 150 mm.
 - .1 Identify on the cover plate, using permanent indelible black marker the panel and circuit numbers contained with.
 - .2 Identification of electrical junction boxes, pull boxes, splitter troughs: 150 mm x

150 mm and larger.

- .1 Provide Lamicaid plate fastened to cover plate, indicating:
 - .1 Voltage and phase.
 - .2 Originating panel.
 - .3 Size 6.
 - .4 Example: "120/208 v, 3Ø, 4w, panel 'A'."
- .2 Using permanent indelible black marker, identify circuits contained within.

3.7 IDENTIFICATION OF SYSTEM CONTROL PANELS

- .1 Provide Lamicaid plate fastened to equipment enclosure indicating:
 - .1 System name.
 - .2 Size 6.
 - .3 Example: "Fire Alarm Control Panel".

3.8 IDENTIFICATION OF WIRING

- .1 Identification of wiring:
 - .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
 - .2 Label each neutral conductor to indicate its associated phase conductors in each panelboard, distribution panel, pull box and junction box it appears in. These labels are to be installed in a 'flagged' manner.
 - .3 All circuit conductors are to be individually tie wrapped to their corresponding labeled neutral conductor in all panelboards, pull boxes and junction boxes. Each neutral conductor is to be identified to indicate its corresponding phase conductors.
 - .4 Labeling of all branch circuit wiring including phase conductors, neutral, ground and/or bonding conductors to be done on both ends of all circuit wires plus in any junction and/or pull boxes located in between using approved product (refer to 2.3). These labels are to be installed in a 'flagged' manner around individual conductors.
 - .5 Indicate panel and circuit number i.e.: Panel '1101', cct. #10.

END OF SECTION

1 General

1.1 GENERAL

- .1 NOTE: Section 26 05 00 Common Work Results for Electrical, Section 26 05 01 Electrical Submittals and Section 26 05 02 Electrical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCE SECTIONS

- .1 Section 07 84 00 Firestopping

1.3 SUBMITTALS

- .1 In accordance with the following Sections:
.1 Section 07 84 00 Firestopping
.2 Section 26 05 01 Electrical Submittals.

2 Products

2.1 MATERIALS

- .1 In accordance with the following Section 07 84 00 Firestopping

3 Execution

3.1 INSTALLATION

- .1 In accordance with the following Section 07 84 00 Firestopping.

3.2 FIRESTOPPING

- .1 Firestopping material and installation within annular space around conduits and adjacent fire separation.
- .2 Firestopping material and installation for cable tray assembly and adjacent fire separation.
- .3 Firestopping material and installation inside conduit sleeves which penetrate an assembly with a fire resistance rating

*******END OF SECTION*******

1 General

1.1 GENERAL

- .1 NOTE: Section 26 05 00 Common Work Results for Electrical, Section 26 05 01 Electrical Submittals and Section 26 05 02 Electrical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 REFERENCES

- .1 C22.2 No.65-13 Wire Connectors.

2 Products

2.1 MATERIALS

- .1 Spring type pressure type connectors for all branch circuit wiring sized #8 AWG and smaller. Current carrying parts are to be made of copper or copper alloy and be complete with an appropriate size insulating cap. Cap is to completely fit, or cover all enclosed conductors as required, with current carrying parts of connector sized to fit conductors as required.
- .2 Branch circuit wiring sized #6 AWG and larger will be connected together using split bolt type with heat shrink insulation.

3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors.
- .2 All wire connectors are to be “plier-tightened”. Finger tight is not acceptable.
- .3 Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

*******END OF SECTION*******

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with Division 1.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility.

2 Products

2.1 BUILDING WIRES

- .1 Unless otherwise noted, all conductors (phase, neutral, bond, isolated ground) installed on this project shall be stranded, soft drawn copper, with RW90 XLPE insulation rated for a minimum of 600 VAC. The minimum wire size will be #12 AWG.
- .2 Grounding and bonding conductors to have green coloured RW90 X-link insulation.
- .3 Unless noted otherwise, phase colour coding as per C.E.C. rule 4-036, will apply.
- .4 All phase conductors sized from #12 AWG up to and including #2 AWG to have appropriate coloured insulation (red, black & blue).
- .5 All neutral, grounds and/or bond conductors sized #12 AWG up to and including #3/0 AWG to have appropriate coloured insulation (white or green).
- .6 Isolated ground conductors to have green coloured insulation c/w yellow stripe.
- .7 Where three- and four-way switches are indicated, the associated travelers are to complete with yellow coloured insulation.
- .8 Coloured tape may only be utilized when phase conductors sized larger than noted in item 4 are used.
- .9 Coloured tape may only be utilized when neutral, grounds or bond conductors sized larger than noted in item 5 are used.

- .10 Multi-conductor AC-90 cables containing a single white coloured conductor are not to be used where more than one neutral conductor is required.

2.2 ARMORED CABLE

- .1 Conductor: copper, size as indicated.
- .2 Type AC-90.
- .3 Bonding conductor sized to CEC Table 16.
- .4 AC-90 cable connectors shall be as follows:
 - .1 Two-screw, steel-type similar to T & B #3301, 3312.

3 Execution

3.1 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34.
 - .2 The minimum size of any branch circuit conductor used shall be based on the allowable ampacity in the 75 degree C Column of Table 2 with all relevant correction factors being applied as required by Rule 4-004. Cable transitions in gauge between the equipment's lower termination temperature rating and a higher insulation temperature rating used in the circuit shall not be permitted in the balance of the branch circuit wiring.
 - .3 All stranded conductors, (neutrals, bonds, and phase conductors) prior to terminating under device bolts i.e., circuit breakers, light switches receptacles etc., to be twisted together so as to form a single conductor.
 - .4 All branch circuit phase conductors feeding light fixtures via junction and/or outlet boxes are to be complete with "pigtail" type leads to ensure minimal disruption of lighting circuits if fixtures are removed for future maintenance.
 - .5 Each line voltage switch is to be wired with the neutral conductor extended to the device box.
 - .6 All branch circuit phase conductors feeding receptacles via junction and/or outlet boxes are to be complete with "pigtail" type leads to ensure minimal disruption of receptacle circuits if receptacles are removed for future maintenance.
 - .7 All branch circuit wiring feeding light fixtures will be installed complete with a separate neutral conductor for each circuit.
 - .8 Where the application of coloured tape has been approved, apply as follows:
 - .1 Both ends of the conductor must be taped for all installed segments.
 - .2 Each location where the conductor is visible, i.e.; all junction and pull boxes.
 - .3 A minimum of 305 mm (12") of tape to be applied for all phase conductors.
 - .4 All neutral, grounds and/or bond conductors must be taped for their entire visible length in all enclosures.

- .2 Use of AC-90 Cable.
 - .1 The use of AC-90 cable is acceptable for this project as a general wiring method with several exceptions.
 - .2 AC-90 cable is to be installed as per the following guidelines:
 - .1 All types of armoured cables are to be installed concealed, parallel and perpendicular to building lines and shall be adequately secured to the building structure at not less than 1.5M (5 foot) intervals or as otherwise indicated, in such manner as to ensure they are protected from potential mechanical damage. Install independent supports for cabling in ceiling spaces, and do not use those of other trades. Do not secure cables to mechanical systems piping or ducts, suspended ceiling support wires. The laying of cables directly atop ceiling grid system is strictly prohibited.
 - .2 Where possible, always install and secure cables directly to underside of decking and/or ceiling slabs where located in concealed ceiling spaces. Install supports to firmly secure AC90 to decking midway between OWSJ and when any change in direction occurs.
 - .3 The grouping together of AC-90 cables to form a “bundle” for securing purposes is acceptable providing the following procedures are adhered:
 - .1 In addition to securing type AC-90 cables at 1.5 M(5 foot) intervals to structure, multiple or bundled groups of armoured cables shall be tye-wrapped together at mid-point between each structure support and are to be secured together (between each structure support).
 - .2 Grouping of AC-90 cables shall be limited to a maximum of eight (8) current carrying conductors, including associated oversized neutral conductors where phase sharing occurs.
 - .4 The following examples incorporate uses of both, common and dedicated (separate) branch circuit neutral conductors:
 - .1 Maximum of two runs of #12/4 conductor cables, including common (oversized) branch circuit neutral in each.
 - .2 Maximum of two runs of #12/3 conductor cables, including (oversized) branch circuit neutrals (if not 3 phases, 3 wire), plus one run of #12/2 cable.
 - .3 Maximum of four runs of #12/2 conductor cables, each including a separate, dedicated branch circuit neutral conductor.
 - .5 Where dedicated or separate branch circuit neutral conductors are non-phase sharing, they need not be sized larger than phase conductors they accompany unless specifically indicated otherwise.
 - .6 All AC-90 fixture feeds shall originate from the sides of outlet boxes and not from the box cover. Where 3 and/or 4 fixture drops extend from any one outlet box, the box shall not be sized smaller than 120 mm (4-11/16") square.

- .3 Light Fixture Drops:
- .1 Light Fixture drop is defined as that portion of AC-90 cable or flexible conduit being used to make final connection between accessible type junction or outlet box located in ceiling space (above T-Bar ceiling only) and its respective light fixture. Refer to Detail 7, Drawing EL501 for light fixture drop general arrangement.
 - .2 Where light fixtures are installed in Non-Accessible type ceiling spaces, provide a separate, individual fixture drop, extended to a junction box located in an accessible ceiling space.
 - .3 Fixture drops are not to exceed 4.5 M (15 feet) in total length unless specifically indicated otherwise.
 - .4 Where 3 and/or 4 fixture drops extend from any one outlet box, the box shall not be sized smaller than 120 mm (4-11/16") square. There shall be not more than 4 drops permitted to be fed from any one box regardless of its size. All AC-90 cables used for fixture drops are to be secured within 300 mm (12 in.) of the junction box and the light fixture connection point.
 - .5 Where a fixture drop contains line voltage conductors together with diming conductors, ensure the insulation level for each conductor is rated for the highest voltage present. When calculating box fill, include both line voltage and low voltage conductors and connectors. Boxes shall be of sufficient size to provide usable space for all insulated conductors contained in the box, as per CEC Rule 12-3034. The use of box extensions to provide sufficient space for these combination line and low voltage fixture drops is not an acceptable practice.
 - .6 Fixture drops (and only fixture drops) are permitted to be secured to ceiling system support wires. Each light fixture is to be complete with its own separate fixture drop originating from a junction box located within the ceiling of the same room as the fixture.
 - .7 With the exception of where “modular” type wiring has been approved for a particular application, within a T-Bar ceiling space, each light fixture shall be wired with a separate whip emanating from an overhead junction box.
 - .8 Separate pig-tail type leads shall be provided in each light fixture junction/outlet box for final connections to fixture drops. These pig-tail leads are to be only connected to light fixture returns and associated neutral conductors.
- .4 The use of AC-90 cable for branch circuit home runs is not acceptable.
- .1 A home run is defined as that portion of the branch circuit wiring that runs between the applicable panelboard and the room or area in which it terminates, and/or makes its final splice, for drop off, to the applicable branch circuit device. The home run conduit shall be continued until the final room destination splice or drop off is reached.

- .8 Testing:
- .1 Perform testing in conformance with NSP Electrical Inspection Bulletin B-2-132 and CEC Rule 2-136. Contractors are to verify by testing that all interior wiring is; free from shorts, broken, open, or incorrect connections, proper polarity, and that neutrals are free from connections to ground beyond the supply side of the consumer's service box except as permitted in section 10 of the Canadian Electrical Code Part 1. (CEC).
 - .2 Prior to testing, ensure that all feeders or branch circuits which do not have neutral conductors are to have their respective phase conductors tye-wrapped together in accordance to the methods described previously.
 - .3 Prior to testing, ensure that voltage-sensitive devices such as ground fault circuit interrupters, arc-fault circuit interrupters, electronic ballasts, Surge Protective Devices (SPD) and other electronic equipment are not subjected to voltages that will damage the device.
 - .4 Megger testing is to be performed on all branch circuit wiring on the load side of a consumer's main overcurrent device, including main feeders and sub-feeders. Contractors shall record their results for all testing performed and shall have the testing results available for viewing by the inspection department upon request at the time of inspection. Ensure that the Megger reports are submitted to the Engineer for review and are incorporated into the O & M manuals.

3.2 VOLTAGE DROP

- .1 It is the intent of this specification that each branch circuit will be strategically planned and installed to ensure that when tested, the CEC requirement that the voltage drop will not exceed 3% in a feeder or branch circuit; and 5% from the supply side of the Consumer's service to the point of utilization. The contractor will account for distance and routing for each branch circuit and that appropriate wire sizes will be employed to allow an acceptable voltage drop test to be carried out during commissioning. When testing for voltage drop, each branch circuit fed from a 15-amp circuit breaker will be subjected to a 12 ampere load, and branch circuit fed from a 20 amp circuit breaker will be subjected to a 16 ampere load.
- .2 The following table is to include both vertical and horizontal lengths of conductor runs. Minimum size of branch circuit neutral where phase sharing occurs shall not be smaller than #10 AWG. Minimum size of branch circuit neutral where dedicated to its own branch circuit phase conductor shall be not be less than #12 AWG. Note that minimum size #10 AWG bond conductors to accompany #8 branch circuit conductors.

- .3 AS A MINIMUM, THE FOLLOWING TABLE SHALL BE ADHERED TO:

Branch Circuit Length of Run Mm (feet)	Phase Wire Size	Dedicated Neutral	Shared Neutral	Bond Wire Size
Up to 24,384 (80)	#12	#12	#10	#12
Up to 38,100 (125)	#10	#10	#8	#12
Up to 56,390 (185)	#8	#8	#6	#10

- .4 Oversized #10 AWG branch circuit wiring conductors to be extended to outlet box of device they feed (including switch legs). Oversized #8 AWG branch circuit wiring conductors to be extended from panelboard to junction box located on wall or ceiling directly above wall light switches and/or receptacles. #8 AWG wire to be reduced to #10 AWG for vertical portion of drop only.

*******END OF SECTION *******

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 REFERENCES

- .1 CSA 22.2 No. 41.

2 Products

2.1 EQUIPMENT

- .1 Insulated grounding conductors: green, insulation to Section 26 05 21 Wires and Cables 0-1000 V.
- .2 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermit welded type conductor connectors.
 - .5 Bonding jumpers, straps.
 - .6 Pressure wire connectors.

2.2 CONDUCTOR IDENTIFICATION

- .1 Provide identification for each conductor in accordance with 26 05 03.

3 Execution

3.1 INSTALLATION GENERAL

- .1 Where EMT is used, install bonding conductor in each and every conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .5 Soldered joints not permitted.
- .6 All metal raceways shall be bonded to ground including conduits housing low voltage

- and communications systems.
- .7 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw.
 - .8 Make bonding connections in radial configuration only. Avoid loop connections.

3.2 EQUIPMENT BONDING

- .1 Where non-metallic wiring systems are used, bond all metallic back boxes and metal enclosures to ground that are installed in ceiling spaces or in partitions in conformance with CEC Rule 10-404, including, but not limited to:
 - .1 Public address speaker back boxes.
 - .2 Occupancy sensor back boxes.
 - .3 Communications systems device back boxes and conduit sleeves.

*******END OF SECTION *******

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility.

2 Product

2.1 SUPPORT CHANNELS

- .1 U shape, size 45 mm X 45 mm, 3 mm thick, surface mounted as required.

2.2 BEAM CLAMPS

- .1 Beam clamp for 10 mm threaded rod.
- .2 cUL listed.
- .3 Malleable iron, complete with hardened steel cup point set screw.
- .4 Rated for a minimum of 227 Kg (400 pounds).
- .5 Taylor Pipe Support, Wide Mouth Top Beam Clamp #407, or equal.
- .6 Push-on type conduit clips are not to be used on this project.

2.3 ARMOURED CABLE STRAPS

- .1 Aluminum alloy.
- .2 cUL listed.
- .3 Rated for armoured cable.

- .4 Iberville C10/C15
- .5 Push-on type cable clips are not to be used on this project.

3 Execution

3.1 INSTALLATION

- .1 Secure equipment to hollow and solid masonry, tile and plaster surfaces with lead anchors. Do not use Tapcon screw anchors.
- .2 Secure equipment to poured concrete with expandable inserts. Do not use Tapcon screw anchors.
- .3 Support equipment, conduit or cables using clips, spring-loaded bolts, cable clamps designed as accessories to basic channel members.
- .4 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 35 mm (1-1/4 inch) and smaller.
 - .2 Two-hole steel straps for conduits and cables 41 mm (1-1/2 inch) and larger.
 - .3 Beam clamps to secure conduit to exposed steelwork.
 - .4 “Bang-ons” are not to be used.
- .5 Suspended supports systems.
 - .1 Support single or multiple cables or conduits on a common steel support channel system supported by 10 mm (3/8”) diameter threaded rod hangers, washers and nuts where direct fastening to building construction is impractical. Channel is to be sandwiched between nuts and washers located on both upper and underside portions of channels. Beam clamps are to be used for this purpose.
 - .2 Do not support a single conduit using a threaded rod and a beam clamp. This is not an acceptable means of installation as no lateral support is provided.
- .6 For surface mounting of single and multiple conduits use channels. Channels are to be securely attached to hangers with the maximum spacing not greater than:
 - .1 Conduits of one size only:

.1	16 mm to 21 mm (1/2” to 3/4”) conduit	1524 mm (60”)
.2	27 mm & 35 mm (1” to 1 1/4”) conduit	1980 mm (78”)
.3	41 mm (1 1/2”) & larger conduit	3050 mm (120”)
 - .2 Conduits of mixed size:
 - .1 Arrange supports so that maximum spacing of supports conforms to above, based on smallest conduit diameter.
- .7 All suspended types of junction and pull boxes are to be supported using a minimum of 10 mm (3/8”) threaded rod c/w nuts and flat washers. Secure threaded rods to boxes using one

flat washer and nut installed on both sides of box. Provide as follows:

- .1 One rod required for all types of boxes sized 150 X 150 mm (6 X 6 inches) or smaller.
- .2 Two rods required for all types of boxes larger than 150 X 150 mm (6 X 6 inches) up to and including 304 X 304 mm (12 X 12 inches).
- .3 Minimum of four rods required for all types of boxes sized larger than 304 X 304 mm (12 X 12 inches).

- .8 All excess threaded rod is to be cut-off within 13 mm (1/2") of channel bottom.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .12 **Do not use supports or equipment installed by other trade contractors for conduit or cable support except with permission of other trade and approval of Engineer.**
- .13 **Do not attach electrical conduit and cable to supports installed as part of a suspended ceiling installation (gypsum board or T-Bar for example), with the exception of light fixture drops.** Fixture drops (and only fixture drops) are permitted to be secured to ceiling system support wires.
- .14 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

*****END OF SECTION*****

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data for cabinets in accordance with Division 1.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility.

2 Products

2.1 JUNCTION AND PULL BOXES

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm (1 inch) minimum extension all around, for flush-mounted pull and junction boxes.
- .3 Junction boxes larger than 120 mm (4 11/16) to have a bonding terminal strip installed.

2.2 CABINETS

- .1 Type D: 1.6 mm steel cabinet, built for surface or flush mounting. Flush cover lip 25 mm all around. Finish - ASA-61 grey enamel. Complete with screw on cover. Complete with bonding terminal strip.
- .2 Type E: 1.6 mm steel cabinet, surface mount. Formed steel hinge with pull ring catch. Finish ASA-61 grey enamel. Complete with bonding terminal strip.
- .3 Type T: 1.6 mm steel cabinet, 1.9 mm cover, latch lock, 2 keys. Finish - ASA - 61 grey enamel. Complete with bonding terminal strip.

3 Execution

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

- .1 Install all raceways in conformance with CEC, Section 12.
- .2 Install pull boxes in inconspicuous but accessible locations. Box cover to be hinged on the side. **Do not install boxes with hinge on top.**
- .3 Install pull boxes so as not to exceed 27 m (90 feet) of conduit run between pull boxes. Each run of raceway shall not have more than the equivalent of four 90 degree bends installed, including the bends located at an outlet or fitting. Pull boxes are to be sized in accordance with CEC Rule 12-3036.
- .4 Terminate all bonding conductors on bonding terminal strip installed inside junction box.
- .5 Where junction and or pull boxes are required to be 150 mm X 150 mm (6 inch X 6 inch) or larger Type E cabinets (hinged cover) shall be used. Do not use splitter troughs in lieu of pull boxes.
- .6 Type T cabinets shall be used when equipment is required to be housed in a lockable enclosure.
- .7 Location of junctions and/or pull boxes in suspended ceiling spaces, i.e., gyprock, T-bar, etc., are not to be greater than 760 mm (30 inch) above finish ceiling.
- .8 All suspended types of junction and pull boxes are to be supported using a minimum of 10 mm (3/8 inch) threaded rod c/w nuts and flat washers. Secure threaded rods to boxes using one flat washer and nut installed on both sides of box. Provide as follows:
 - .1 One rod required for all types of boxes sized 150 X 150 mm (6 X 6 inches) or smaller.
 - .2 Two rods required for all types of boxes larger than 150 X 150 mm (6 X 6 inches) up to and including 304 X 304 mm (12 X 12 inches).
 - .3 Minimum of four rods required for all types of boxes sized larger than 304 X 304 mm (12 X 12 inches).
- .9 Where junction boxes and pull boxes are secured to building structural components, they shall be mounted and secured in such a manner so as not to be “cantilevered” (ie, only supported on one side of the box). In rare instances where site constraints dictate the installation of a “cantilevered” box, threaded rods shall be installed to provide additional support on the opposite end.
- .10 Colour Coding: Refer to 26 05 31. All electrical junction pull boxes splitters and cabinets shall be colour coded inside and out with appropriate coloured paint. **All paint is to be applied prior to installation and not with-in the confines of the building.**

*****END OF SECTION *****

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 RELATED WORK:

- .1 Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility.

2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1-18.
- .2 100-mm (4 inch) square for general use, or larger outlet boxes as required for special devices.
- .3 125-mm (5 inch) square outlet boxes for communications devices.
- .4 Multi-Gang boxes where wiring devices are grouped.
- .5 Blank cover plates for boxes without wiring devices.
- .6 Combination boxes with barriers where outlets for more than one system or voltage are grouped.
- .7 Where tile rings are installed on this project, they must be the welded type with square corners (Rounded corners will not be acceptable).
- .8 Adjustable type tile rings such as Iberville # 52C-ADJ are not permitted on this project.

2.2 SHEET STEEL OUTLET BOXES

- .1 One or Two Device, Flush Installation, Suitable for Armoured Cable and Conduit Entry:
 - .1 For general use, and unless otherwise noted:
 - .1 Electro-galvanized steel single, flush device boxes for use in dry flush installation, shall be pressed steel, minimum size 100 mm (4 inch) square x 54 mm (2.125 inch) deep, minimum volume of 490 cubic centimeters (30 cu.in.), (similar to Iberville # 52171-K). Provide single device square cornered tile cover (similar to Iberville # BC52-C-49XX) or two device square cornered tile covers (similar to Iberville # 52-C-52-XX).
 - .2 Provide an outlet box for all communications outlets, c/w single gang raised tile ring and stainless-steel cover plate, unless noted otherwise. Minimum dimensions as follows: 100mm (4 inch) x 100mm (4 inch) x 53mm (2.125 inch) deep, minimum volume of 490 cubic centimetres (30 cu.in.), (similar to Iberville # 52171-K).
 - .3 100-mm square or octagonal outlet boxes for lighting fixture outlets.

2.3 MASONRY BOXES

- .1 Electro-galvanized steel masonry single and multi-gang boxes for devices flush mounted in exposed block walls, minimum volume of 343 cubic centimetres (21 cu.in), 89 mm (3.5 in.) deep, (similar to Iberville # MBD).
- .2 Provide the following for each range or dryer outlet:
 - .1 Electro-galvanized steel masonry two-gang box for devices flush mounted in walls, minimum volume of 686 cubic centimetres (42 cu.in), 89 mm (3.5 in.) deep, (similar to Iberville # CI-MBD-2K).

2.4 SURFACE MOUNT CONDUIT BOXES

- .1 Cast FS aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles.
- .2 Metal type "FS" device plates to be used on all type "FS" boxes unless noted otherwise.

2.5 MOUNTING BRACKETS

- .1 Provide box mounting brackets for the installation of multiple boxes for drywall partitions, c/w tile rings.
- .2 Acceptable material: Caddy RBS Type (16 or 24 as required), or equal.

2.6 FITTINGS - GENERAL

- .1 Knock-out fillers to prevent entry of foreign materials.
- .2 Double locknuts and insulated bushings on sheet metal boxes.

2.7 COLOUR CODING

- .1 Colour coding of system as per 26 05 03.

3 Execution

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of construction material.
- .3 Install multiple box mounting brackets and mount boxes. To prevent the bracket from being pushed into the wall install a drywall screw at bracket midpoint following drywall installation.
- .4 Where outlet boxes are installed in stud walls and not installed in multiple box mounting brackets, secure the box to a stud, and provide additional support on the opposite side of the box via a bracket or some other acceptable means so the box is firmly secured. Where stud walls are deeper than 100 mm, this may require additional brackets to provide the required support.
- .5 For flush installations mount outlets flush with finished wall using tile rings to permit wall finish to come within 6 mm (1/4") of opening.
- .6 The front edges of boxes, cabinets and fittings installed in noncombustible walls or ceilings shall not be set in more than 6 mm (1/4").
- .7 The front edges of boxes, cabinets and fittings installed in combustible walls (ie, millwork) shall be flush with surface. Application of non-conductive box extenders, similar to Arlington BE Series can be employed where no other practical solution exists.
- .8 Provide correct size of openings in boxes for conduit, mineral insulated and armored cable connections. Reducing washers not to be used.
- .9 Install multi-gang boxes where more than one device is required. Sectional (gangable) boxes are not to be used on this project.
- .10 Install range and dryer receptacles in mud boxes. Ensure U-Ground for range outlet is oriented to the side as per 26-744.

*****END OF SECTION *****

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 LOCATION OF CONDUIT

- .1 Drawings do not show all conduits. Those shown are in diagrammatic form only.

1.3 REFERENCES

- .1 Canadian Standards Association
 - .1 CAN/CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 45-M1981 (R2003), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985 (R2003), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-M1984 (R2003), Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility.

2 Products

2.1 CONDUITS

- .1 Rigid galvanized steel threaded conduit: size as indicated.
- .2 Electrical metallic tubing (EMT): with couplings, size as indicated.
- .3 Liquid-tight flexible metal conduit: size as indicated.

- .4 Metal flexible conduit: size as indicated.
- .5 ENT conduit is not permitted for use on this project.

2.2 CONDUIT FASTENINGS

- .1 Fasten conduit to building construction or support system using straps, as follows:
 - .1 One-hole steel straps to secure surface conduits and cables 35 mm (1-1/4 inch) and smaller.
 - .2 Two hole steel straps for conduits and cables 41 mm (1-1/2 inch) and larger.
- .2 Beam clamps to secure conduits to exposed steelwork.
- .3 Channel type supports for one or more conduits.
- .4 10-mm (3/8 inch) diameter threaded rods to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 Fittings: manufactured for use with conduit specified. Coating same as conduit.
- .2 Couplings for thinwall type EMT conduits shall be concrete tight, set screw, steel type, similar to Iberville Series CI-5500, unless noted otherwise.
- .3 Conduits exiting equipment enclosures equipped with sprinkler hoods shall be installed with rain tight EMT connectors. These connectors will be equipped with a rubber "O" Ring gasket. In addition, any conduit couplings in the vertical portion of the conduit run over equipment enclosures equipped with sprinkler hoods shall be rain tight.
- .4 Connectors for thinwall type EMT conduits shall be concrete tight, set screw, steel, c/w case hardened steel locknuts, similar to Iberville Series CI-5400-IT. Insulated throats are to be provided on connectors up to and including 27 mm (1 inch). Metal thread on bushings to be installed on all EMT connectors sized 35 mm (1 1/4 inch) or larger.
- .5 Armoured cable connectors shall be two-screw, steel type similar to T & B #3301, 3312. The use of "snap-in" type connectors is not permitted. Provide insulating bushings (anti-shorts) for armoured cable connectors.
- .6 Flexible metal conduit connectors shall be nylon insulated, steel or malleable iron type similar to T & B Tite-Bite #3115 thru 3124. Provide insulating bushings (anti-shorts) for flexible metal conduit connectors. Plastic thread on bushings to be installed on all flexible metal conduit connectors sized 35 mm (1 1/4 inch) or larger.

- .7 Liquid-tight flexible metal conduit fittings:
 - .1 Specifically listed for liquid tight flexible metal conduit.
 - .2 Steel type, to match conduit size.
 - .3 Fittings must incorporate a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening.
 - .4 Safe edge ground type.
 - .5 Connectors shall have insulated throats.
 - .6 T & B #5300 series or equal.

2.4 FISH CORD

- .1 Polypropylene.

3 Execution

3.1 INSTALLATION

- .1 Unless noted otherwise, conduits are to be installed as high as possible to conserve headroom, to reduce interference with other trades and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in service rooms and in unfinished areas.
- .3 Conduits are to be installed as follows as high as possible in the space to conserve headroom.
- .4 Use rigid galvanized steel threaded conduit where subject to injury.
- .5 Use electrical metallic tubing (EMT) for the following:
 - .1 Communication outlets between device box and accessible ceiling space in all walls and partitions.
 - .2 Sleeves for communication wiring.
 - .3 All Fire alarm system wiring.
 - .4 All exposed wiring.
 - .5 Home Runs. A home run is defined as that portion of the branch circuit wiring that runs between the applicable panelboard and the room or area in which it terminates, and/or makes its final splice, for drop off, to the applicable branch circuit device. The home run conduit shall be continued until the final room destination splice or drop off is reached. AC90 will not be acceptable for this application. Where the branch circuit has multiple splices and/or drop offs to multiple rooms, the use of AC90 for the drop off is permitted, however, the home run conduit shall be continued until the final room destination or drop off is reached.
 - .6 Where noted elsewhere in the contract documents.

- .6 EMT shall be installed as a complete system and shall be securely fastened in place within 1 metre (39 inches) of each outlet box, junction box, cabinet, couplings, fittings and changes in direction and the spacing between supports as follows:
 - .1 Not greater than 1500 mm (five feet) for 16 mm (1/2 inch) and 21 mm (3/4 inch) EMT
 - .2 Not greater than 1800 mm (six feet) for 27 mm (1 inch) and 35 mm (1-1/4 inch) EMT
 - .3 Not greater than 3050 mm (ten feet) for 41 mm (1-1/2 inch) EMT or larger.
- .7 Install supports to firmly secure conduits to metal decking when any change in direction occurs.
- .8 All conduit runs shall be a maximum of 30 meters (100 feet) in length with a maximum of four (4) 90 degree bends between pull points. A pull box shall be placed in conduit runs where the sum of the bends exceeds 360 degrees, where the overall run exceeds 30 meters (100 feet) or there is a reverse bend in the run.
- .9 Pull boxes shall be placed in straight sections of conduit run and shall not be used in lieu of a bend. Conduit fittings shall not be used in place of pull boxes or bends. The use of C, LB, LL, LR and T type fittings are prohibited on this project unless written permission is provided by the Engineer.
- .10 Pull boxes are to be sized in conformance with CEC Rule 12-3036, unless noted otherwise.
- .11 The use of corner pulling ELLs or corner pulling elbows is not permitted.
- .12 Conduits shall be installed in a neat and ordered manner. When installed in a group, conduits shall be parallel and evenly spaced apart.
- .13 Liquid tight metal flexible conduit is not to be used as a general purpose raceway. Use liquid tight flexible metal conduit (maximum length permitted to be 1.5 M) and liquid tight conduit fittings for:
 - .1 Final connection to all mechanical equipment (fans, pumps, terminal units, etc.) and all vibrating equipment.
 - .2 Final connection to **all** sprinkler system equipment (flow switches, supervised valves, alarm pressure switches, etc).
 - .3 Final connection for primary, secondary and system ground conductors on all dry core transformers.
- .14 Metal flexible conduit may be used for short runs for final connections (For example to fire alarm and security device boxes in suspended ceilings), unless noted otherwise. It must be securely fastened in place within 300 mm (12 inch) of each junction box, cabinet and device. Install specified connectors and bushings. Where supports are required, do not derive support from ceiling support wires on supports of other trades. Do not use liquid tight metal

- flexible conduit in lieu of metal flexible conduit unless specifically approved by the Engineer for that application.
- .15 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
 - .16 Mechanically bend steel conduit over 19-mm (3/4 inch) diameter.
 - .17 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
 - .18 Install fish cord in empty conduits.
 - .19 Run 2 – 27 mm (1 inch) spare conduits up to nearest accessible ceiling space from existing Panel K. Terminate these conduits in one 150-mm X 150 mm X 100 mm (6 inch X 6 inch X 4 inch) junction box in nearest accessible ceiling space or in case of an exposed concrete slab, terminate conduits in a flush concrete type box.
 - .20 Where conduits become blocked, remove and replace blocked section.
 - .21 Dry conduits out before installing wire.
 - .22 The installation of conduits above the structure, directly below roof insulation is strictly prohibited.
 - .23 All conduits to be complete with minimum #12 green insulated bond conductor.
 - .24 Ensure all metal raceways are bonded to ground, including those used for communication systems, fire alarm systems. Where a separate bonding conductor is run to a bonding bushing on an open end of a metal raceway, a #6 green RW90 shall be used.

3.2 SURFACE AND CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines. When installed in a wall cavity, conduit is to be installed vertically from outlet box to ceiling space, not run in an angled manner through the studs.
- .2 Run conduits in flanged portion of structural steel.
- .3 Group conduits wherever possible.
- .4 Do not pass conduits through structural members except as indicated.
- .5 Do not locate conduits closer than 75-mm (3 inch) parallel to hot water lines with a minimum of 25 mm (1 inch) at crossovers.

- .6 Support of electrical systems raceway shall be independent of any type of suspended ceiling support rods, wires, etc. Toggle bolts shall not be used in Gypsum board construction.

3.3 CONCEALED CONDUITS

- .1 Do not install horizontal runs in masonry walls.
- .2 Do not install conduits in terrazzo or concrete toppings.
- *******END OF SECTION*******

The Executed Agreement including General Conditions and Supplementary Conditions, Division 01, applicable drawings, and amendments are part of and are to be read in conjunction with this Section.

1 General

1.1 GENERAL

- .1 NOTE: Section 26 05 00 Common Work Results for Electrical, Section 26 05 01 Electrical Submittals and Section 26 05 02 Electrical Contract Closeout are part of and to be read in conjunction with this Section.

1.2 RELATED WORK:

- .1 Electrical Contractor will provide all plywood backboards required for mounting electrical equipment.

1.3 RELATED SECTIONS:

- .1 Submittal Procedures.
- .2 Construction/Demolition Waste Management.
- .3 Section 26 05 00- Common Work Results Electrical.
- .4 Section 26 05 03 - Electrical Identification.
- .5 Section 26 28 16.02- Molded Case Circuit Breakers.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Division 1.
- .2 Drawings to include electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

2 Products

2.1 LIGHTING & BRANCH CIRCUIT PANELBOARDS

- .1 Panelboards: as indicated on drawings.
- .2 Short Circuit Current Ratings:
 - .1 All panelboard bus structures must be designed to withstand the magnetic forces generated by fault current passing through them at the installed location in the distribution system.
 - .2 The minimum acceptable withstand rating for panelboard bus structures is 50 KAIC (RMS symmetrical).
- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as

indicated.

- .5 Two keys for each panelboard and key panelboards alike.
- .6 Bus Bars:
 - .1 Lugs to be rated for CU/AL.
 - .2 Tin-plated copper.
 - .3 Neutral to have same ampacity rating as main bus, unless noted otherwise.
- .7 Mains: To accommodate bolt-on type Circuit breakers only.
- .8 All feeder conductors (phase, neutral and bonds) are to be terminated in factory provided multi-barrel lugs (Each conductor is to be provided with an individual, suitably sized connection point) with a single connection point to the bus bar. Multiple conductor type connection lugs under one screw are not acceptable (For example CMC-LA- 750 (2) style).
- .9 Provide trim and doors on all panelboards.
- .10 Trim and door finish: grey enamel.
- .11 All panelboards to have factory installed bonding terminal strip.
- .12 Panel tubs to be a minimum of 508 mm (20 in.) wide, 146 mm (6 in.) deep for ampacity up to 225 amperes, unless noted otherwise.

2.2 BREAKERS

- .1 Breakers: to Section 26 28 16.02.
- .2 Breakers with thermal magnetic tripping in panelboards, unless noted otherwise.

2.3 EQUIPMENT IDENTIFICATION AND PANEL DIRECTORY

- .1 Provide lamicoïd identification plates for all Panelboards in accordance with Section 26 05 03.
- .2 Provide a complete circuit directory with typewritten legend indicating location and load of each circuit. All branch circuits such as lighting, receptacle, etc. to be identified by the room they terminate in. Panel directory is to be formatted so that odd numbered circuits appear on left of card; even numbered circuits appear on right. Identify all spare breakers. Panel directory is to include the number of breaker positions available in that particular panel, 72 circuit panel will require a single directory with a total of 72 spaces.
- .3 Provide lamicoïd identification plates for each breaker in each Distribution Panelboard.

2.4 STANDARD OF ACCEPTANCE

- .1 Lighting and branch circuit panelboards:
 - .1 Cutler- Hammer
 - .1 POW-R-LINE 1 & 2

2.5 ACCEPTABLE MANUFACTURERS TO THE REQUIREMENTS ABOVE:

- .1 Siemens.
- .2 Square D.

3 Execution

3.1 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb true and square, to adjoining surfaces. If plywood backboards are the preferred method utilized to mount panelboards, the Electrical Contractor is responsible to supply and install the backboards.
- .2 Mount panelboards to height specified in Section 26 05 00 or as indicated. Ensure that the operating handle of the top mounted device is with-in two metres of the finished floor.
- .3 Raceways entering into wall mounted panelboards shall be mechanically secured to the tub and shall be mechanically continuous throughout the run.
- .4 Connect feeder conductors to panel lugs. For proper termination of conductors, it is very important that field connections be properly tightened. Obtain manufacturer's recommended torque for the type of connection and wire type and gauge. Using a properly set up torque wrench, torque each termination to manufacturer's setting. In the absence of Manufacturer's instructions, make terminations in conformance with the values given in Tables D6 and D7 of the 2018 CEC. Using a black felt tip marker, mark each terminal with a diagonal line to indicate a complete termination. The torque wrench being used for terminations must have been calibrated by a recognized company within the last year, indicated by a sticker on the torque wrench showing the date the calibration was done.
- .5 Connect neutral conductors to common neutral bus.
- .6 Connect bonding conductors to common bonding bar.
- .7 Connect loads to circuits as indicated.
- .8 Provide separate neutral conductors for all circuits feeding lighting equipment from panelboards.
- .9 Provide a wire nut on each unused GFCI circuit breaker neutral conductor.
- .10 AC-90 cables are not permitted to enter panelboards under any circumstances.
- .11 Provide a NSPI compliant Arc Flash warning label.

3.2 PANELBOARD START-UP, VERIFICATION AND PERFORMANCE TESTING

- .1 Start-Up
 - .1 Perform start-up checks paying particular attention to:
 - .1 Name plate complete.
 - .2 Proper grounding.

- .3 Drip hood in place.
- .4 Clean equipment.
- .5 Condition of insulation and insulators.
- .6 Evidence of moisture damage.
- .7 Cable lugs torqued to manufacturer's recommendation.
- .8 Bus bolts torqued to manufacturer's recommendation.
- .9 Doors and covers in place.
- .10 Code required clearances around equipment.
- .11 Exterior and paint finish.
- .12 Insulation Megger tests.
- .2 Provide a written start-up report.
- .2 Verification
 - .1 Perform verification checks paying particular attention to:
 - .1 Manufacturer
 - .2 Voltage
 - .3 Main Bus Rating
 - .4 Copper Busing
 - .5 Copper Ground Bus
 - .6 Phase Rotation Test
 - .7 Feeder Breakers
 - .2 Provide a written verification report.
- .3 Performance
 - .1 Carry out performance checks:
 - .1 Test Feeder Breakers and Trip Units.
 - .2 Provide a written performance report.

3.3 COMMISSIONING

- .1 Commission the system in accordance with 26 91 13.

*****END OF SECTION *****

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 33 00- Submittal Procedures.

1.3 RELATED SECTIONS:

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 26 05 00 - Common Work Results Electrical.
- .3 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.4 REFERENCES:

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-C22.2 No.42-99 (R2002), General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CSA-C22.2 No.42.1-00, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
 - .3 CSA-C22.2 No.55-M1986 (July 2001), Special Use Switches.
 - .4 CSA-C22.2 No.111-00, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility.

2 Products

2.1 SWITCHES

- .1 20 A, 120 V single pole, three-way, four-way switches as indicated.
- .2 Manually operated general purpose AC switches, industrial, specification grade, toggle type, as indicated and with the following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.

- .3 Urea or melamine molding for parts subject to carbon tracking.
- .4 Suitable for back and side wiring.
- .5 White toggle.

- .3 Maximum continuous current: 20 Amps.

- .4 Switches of one manufacturer throughout project.

- .5 Standard of Acceptance:
 - .1 120 VAC: Hubbell No. HBL1221WCN.

- .6 Acceptable manufacturers:
 - .1 Leviton.
 - .2 Pass & Seymour.

2.2 RECEPTACLES

- .1 Unless specified otherwise, duplex receptacles, CSA type 5-15 R, 125V, 15 A, U ground, heavy duty specification grade, with the following features:
 - .1 Reinforced thermoplastic base and deep nylon body.
 - .2 Two pole, three wire grounding type.
 - .3 Impact resistant nylon face.
 - .4 One-piece brass mounting strap with integral ground contacts.
 - .5 Suitable for No. 10 AWG for back and side wiring.
 - .6 Break-off links for use as split receptacles.
 - .7 Eight back wired entrances, four side wiring screws.
 - .8 Double wipe contacts.
 - .9 White in color.
 - .10 Standard of Acceptance: Hubbell No. HBL5252W.
 - .11 Acceptable Manufacturers:
 - .1 Leviton #5262.
 - .2 Pass and Seymour #PS5262

- .2 Duplex receptacles where indicated: CSA 5-20R, 125V, 20A U ground as above, except Hubbell No. HBL5352 WCN.

- .3 Duplex receptacles, ground fault with self-test technology and LED indicators, for use in elevator machine room and elevator shaft only: CSA 5-20R, 125V, 20A U ground as above, except Hubbell No. GFRST20W.

- .4 Duplex receptacles, tamper-resistant where indicated: CSA 5-15R, 125V, 15A U ground as above, except Hubbell No. HBL5262WTR.

- .5 Two pole, three wire grounding receptacles where indicated: CSA 5-30R, 30-amp, single phase, 125 VAC, heavy duty, specification grade, Hubbell # HBL9308.

- .6 Two pole, three wire grounding receptacles with TVSS, light and alarm where indicated: CSA 5-20R, 20-amp, single phase, 125 VAC, heavy duty, specification grade, Hubbell #

HBL5362SA.

- .7 Three pole, thirty amp, four wire grounding receptacle where indicated: CSA 14-30R, 30 amp, single phase, 125/250 VAC, heavy duty, specification grade, Hubbell # HBL9430A.
- .8 Three pole, fifty amp, four wire grounding receptacle where indicated: CSA 14-50R, 50 amp, single phase, 125/250 VAC, heavy duty, specification grade, Hubbell # HBL9450A.
- .9 Three pole, sixty amp, four wire grounding receptacle where indicated: CSA 15-60R, 60 amp, three phase, 250 VAC, heavy duty, specification grade, Hubbell # HBL8460A.
- .10 Receptacles of one manufacturer throughout project.
- .11 Acceptable manufacturers: Leviton, Pass & Seymour.

2.3 COVER PLATES

- .1 Cover plates are required for all wiring devices.
- .2 Cover plates from one manufacturer throughout project.
- .3 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .4 Stainless steel, vertically brushed, 1 mm thick cover plates for wiring devices mounted in flush-mounted outlet box.
- .5 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes, complete with four screws.
- .6 For four-inch square boxes in above ceiling applications, 3/8 inch (9.5 mm) raised surface covers as follows:
 - .1 One duplex receptacle: Iberville Cat# BC-8365.
 - .2 One toggle switch: Iberville Cat# BC-8361.

3 Execution

3.1 INSTALLATION

- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount toggle switches at height specified in Section 26 05 00 or as indicated.
 - .4 **Each line voltage switch is to be wired with the neutral conductor extended to the device box.**

- .2 Interior Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Review shop drawings for each item of equipment supplied for this project and confirm electrical requirements and recommended rough-in location for appropriate connections (ranges, cook tops, wall ovens, etc.).
 - .3 Mount receptacles at height specified in Section 26 05 00 or as indicated.
 - .4 All receptacles to be polarity tested.
 - .5 Install with U-ground up, unless noted otherwise.
 - .6 Receptacles shall project a minimum of 3 mm (.125 in) from metal face plates.
 - .7 All receptacles to be mounted level and plumb.
 - .8 For above ceiling applications, outlet box is to be 100 mm (4 inch) square, c/w with raised surface covers.
 - .9 Install dryer receptacles in mud boxes.
 - .10 Install range receptacles in conformance to CEC Rule 26-744, and as follows:
 - .1 In mud boxes, flush mounted, unless indicated otherwise.
 - .2 Above the finished floor at a height not exceeding 130 mm to the centre of the receptacle.
 - .3 With the U-Ground slot oriented to either side.
- .3 Cover plates:
 - .1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
 - .2 Install suitable common cover plates where wiring devices are grouped.
 - .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
 - .4 Use "FS" coverplates for all "FS" boxes.
- .4 Identification:
 - .1 Identify all receptacles as per 26 05 03.

*****END OF SECTION *****

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility.

1.4 REFERENCES

- .1 Canadian Standards Association (CSA International).
 - .1 CSA-C22.2 No. 5-02, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

1.5 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include time-current characteristic curves for breakers.

2 Products

2.1 BREAKER GENERAL

- .1 Bolt-on molded case circuit breaker, quick make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees Celsius ambient.
- .2 Plug-in molded case circuit breakers not accepted.
- .3 Common-trip breakers with single handle for multipole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of

current reaches setting.

- .5 Short Circuit Interrupting Ratings:
 - .1 Unless otherwise noted, all circuit breakers are to be fully rated for a symmetrical short circuit fault current of not less than 10 KA @ 240 volts.

2.2 THERMAL MAGNETIC BREAKERS

- .1 Molded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping. Under overload conditions and instantaneous tripping for short circuit protection.

2.3 BREAKER TYPE GROUND FAULT CIRCUIT INTERRUPTER

- .1 Single pole, Class A, ground fault circuit interrupter for 15 or 20 amp, as indicated, 120 VAC, single phase circuit, C/W test and reset facilities.

2.4 ACCEPTABLE MANUFACTURERS

- .1 Eaton.
- .2 Siemens.
- .3 Square D.

3 Execution

3.1 INSTALLATION

- .1 Install circuit breakers as indicated.
- .2 Connect to branch circuit wiring as indicated.

*****END OF SECTION*****

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with Division 1.

2 Products

2.1 DISCONNECT SWITCHES

- .1 Non-fusible and fusible disconnect switch in CSA Enclosure as indicated.
- .2 Heavy Duty specification grade.
- .3 Provision for padlocking in on-off switch position.
- .4 Mechanically interlocked door to prevent opening when handle in ON position.
- .5 Quick-make, quick-break action.
- .6 ON-OFF switch position indication on switch enclosure cover.
- .7 Fuse clips, where indicated to accommodate Class J only.
- .8 Supply HRC-I-J fuses for all fused disconnect switches, unless indicated otherwise.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 03.

2.3 MANUFACTURERS

- .1 Standard of Acceptance:
 - .1 Cutler-Hammer.
- .2 Acceptable Manufacturer:
 - .1 Square D.
 - .2 Siemens.

3 Execution

3.1 INSTALLATION

- .1 Install disconnect switches as indicated.

*****END OF SECTION*****

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Division 1.
- .2 Indicate:
 - .1 Mounting method and dimensions.
 - .2 Starter size and type.
 - .3 Layout of identified internal and front panel components.
 - .4 Enclosure types.
 - .5 Wiring diagram for each type of starter.
 - .6 Interconnection diagrams.
 - .7 Equipment being controlled, making reference to the Motor Starter and Control list.
- .3 Project Specific Wiring Diagrams:
 - .1 Refer to the control drawings for individual motor starter control wiring diagrams and sequences of operation.
 - .2 Submit with each starter a project specific wiring diagram indicating all interconnections.
 - .3 Each starter shop drawing will indicate the equipment being controlled (For example- Supply fan #1).

1.3 OPERATION AND MAINTENANCE DATA

- .1 Provide data for incorporation into maintenance manual specified in Division 1.
- .2 Include operation and maintenance data for each type and style of starter.

1.4 SPARE PARTS

- .1 Provide spare parts as indicated in 26 05 01.

2 Products

2.1 MATERIALS

- .1 All individual starters and motor control centre starters are to be of one manufacturer.
- .2 Starters: EEMAC E14-1.
 - .1 Half size starters not acceptable.

2.2 MANUAL MOTOR STARTERS

- .1 Single phase manual motor starters of size, type, rating, and enclosure type as indicated, with components as follows:
 - .1 Switching mechanism, quick make and break.
 - .2 One overload heater, manual reset, trip indicating handle.
- .2 Accessories:
 - .1 Toggle switch: standard labeled as indicated.
 - .2 Indicating light: LED type and colour as indicated.
 - .3 Locking tab to permit padlocking in "ON" or "OFF" position.

2.3 ENCLOSURE

- .1 Provide EEMAC 1 enclosures for all starters unless indicated otherwise.

2.4 COORDINATION

- .1 Coordinate with mechanical contractor.

2.5 STANDARD OF ACCEPTANCE

- .1 Cutler-Hammer MS Series manual motor starters.

2.6 ACCEPTABLE MANUFACTURERS

- .1 Acceptable manufacturer: Furnas, Square D, Allen Bradley, Siemens.

3 Execution

3.1 INSTALLATION OF STARTERS

- .1 Install starters, connect power and control as indicated.
- .2 Make field power and control connections as indicated. Refer to Motor Starter and Control drawings for division of responsibility.
- .3 Final connection to motors:
 - .1 The conductor phase colour coding as per C.E.C. rule 4-038 will carry through from the incoming service point to the motor starter and to the final connection to each motor. In the instance that a three-phase motor requires transposition of phase conductors to achieve proper rotation, the change is to take place at the motor terminal box. Changing the motor feeder phase conductors at any other point in the distribution system (for example at the starter) will not be acceptable.
- .4 Before energizing the starter, conduct a thorough inspection to make certain that all foreign materials, scraps of wire and other debris are removed from the enclosure. Remove any

accumulation of dust and dirt with a vacuum cleaner.

- .5 Check all devices for damage. Make all necessary repairs or replacements, prior to energizing.
- .6 Ensure that overload relays are installed and adjusted to match the full-load current shown on the nameplate of each motor and comply with CEC, Rule 28-306 and set to trip at no more than the following:
 - .1 125% of the FLA rating of a motor having a service factor of 1.15 or greater.
 - .2 115% of the FLA rating of a motor having a service factor that is unmarked or less than 1.15.

3.2 MOTOR STARTER START-UP, VERIFICATION AND PERFORMANCE TESTING

- .1 Start-Up
 - .1 Perform start-up checks paying particular attention to:
 - .1 Name plate complete.
 - .2 Proper grounding.
 - .3 Clean equipment.
 - .4 Evidence of moisture damage.
 - .5 Cable lugs torqued to manufacturer's recommendation.
 - .6 Doors and covers in place.
 - .7 Code required clearances around equipment.
 - .8 Exterior and paint finish.
- .2 Verification
 - .1 Perform verification checks paying particular attention to:
 - .1 Manufacturer
 - .2 Voltage
 - .3 Phase Rotation Test
 - .4 Breakers (MCP and Thermal/magnetic type)
- .3 Performance
 - .1 Carry out performance checks:
 - .1 Test overcurrent devices.
 - .2 Test overload Trip Units.

3.3 TESTS

- .1 Operate switches to verify correct functioning.
- .2 Perform starting and stopping.
- .3 Check that starters operate as indicated and to requirements of the mechanical contractor.

3.4 RECORDS

- .1 Obtain and record the following information for each motor.

- .1 Motor horsepower.
 - .2 Motor voltage.
 - .3 Motor full load amps (both nameplate and site measured values).
 - .4 Installed solid state overload unit's setpoint.
 - .5 Installed over current protection.
 - .6 Motor circuit protector setpoint, where applicable.
-
- .2 Submit chart to Engineer for approval and make changes where instructed.
 - .3 Incorporate in maintenance manuals.

*******END OF SECTION*******

1 General

1.1 GENERAL

- .1 The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with Division 1.
- .2 Data to indicate system components, mounting method, source of power and special attachments.
- .3 Units shall comply with CSA C22.2 No. 141.

1.3 WARRANTY

- .1 For batteries, the 12 months warranty period is extended to 10 years.

2 Products

2.1 EQUIPMENT

- .1 Supply voltage: 120 VAC.
- .2 Output voltage: 12 VDC.
- .3 Operating time as indicated, but in no case less than 30 min.
- .4 Long-life, maintenance-free lead acid battery.
- .5 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01 V for plus or minus 10% input variations.
- .6 Solid state transfer circuit.
- .7 The unit shall be furnished with an electronic lockout circuit, which will connect the battery when the AC circuit is activated, and an electronic brownout circuit, which will activate the emergency lights when utility power dips below 75% of nominal voltage. A low voltage battery protection circuit shall be provided and will disconnect the load when the battery reaches the end of discharge.
- .8 Signal lights: solid state, for 'AC Power ON'.
- .9 Lamp Type: 5 Watt LED.
- .10 Heavy duty steel housing, c/w corrosion resistant undercoating.

- .11 Battery units to be direct connect (not cord and cap) unless specifically noted otherwise.
- .12 Automatic self-diagnostic circuitry and test features. The unit shall self-test for 1 minute every 30 days, 10 minutes on the 6th month and 30 minutes every 12 months and be complete with the following features:
 - .1 Microprocessor based.
 - .2 Monitors lamps, battery and circuitry.
 - .3 Multicolour LED visual display (Red, Yellow & Green).
 - .4 Non-audible.
- .13 Auxiliary equipment:
 - .1 Test switch.

2.2 REMOTE HEADS

- .1 Fully gasketed with a Die-Cast aluminum back plate with a clear heavy-duty polycarbonate light cover. The unit shall be equipped with two emergency heads with tool-less adjustable swivels. Units shall be NEMA-4X and certified and specifically designed for high abuse areas. Provide stainless-steel tamper proof screws.
- .2 Remote heads to be 12-volt, 5 Watt LED, unless indicated otherwise.

2.3 WIRING OF REMOTE HEADS

- .1 Conductors: RW90 type to Section 26 05 21 - Wires and Cables 0-1000 V.
- .2 Conduit: type EMT, to Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

2.4 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 03

2.5 STANDARD OF ACCEPTANCE

- .1 Lumacell Q-BIC-AT Series for surface mount units, c/w 5 Watt LED lamps.
- .2 Lumacell Q-BIC-RG12 Series for surface mount units, RG12S-TB-AT Series for T-Bar mount, c/w 5Watt LED lamps .
- .3 Lumacell MQM2NX-2LED-12V-5W NEMA 4X C/W two 5 Watt LED Lamps for remote heads.

2.6 ACCEPTABLE MANUFACTURERS TO THE REQUIREMENTS ABOVE

- .1 Emergilite
- .2 Stanpro
- .3 Aimlite

3 Execution

3.1 INSTALLATION

- .1 Ceiling mount units where indicated.
- .2 Provide individual fixture chain supports on both ends of each ceiling mounted battery unit. The weight of each battery unit is not to be supported by the ceiling grid.
- .3 Install remote heads in suspended ceilings using bar hangers, similar to B-Line BA50F RediMount. Install Kwik-Wire cable kit and attach to deck. Secure bracket to T-bar using self-tapping screws. Install wiring between battery packs and remote heads in a conduit system.
- .4 Install unit equipment and remote mounted fixtures.
- .5 Install battery units where indicated and connect to remote heads. Wiring between battery units and remote heads to be installed in a conduit system.
- .6 Connect each emergency battery unit in such a manner that it will automatically be actuated upon failure of the power supply to the normal lighting in the area covered by that equipment.
- .7 Direct heads.
- .8 Where multiple DC feeds originate from a battery pack, install one feed from the battery pack to a suitably sized junction box. Feed multiple feeds from the junction box.
- .9 Provide and post instructions for the operation and care of the emergency battery units and testing interval, in conformance with CEC Rule 46-102.
- .10 Provide identification as per 26 05 03.

*****END OF SECTION*****

1 General

1.1 GENERAL

1. The General Conditions of the contract as well as provisions of Division 1 are part of and to be read in conjunction with this Section.

1.2 RELATED WORK

- .1 General requirements: Division 1.
- .2 Common Work Results for Electrical - Section 26 05 00.

1.3 PERFORMANCE TESTING AND COMMISSIONING

- .1 The electrical and communications systems installed within this facility will require inspection, performance testing and commissioning.
- .2 The electrical contractor will be responsible for inspection, performance testing and commissioning of the installed electrical and communications systems as part of this process.
- .3 Manufactured systems or components shall be commissioned by factory trained technicians representing the manufacturer, in the presence of the Owner's designated representatives, and under the direction of the electrical contractor.
- .4 Tests shall be performed by qualified electricians or technicians as required by the nature and complexity of the test.

1.4 SCOPE

- .1 Systems verification are called for throughout the individual specifications, however, this does not relieve this section from providing all testing and verification necessary to ensure that systems and equipment operate as required and that they interface with other systems and equipment as required.

1.5 QUALITY ASSURANCE

- .1 The Electrical Contractor is responsible for quality assurance and whenever necessary, to ensure compliance with operating requirements, CSA, these contract documents, the Authority having Jurisdiction and other requirements and codes as applicable.

1.6 CONTRACTOR'S RESPONSIBILITIES

- .1 Prepare each system for testing and verification.
- .2 Co-ordinate the efforts of testing and verification.

- .3 Provide personnel, operate systems at designated times, and under conditions required for proper testing and adjusting.
- .4 Provide all necessary test and calibration equipment, temporary facilities, meters, sensors, load banks, etc. necessary to simulate and verify correct operating conditions.
- .5 Co-ordinate and pay for all costs associated with testing and verification, including but not limited to costs for: travel, labour, equipment, testing agencies, manufacturers, testing and any other costs incurred to test and verify equipment and systems.
- .6 Make test instruments available to Engineer to facilitate spot checks during testing.
- .7 Retain possession of test instruments and remove at completion of services.
- .8 Verify system installation is complete and in continuous operation.
- .9 Where systems or equipment do not operate as required, make the necessary corrections or modifications, re-test and re-commission.

1.7 SUBMITTALS

- .1 The Contractor shall submit the following documentation:
 - .1 Record drawings.
 - .2 Operations and maintenance manuals.
 - .3 A letter of acceptance from the local inspection authority. A copy is to be included in the operations and maintenance manuals.
 - .4 A letter of guarantee. A copy is to be included in the operations and maintenance manuals.
 - .5 Copies of the following test results (A copy is to be included in the operations and maintenance manuals):
 - .1 Insulation/megger tests.
 - .2 Load balance tests on all distribution panels.
 - .3 Load tests on all electric motors.
 - .4 Structured cabling system link tests.
 - .5 Fire alarm system.
 - .6 Receptacle polarity and voltage drop documentation.
- .2 A Commissioning and/or Certification Report from the manufacturer for the following systems (A copy is to be included in the operations and maintenance manuals):
 - .1 Structured cabling system link tests.
 - .2 Fire alarm system.
- .3 Completed verification forms included with this section. When there are multiples of referenced equipment, devices or systems, electrical contractor is responsible for

obtaining a suitable number of forms to complete the verification process for the entire project.

1.8 INSTRUCTION OF OWNER'S STAFF

- .1 Provide the following:
 - .1 Necessary instruction of equipment and systems operation to Owner's staff.
 - .1 At least 72 hours advance notifications in writing.
 - .2 Provision of factory trained technicians where necessary.
 - .3 Provision of presentation with the use of as-built drawings and data books required in other sections of these specifications.
 - .2 Conduct presentation on project premises.
 - .3 Training for all systems shall take place in four separate training sessions.

2 Products N/A

3 Execution

3.1 INSULATION RESISTANCE TESTING

- .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
- .2 Check resistance to ground before terminating cables and wires.

3.2 PANELBOARD PHASE CURRENT MEASUREMENT

- .1 Energize all possible loads.
- .2 Measure each phase and record voltage and current.

3.3 MOTOR INFORMATION FORM

- .1 Record all pertinent motor information for each motor installed.
- .2 Measure each motor full load amps, after the Balancing Technician has completed his final adjustments.
- .3 Set and record the installed overload and overcurrent data.

3.4 OTHER TESTS

- .1 Perform other tests, not mentioned in this section, but specified in individual specification sections, to the approval of the Engineer.

3.5 VERIFICATION TESTS AND FORMS.

- .1 Perform tests as required to properly complete the verification forms included in this section.

- .2 Deficiencies or discrepancies discovered during this process are to be immediately rectified by the Electrical Contractor. The Electrical Contractor shall provide exceptional arrangements for labor and materials as may be required to correct these deficiencies.

Form 26 52 00-Unit Equipment for Emergency Lighting

EQUIPMENT DETAILS: (Identification)		
Manufacturer: _____	Model: _____	Serial #: _____
Room #: _____	Designation: _____	Capacity: _____

Item	Yes	No	Comments
Nameplate label	<input type="checkbox"/>	<input type="checkbox"/>	
Battery fully charged	<input type="checkbox"/>	<input type="checkbox"/>	
Lamicoid identification plate.....	<input type="checkbox"/>	<input type="checkbox"/>	
Connected to normal lighting system for area served...	<input type="checkbox"/>	<input type="checkbox"/>	
Remote heads functional	<input type="checkbox"/>	<input type="checkbox"/>	
Written guarantee provided	<input type="checkbox"/>	<input type="checkbox"/>	
Auto test feature installed	<input type="checkbox"/>	<input type="checkbox"/>	

FIELD MEASUREMENTS: AC supply voltage _____ DC output voltage prior to test _____ DC voltage at farthest remote unit _____ Battery operating time (not less than 30 min)____	
---	--

SIGN OFF: Electrical Contractor: _____ Signature: _____ Date: _____
--

Form 26 29 10-Motor Starters

EQUIPMENT DETAILS: (Identification)

Manufacturer: _____ Model: _____ Serial #: _____

Room #: _____ Designation: _____ Bus Rating: _____

Item	Yes	No	Comments
Nameplate label	<input type="checkbox"/>	<input type="checkbox"/>	
Cable phase identified correctly.	<input type="checkbox"/>	<input type="checkbox"/>	
Clearance from adjacent surfaces	<input type="checkbox"/>	<input type="checkbox"/>	
Properly grounded.....	<input type="checkbox"/>	<input type="checkbox"/>	
Cleaned.....	<input type="checkbox"/>	<input type="checkbox"/>	
Cable lugs torqued.....	<input type="checkbox"/>	<input type="checkbox"/>	
Lamicoid identification plate.....	<input type="checkbox"/>	<input type="checkbox"/>	
Auxiliary contacts	<input type="checkbox"/>	<input type="checkbox"/>	
BAS components installed	<input type="checkbox"/>	<input type="checkbox"/>	
MCP field adjustments	<input type="checkbox"/>	<input type="checkbox"/>	
Overloads field adjusted	<input type="checkbox"/>	<input type="checkbox"/>	
Control wiring diagrams.....	<input type="checkbox"/>	<input type="checkbox"/>	
Ground installed.....	<input type="checkbox"/>	<input type="checkbox"/>	
Control transformer....	<input type="checkbox"/>	<input type="checkbox"/>	

FIELD MEASUREMENTS:

High Voltage
 H1-H2 _____
 H2-H3 _____
 H3-H1 _____

Current
 H1 _____
 H2 _____
 H3 _____

SIGN OFF:
Electrical
 Contractor: _____ Signature: _____ Date: _____

Form 26 27 26-Wiring Devices

EQUIPMENT DETAILS: (Identification)

Manufacturer: _____ Part Number _____ Amp Rating _____

Room #:

Item	Yes	No	Comments
Receptacle Polarity tested.	<input type="checkbox"/>	<input type="checkbox"/>	
Receptacle properly grounded	<input type="checkbox"/>	<input type="checkbox"/>	
Lamicaid identification plate.....	<input type="checkbox"/>	<input type="checkbox"/>	
Cover plate installed	<input type="checkbox"/>	<input type="checkbox"/>	
GFCI tested	<input type="checkbox"/>	<input type="checkbox"/>	
Voltage drop tested within tolerance	<input type="checkbox"/>	<input type="checkbox"/>	
Installed plumb and level	<input type="checkbox"/>	<input type="checkbox"/>	
Protrudes min of 0.4 mm through plate	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	

FIELD MEASUREMENTS:

Voltage

L1-N _____

SIGN OFF:

Electrical

Contractor: _____ **Signature:** _____ **Date:** _____

Form 26 24 16.01-Panelboards

EQUIPMENT DETAILS: (Identification)

Manufacturer: _____ Model: _____ Serial #: _____

Room #: _____ Designation: _____ Bus Rating: _____

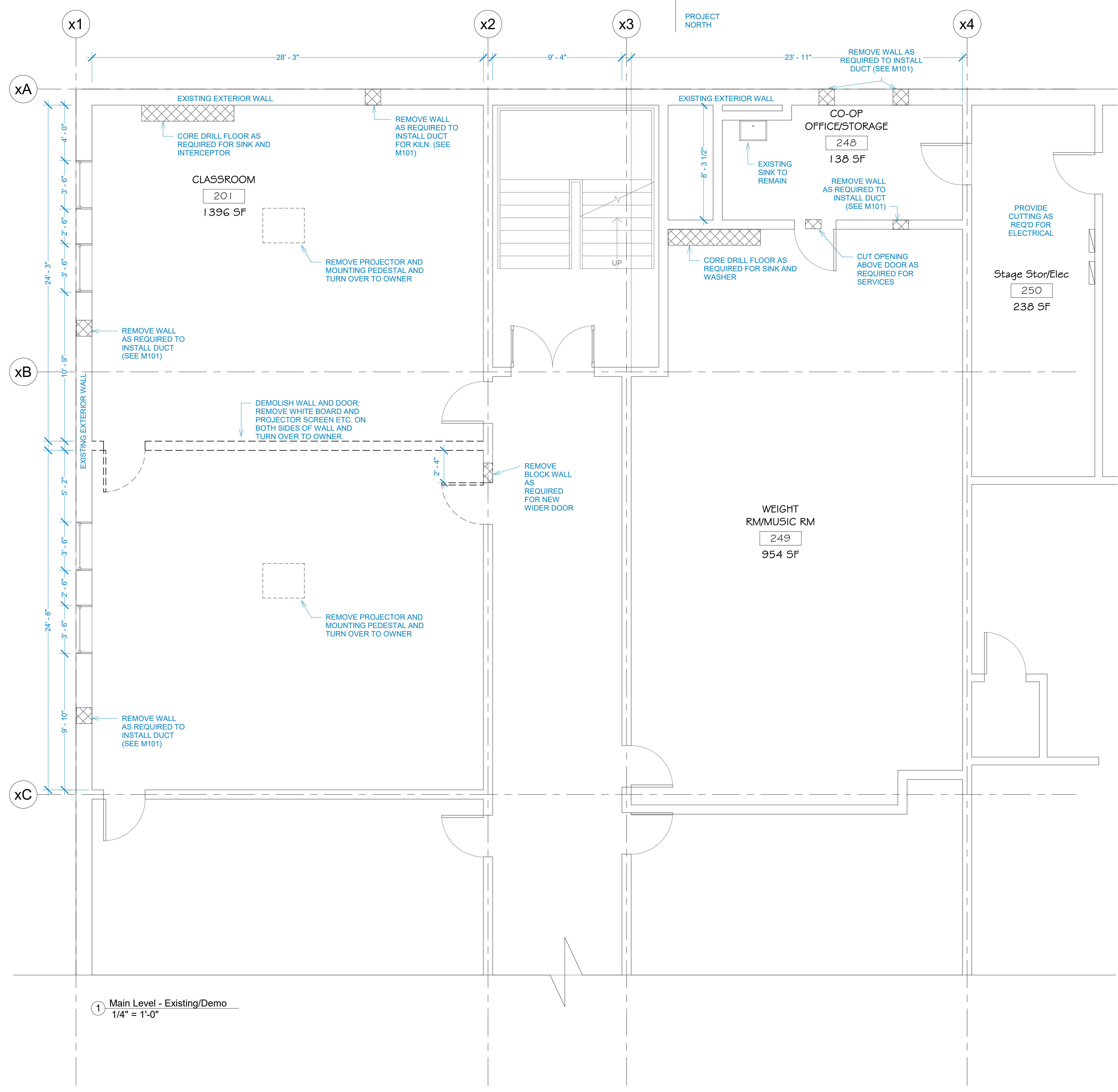
Item	Yes	No	Comments
Nameplate label	<input type="checkbox"/>	<input type="checkbox"/>	
Filler pieces in place	<input type="checkbox"/>	<input type="checkbox"/>	
Cable phase identified correctly.....	<input type="checkbox"/>	<input type="checkbox"/>	
Cable lugs bolted to MRT.....	<input type="checkbox"/>	<input type="checkbox"/>	
Bus bolts torqued to MRT.....	<input type="checkbox"/>	<input type="checkbox"/>	
Properly grounded.....	<input type="checkbox"/>	<input type="checkbox"/>	
Interior and exterior Cleaned.....	<input type="checkbox"/>	<input type="checkbox"/>	
Insulation resistance measured.....	<input type="checkbox"/>	<input type="checkbox"/>	
Spare breakers installed.....	<input type="checkbox"/>	<input type="checkbox"/>	
Lamicoid identification plate.....	<input type="checkbox"/>	<input type="checkbox"/>	
Panel directory typed and complete.....	<input type="checkbox"/>	<input type="checkbox"/>	
Hinged door and front cover installed.....	<input type="checkbox"/>	<input type="checkbox"/>	
Branch circuit breaker operation checked.	<input type="checkbox"/>	<input type="checkbox"/>	
Breaker lock on devices installed.....	<input type="checkbox"/>	<input type="checkbox"/>	
Breaker bolts torqued to MRT.....	<input type="checkbox"/>	<input type="checkbox"/>	
All tools removed, doors covers replaced...	<input type="checkbox"/>	<input type="checkbox"/>	

FIELD MEASUREMENTS:	Current
	L1 _____ L2 _____ N _____
Voltage	
L1-L2 _____	

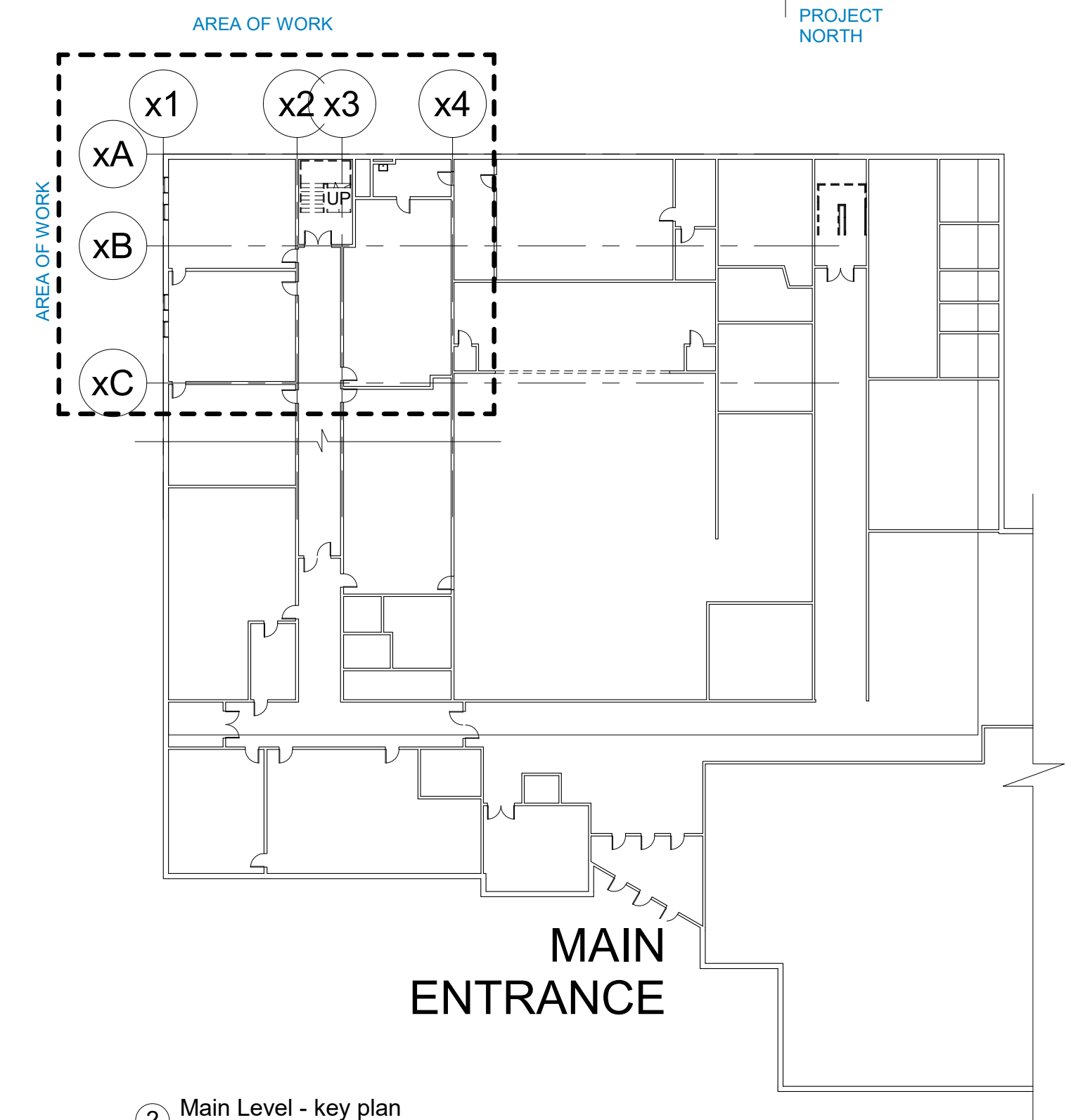
SIGN OFF:

Electrical

Contractor: _____ **Signature:** _____ **Date:** _____



① Main Level - Existing/Demo
1/4" = 1'-0"



② Main Level - key plan
1" = 30'-0"

SCOPE OF WORK:

1. THE SCOPE OF WORK FOR THIS PROJECT IS TO COMBINE 2 CLASS ROOMS INTO AN ART CENTRE COMPLETE WITH 4 KILNS. KILNS ARE PROVIDED BY OWNER AND INSTALLED BY THIS CONTRACT. TO COVER ONE CLASSROOM ACROSS THE HALL INTO A STORAGE/UTILITY ROOM COMPLETE WITH SHELVING UNITS AND WASHER/DRYER.
2. COMPLETE ALL WORK DESCRIBED IN MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.

GENERAL NOTES:

1. FIRE STOP ALL PENETRATIONS THROUGH FLOOR AND CEILING ASSEMBLIES TO MAINTAIN MINIMUM 1HR FIRE RATING BETWEEN FLOORS.
2. FIRE STOP ALL PENETRATIONS THROUGH CORRIDOR WALLS TO MAINTAIN A 'NON-RATED' FIRE SEPARATION
3. MAKE GOOD ALL FINISHES AND MATERIALS DAMAGED DURING CONSTRUCTION

DEMOLITION NOTES:

1. REMOVE ALL CEILINGS IN BOTH CLASSROOMS THAT ARE TO BECOME THE ARTS LAB. SALVAGE PROJECTORS AND MOUNTS AND TURN OVER TO SCHOOL.
2. REMOVE WALL DIVIDING CLASS ROOMS. SALVAGE WHITE BOARDS ETC. AND RETURN TO SCHOOL
3. REMOVE EXISTING DOOR 001 AND ADJACENT BLOCK WALL AS REQUIRED TO INSTALL NEW WIDER DOOR
4. CORE DRILL, SAW CUT ETC FLOOR AS REQUIRED FOR MECHANICAL AND ELECTRICAL SERVICES REMOVE CEILING, INCLUDING THE CEILING ON FLOOR BELOW AND IN CORRIDORS, AS REQUIRED TO INSTALL NEW MECHANICAL AND ELECTRICAL. STORE TILES AND CEILINGS FOR REINSTALLATION. REPLACE AND MAKE GOOD ANY CEILINGS DAMAGED DURING CONSTRUCTION.

SP DUMARESQ ARCHITECT LTD
 6388 DORSET ROAD, THIRD FLOOR, HALIFAX, N.S.

Halifax Regional Centre for Education

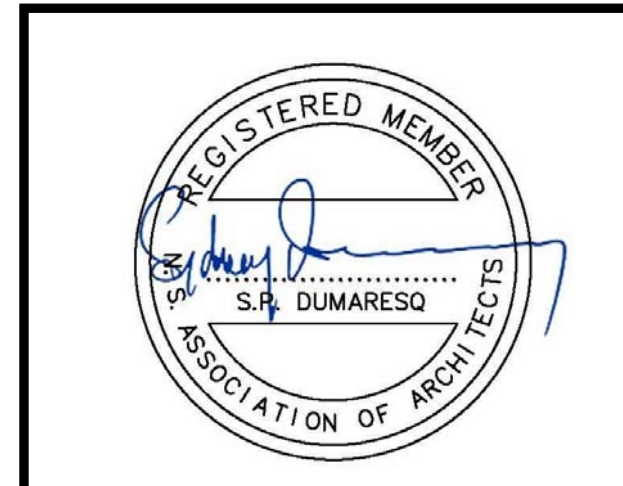
 DUMAC ENERGY LTD.
 CONSULTING ENGINEERS
 752 BEDFORD HIGHWAY
 HALIFAX, N.S.

GENERAL NOTES

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30 JUN 2020	1	FOR TENDER

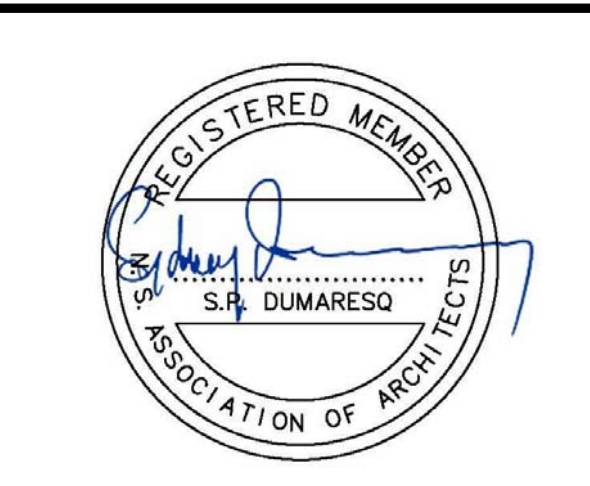


SCALE: As indicated
 DRAWN BY: DD
 REVIEWED BY:
 DATE: JUNE 2020
 PROJECT TITLE
COLE HARBOUR ARTS LAB
 Project Number
 SHEET TITLE
EXISTING & DEMOLITION PLANS
A100

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SCALE: 1/4" = 1'-0"

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DATE: JUNE 2020

PROJECT TITLE

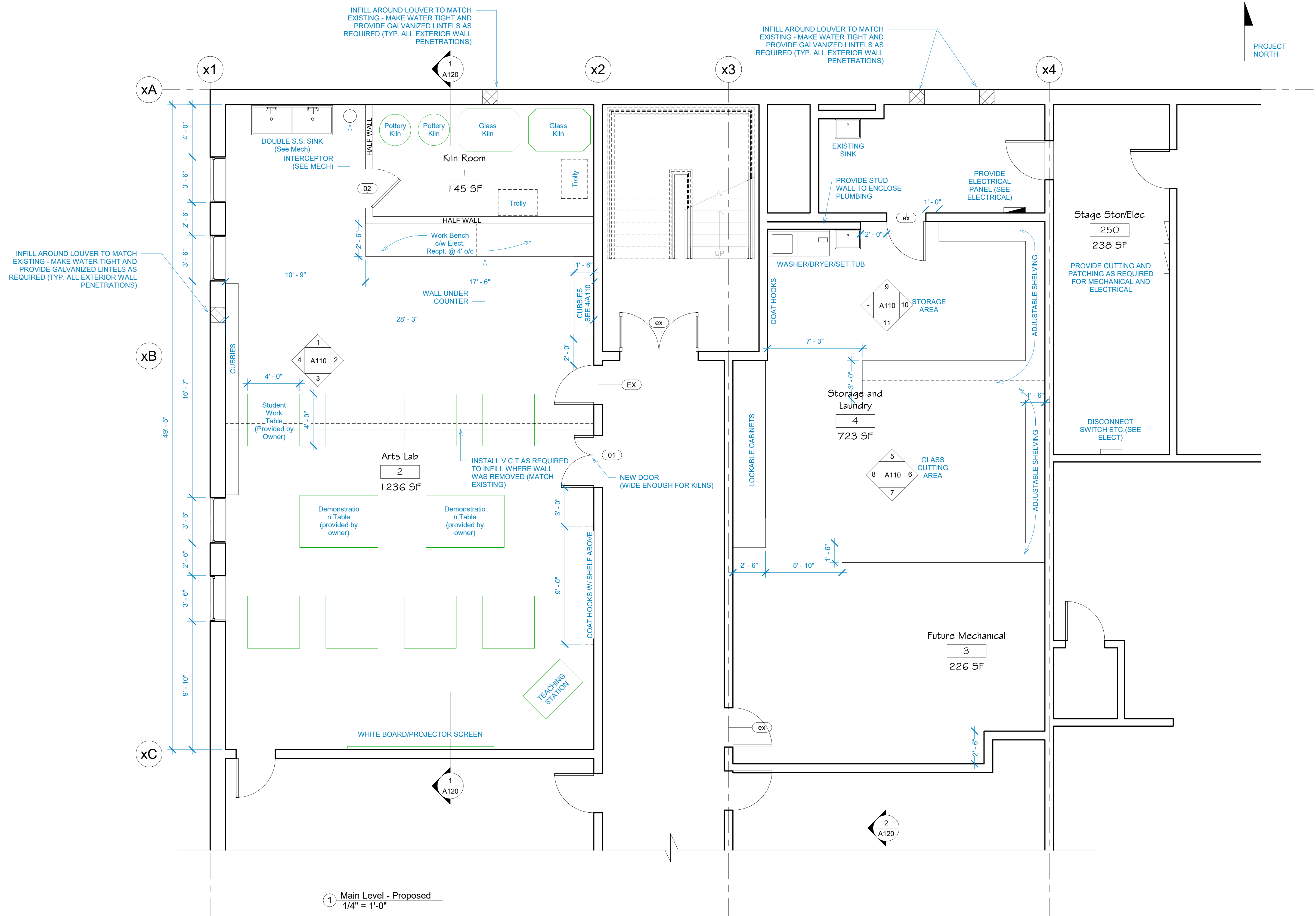
COLE HARBOUR ARTS LAB

Project Number

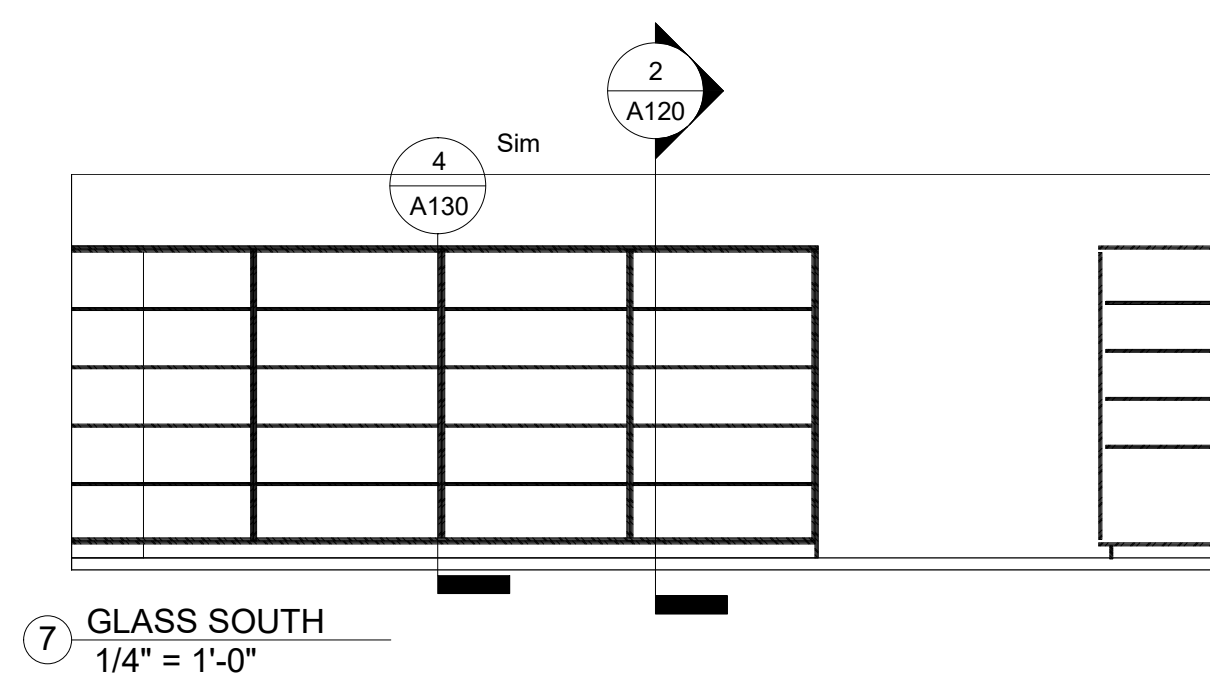
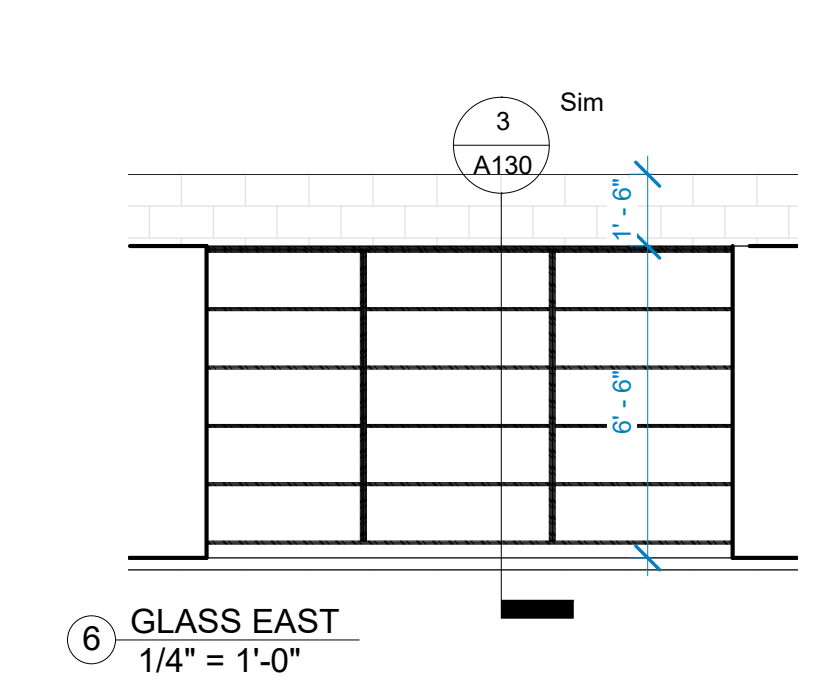
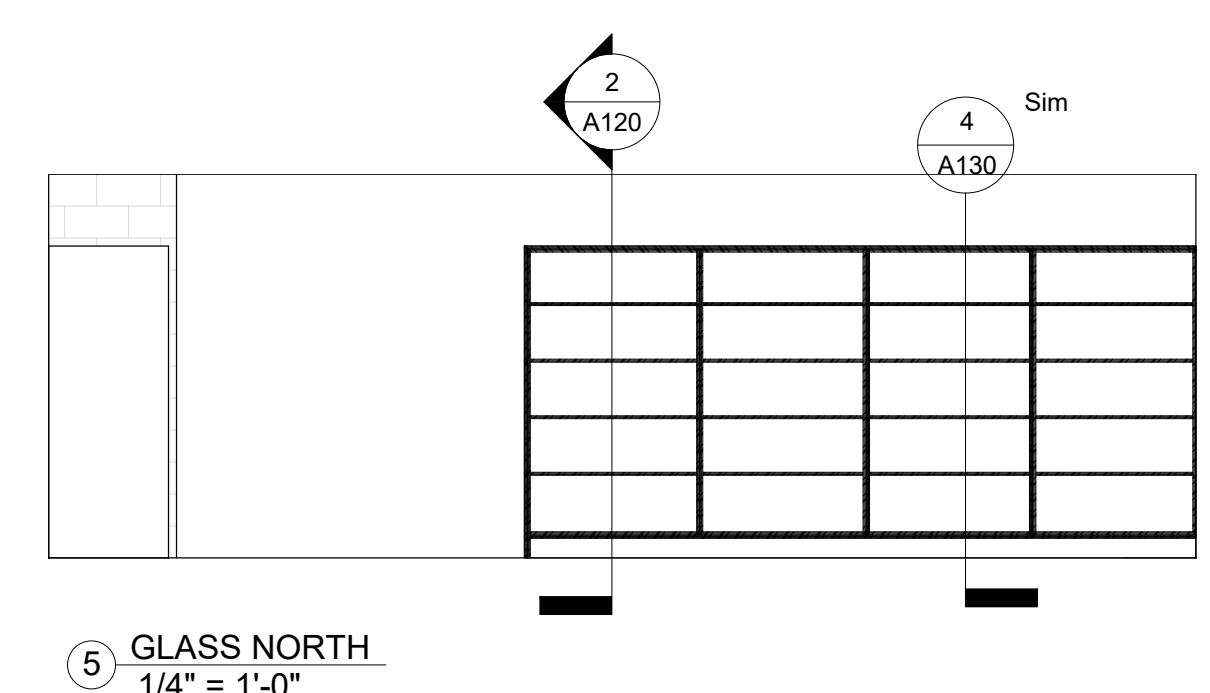
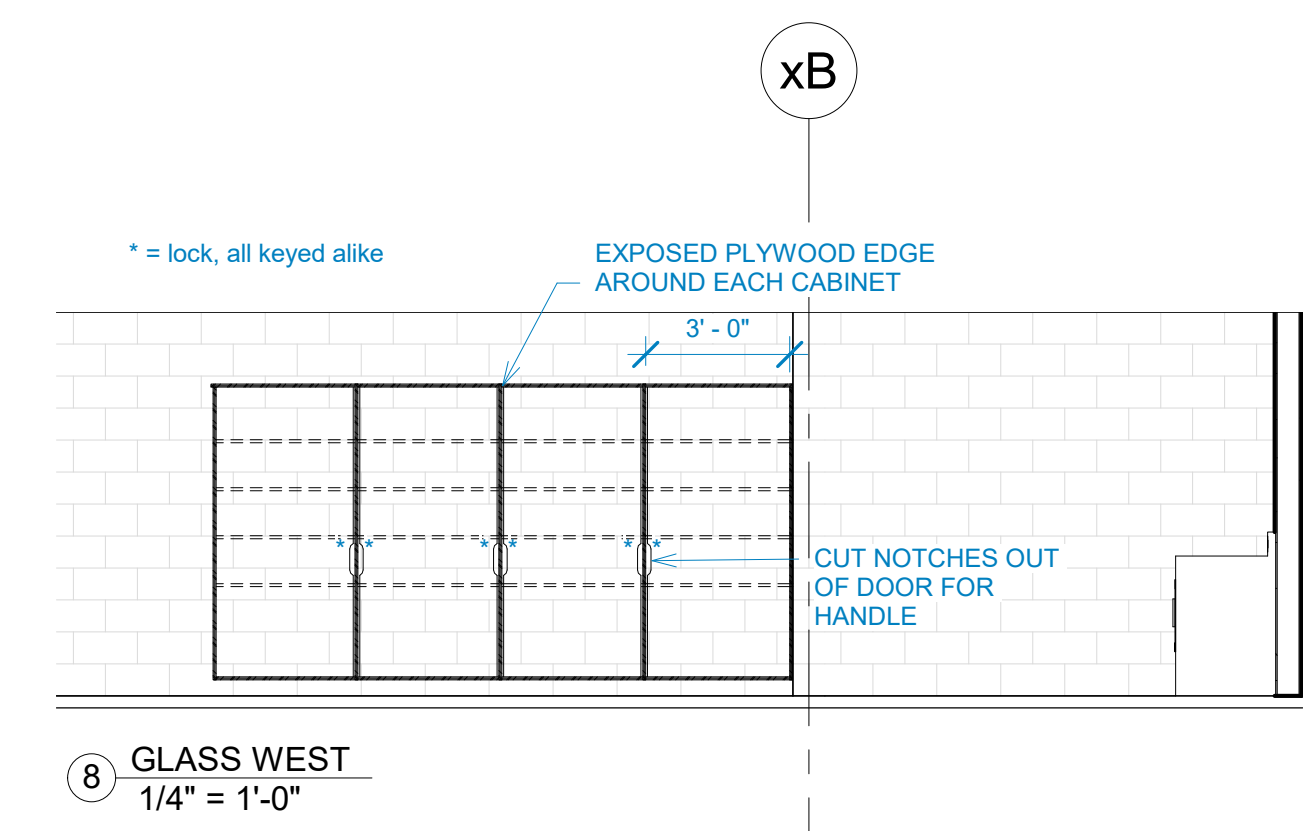
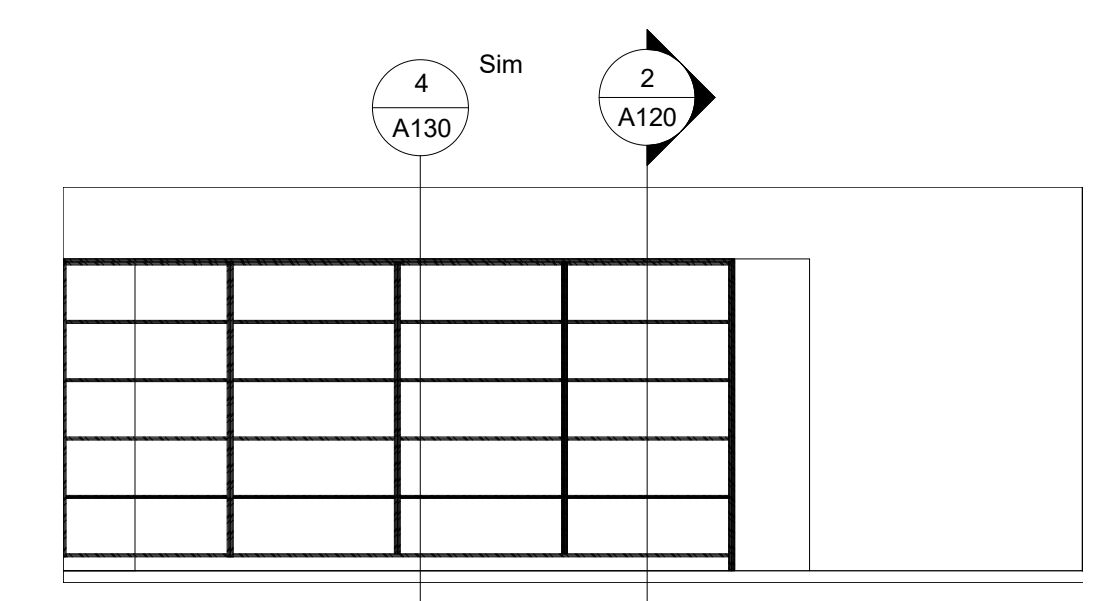
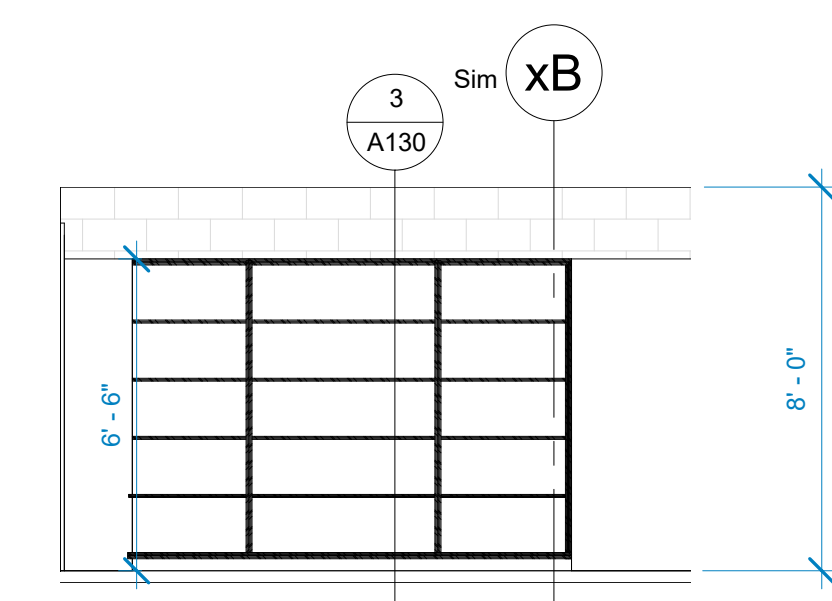
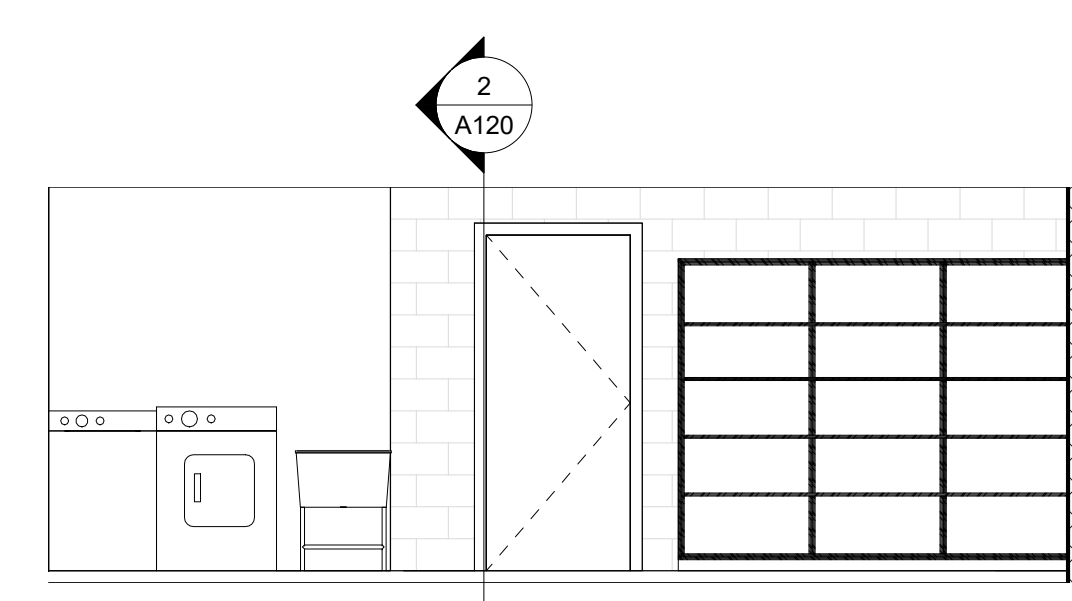
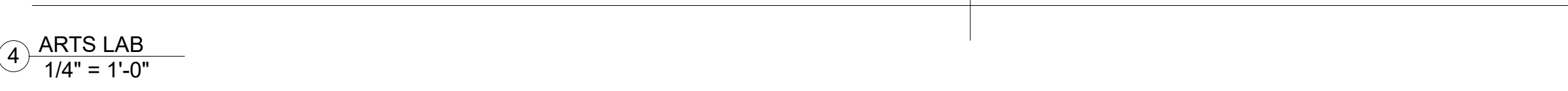
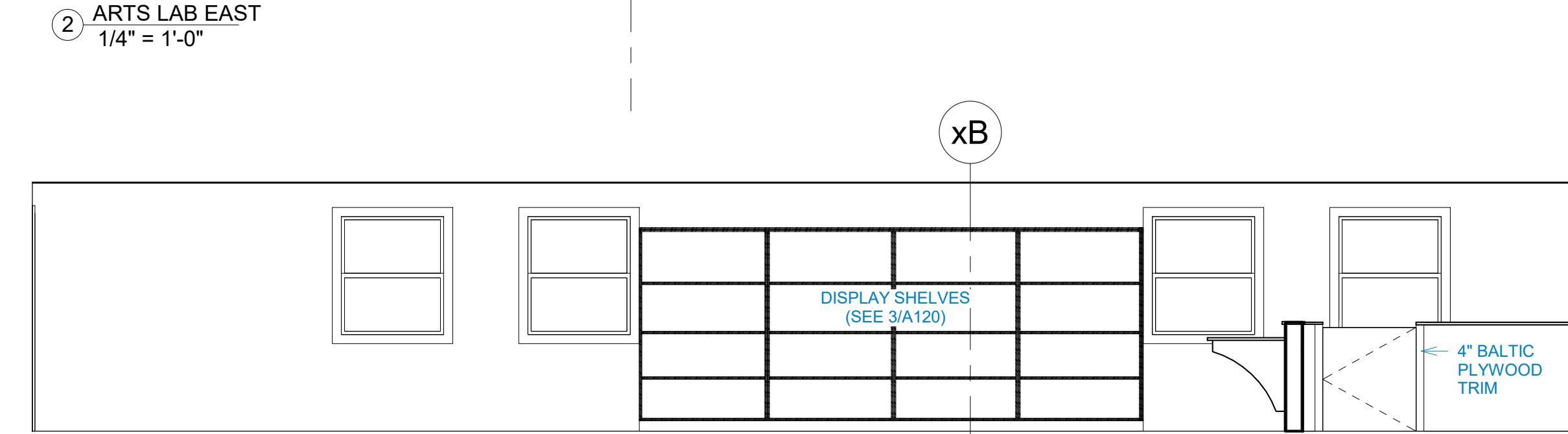
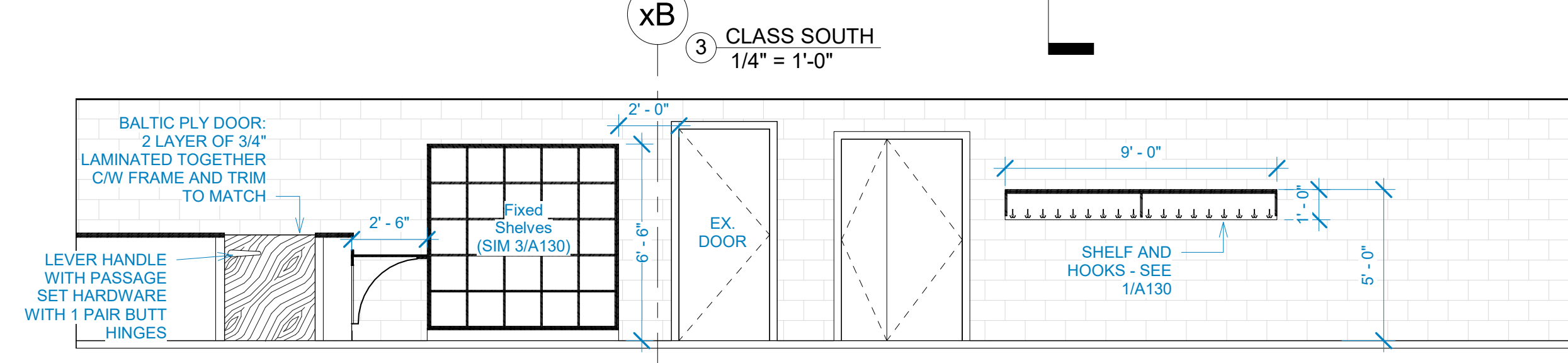
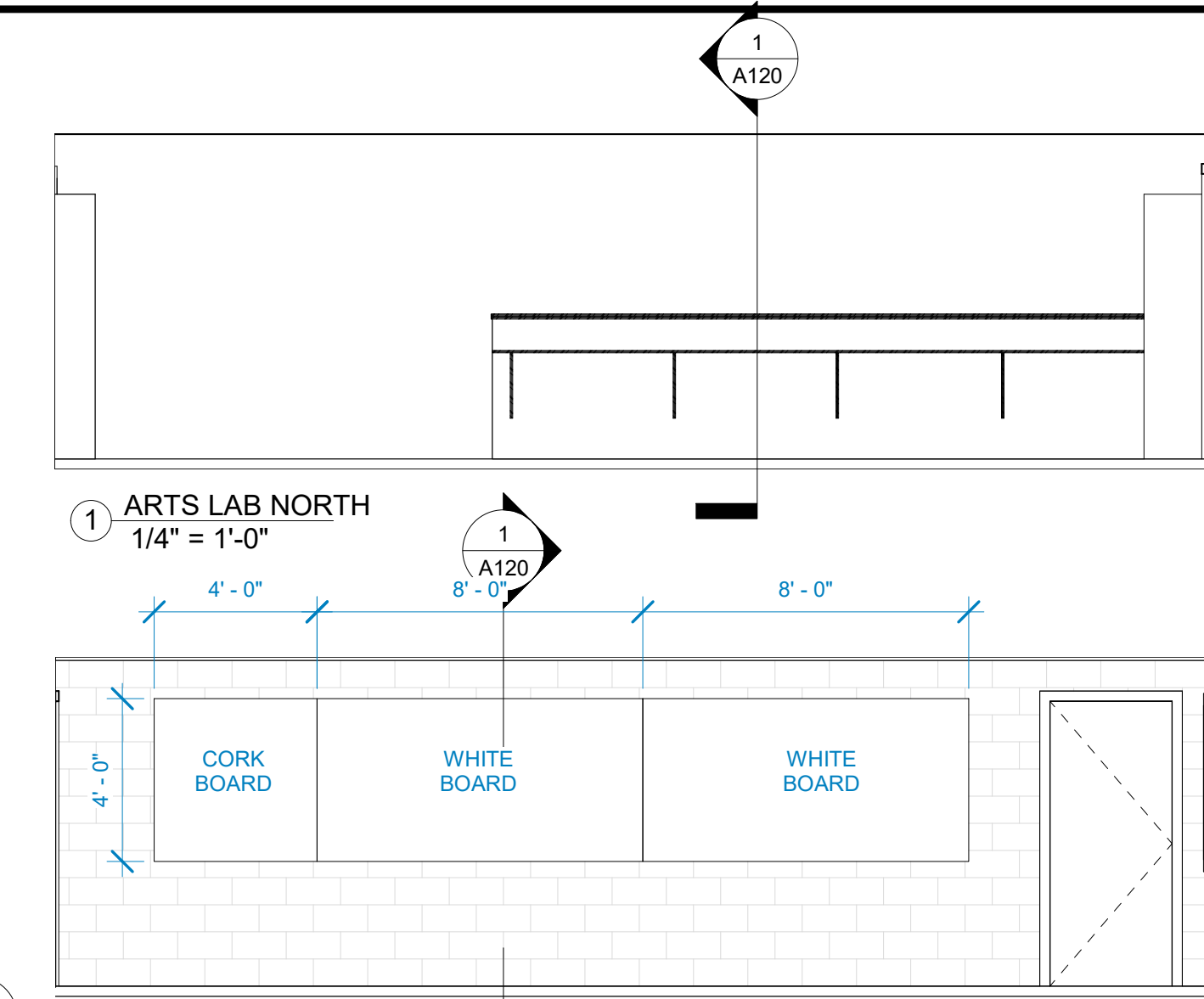
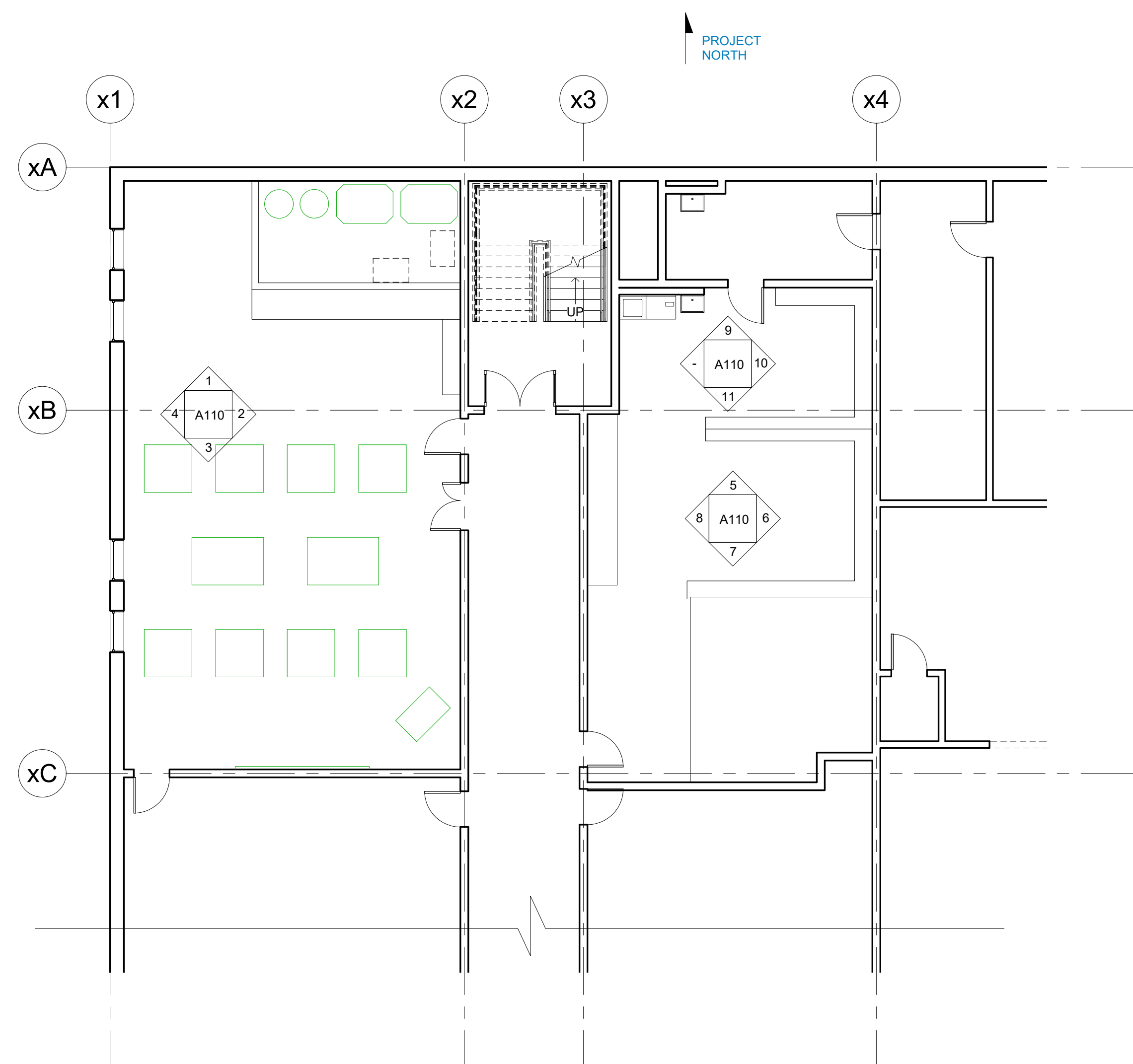
SHEET TITLE

PROPOSED PLANS

A101



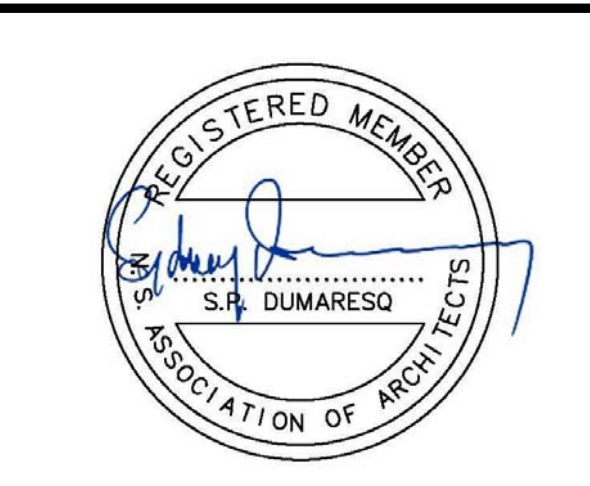
1 Main Level - Proposed
 1/4" = 1'-0"

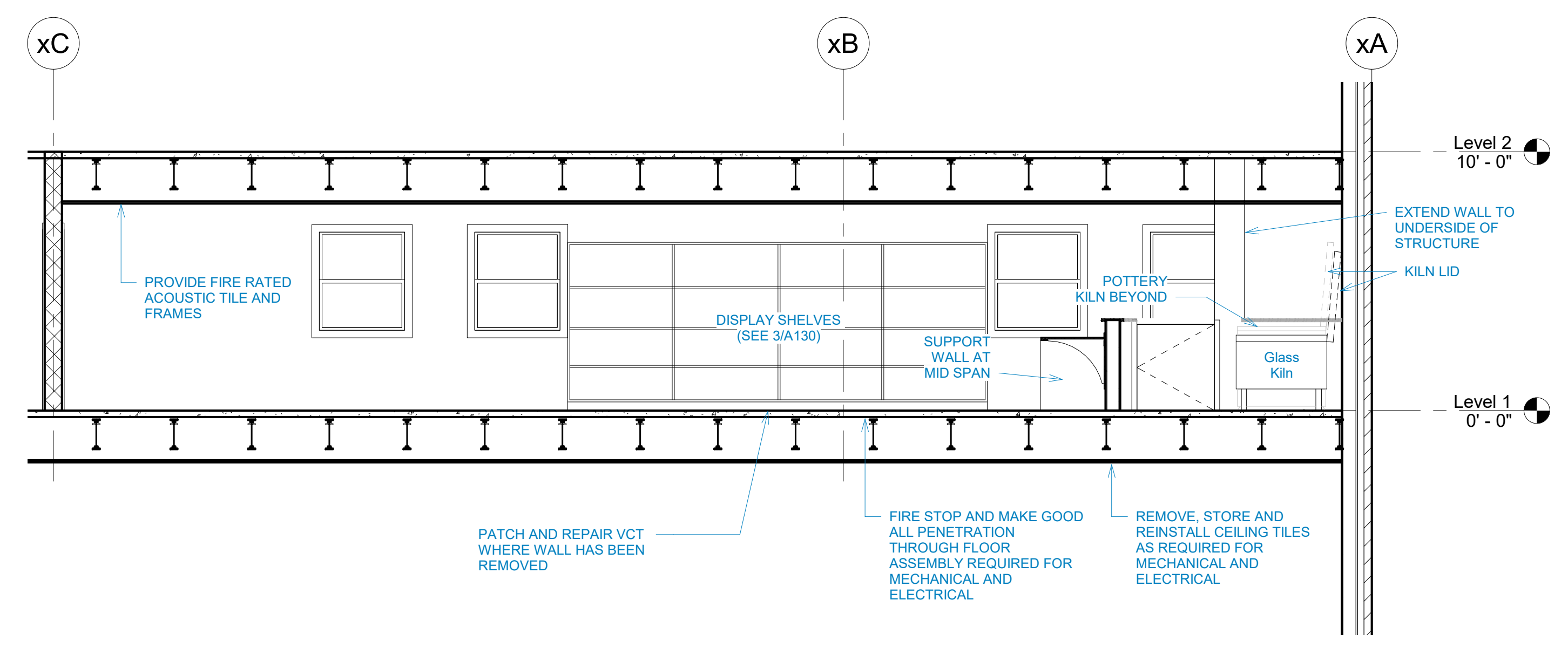


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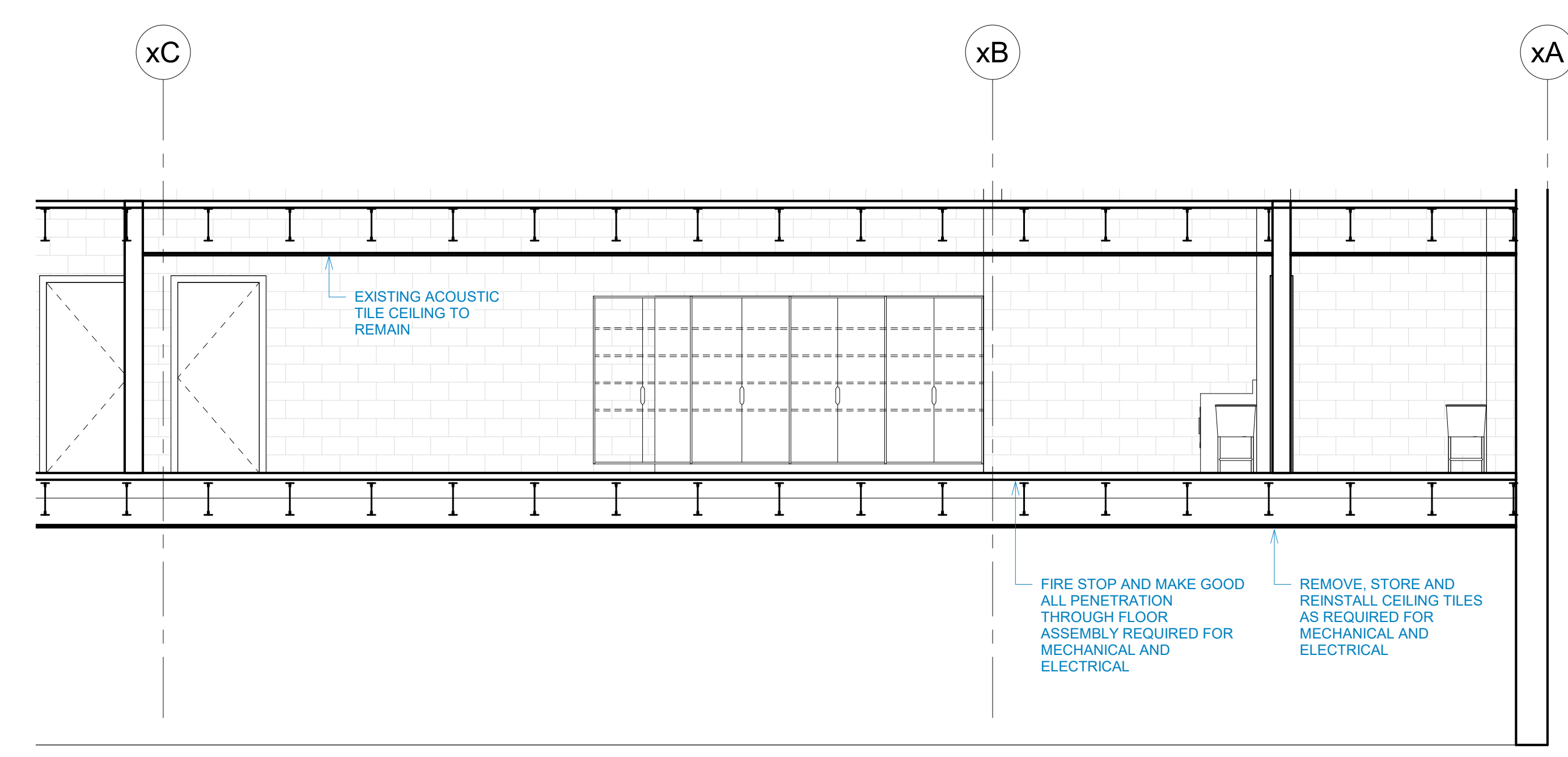
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1 SECTION THROUGH ARTS LAB
1/4" = 1'-0"



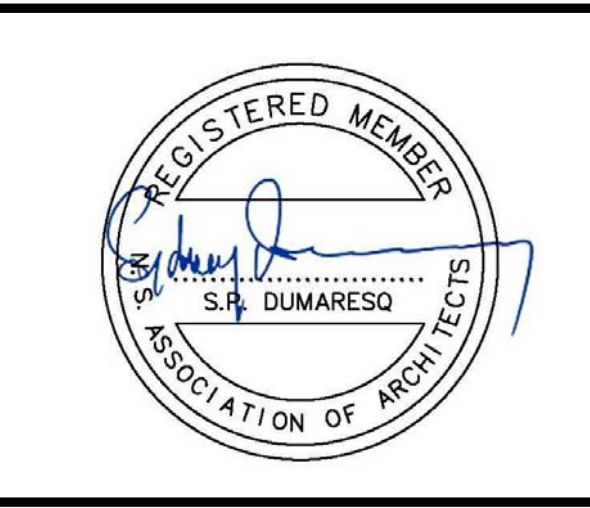
2 SECTION THROUGH STORAGE/GLASS
1/4" = 1'-0"

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REVIEWED BY:

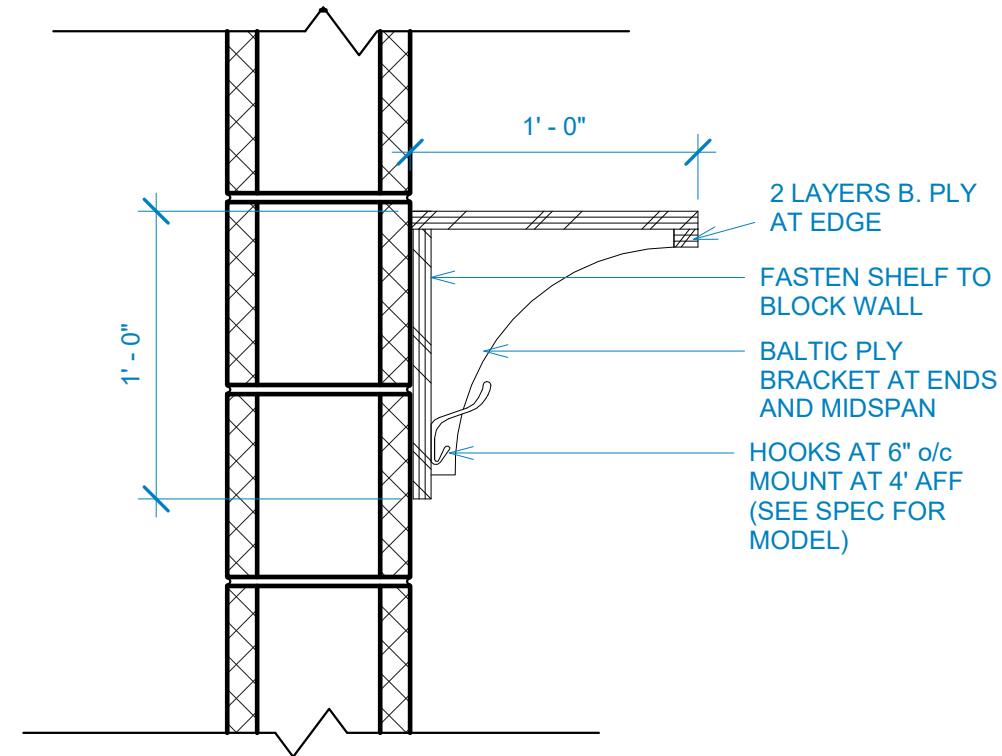
DATE: JUNE 2020

PROJECT TITLE
COLE HARBOUR ARTS LAB

Project Number

SHEET TITLE
SECTIONS

A120



1 HOOKS AND SHELF
1 1/2" = 1'-0"

DOOR DETAILS:

NOTE: ALL DOOR HARDWARE TO BE SCHLAGE INSTITUTION GRADE

DOOR 01:

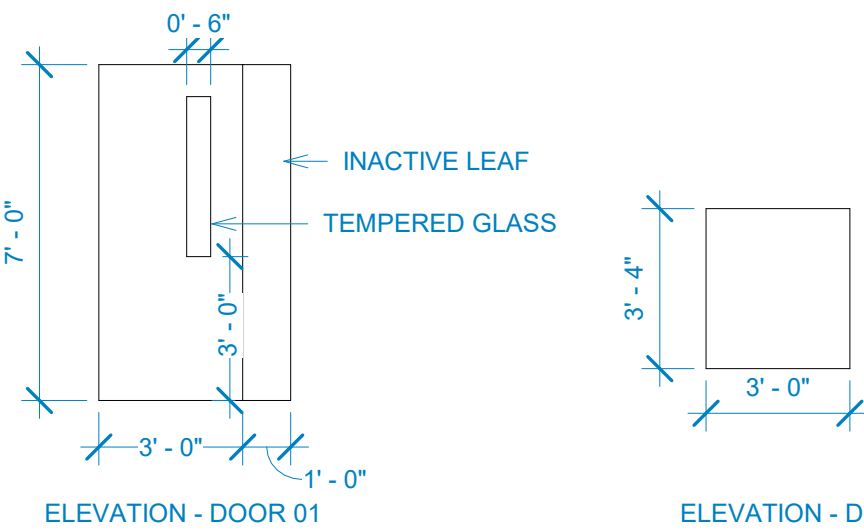
WIDTH: LEAF 1 = 36"
LEAF 2 = 12"
HEIGHT: 7' 0"
THICKNESS: 1.75"
MATERIAL: SOLID CORE WOOD
FINISH: BOOKMATCHED BIRCH VENEER NATURAL FINISH
FRAME MATERIAL: PRESSED STEEL
FRAME FINISH: PAINT
GLAZING: TEMPERED GLASS
MANUFACTURER: BAILLARGEON
MODEL: 8500-ME

HARDWARE
3 PAIR BUTT HINGES
FLUSH BOLTS ON INACTIVE LEAF
LEVER HANDLE CLASS ROOM FUNCTION
KEYED TO MASTER SYSTEM FOR THE SCHOOL CONSULT OWNER
DOOR CLOSER ON OPERABLE LEAF
ASTRAGAL

DOOR 02:

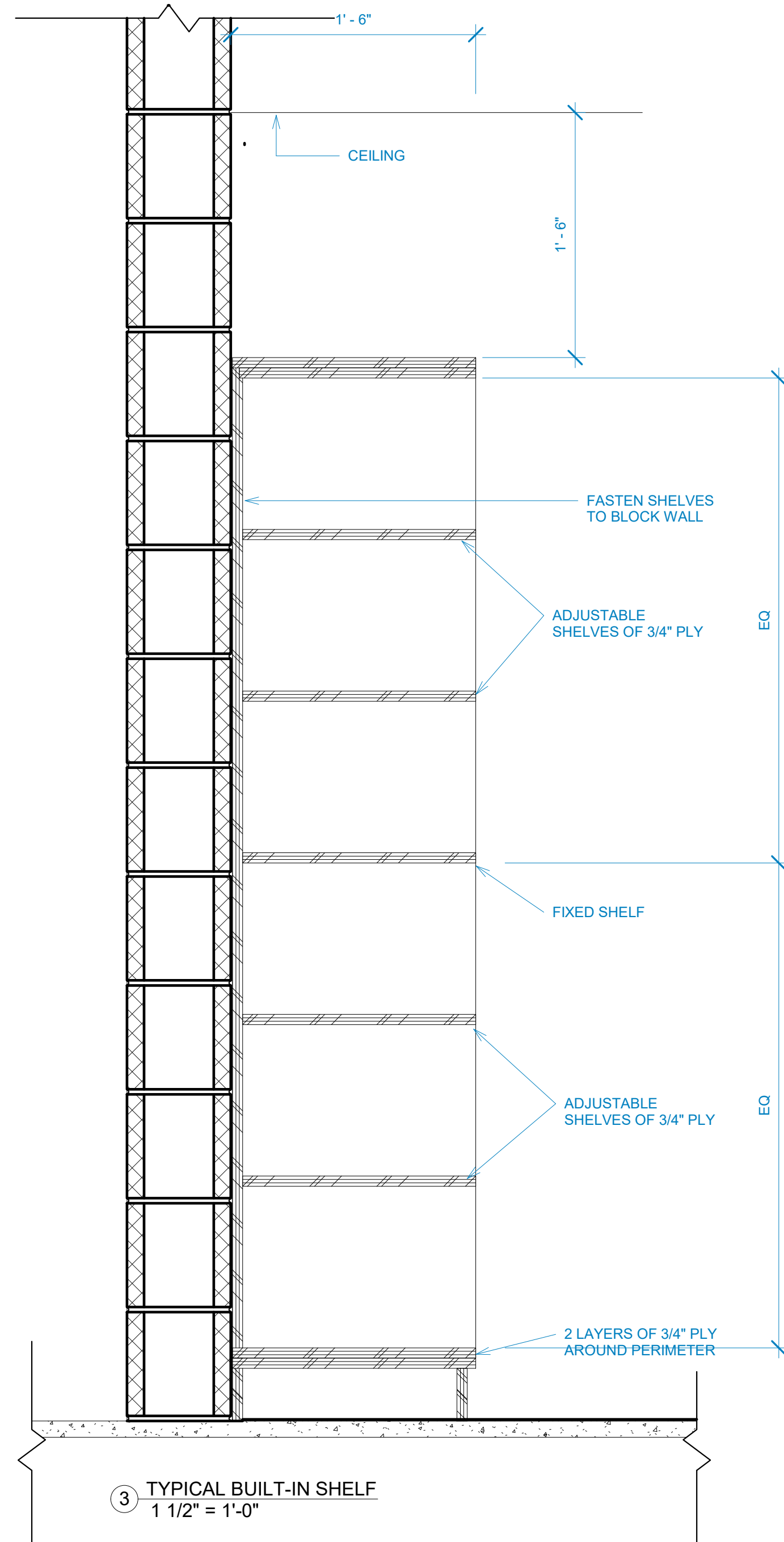
WIDTH: LEAF 1 = 36"
THICKNESS: 3' 4"
HEIGHT: 1' 5"
MATERIAL: 2 LAYERS BALTIC BIRCH PLYWOOD
FINISH: CLEAR COAT
FRAME MATERIAL: BIRCH HARDWOOD
FRAME FINISH: NATURAL FINISH

HARDWARE
LEVER HANDLE
PASSAGE SET FUNCTION
1 PAIR BUTT HINGES

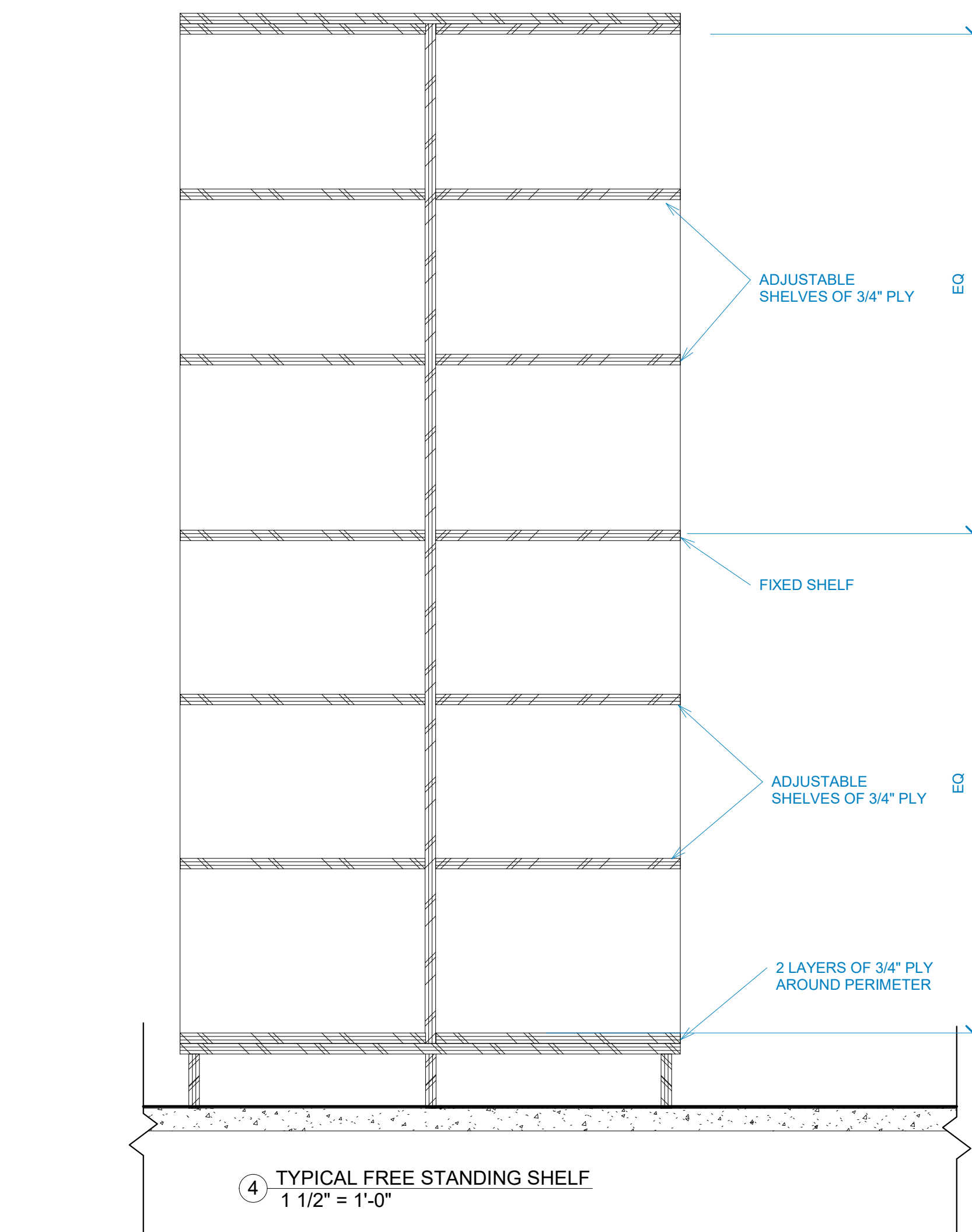
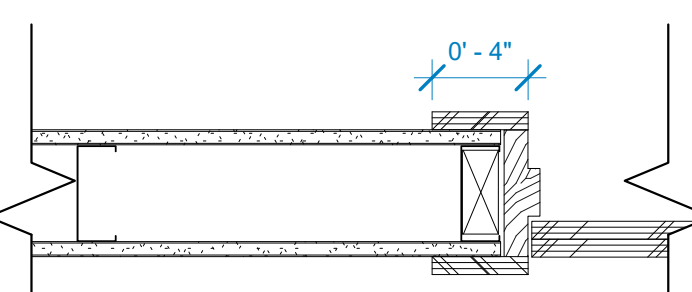
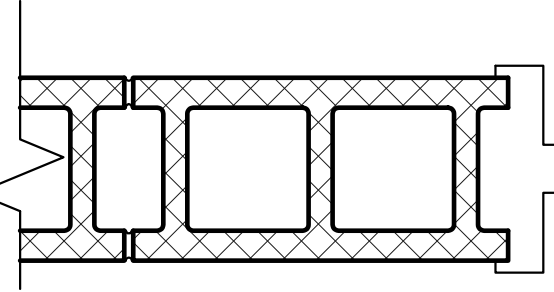


8 DOOR JAMB 01
1 1/2" = 1'-0"

7 HALF DOOR JAMB AND SECTION
1 1/2" = 1'-0"



3 TYPICAL BUILT-IN SHELF
1 1/2" = 1'-0"



4 TYPICAL FREE STANDING SHELF
1 1/2" = 1'-0"

FINISH SCHEDULE:

ROOM 1 AND 2: ARTS LAB AND KILN ROOM

WALLS: PAINTED - PRIME PLUS 2 COATS EGGSHELL
FLOORS: EXISTING VINYL COMPOSITE TILE TO REMAIN - PATCH WHERE WALL IS REMOVED
CEILING: FIRE RATED ACOUSTIC TILES & 2X2 FIRE RATED GRID

ROOM 3 & 4: STORAGE & FUTURE MECH

WALLS: PAINTED - PRIME PLUS 2 COATS EGGSHELL
FLOORS: EXISTING TO REMAIN - PATCH AND MAKE GOOD AS REQUIRED
CEILING: EXISTING TO REMAIN

NOTES:

NEW WALLS TO RECEIVE RUBBER BASE
ALL NEW CEILINGS TO BE FIRE RATED TILES AND FRAMES
ALL GYPSUM WALL BOARD TO BE 5/8" TYPE X



TABLE COVER - PLAN VIEW

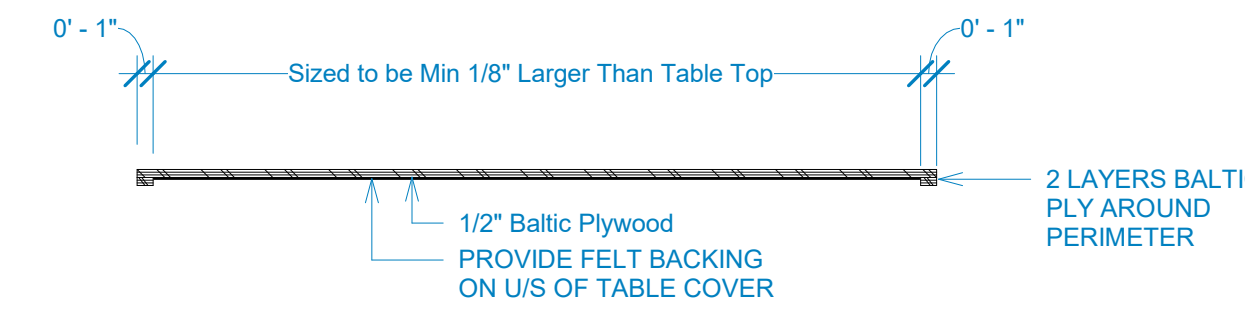
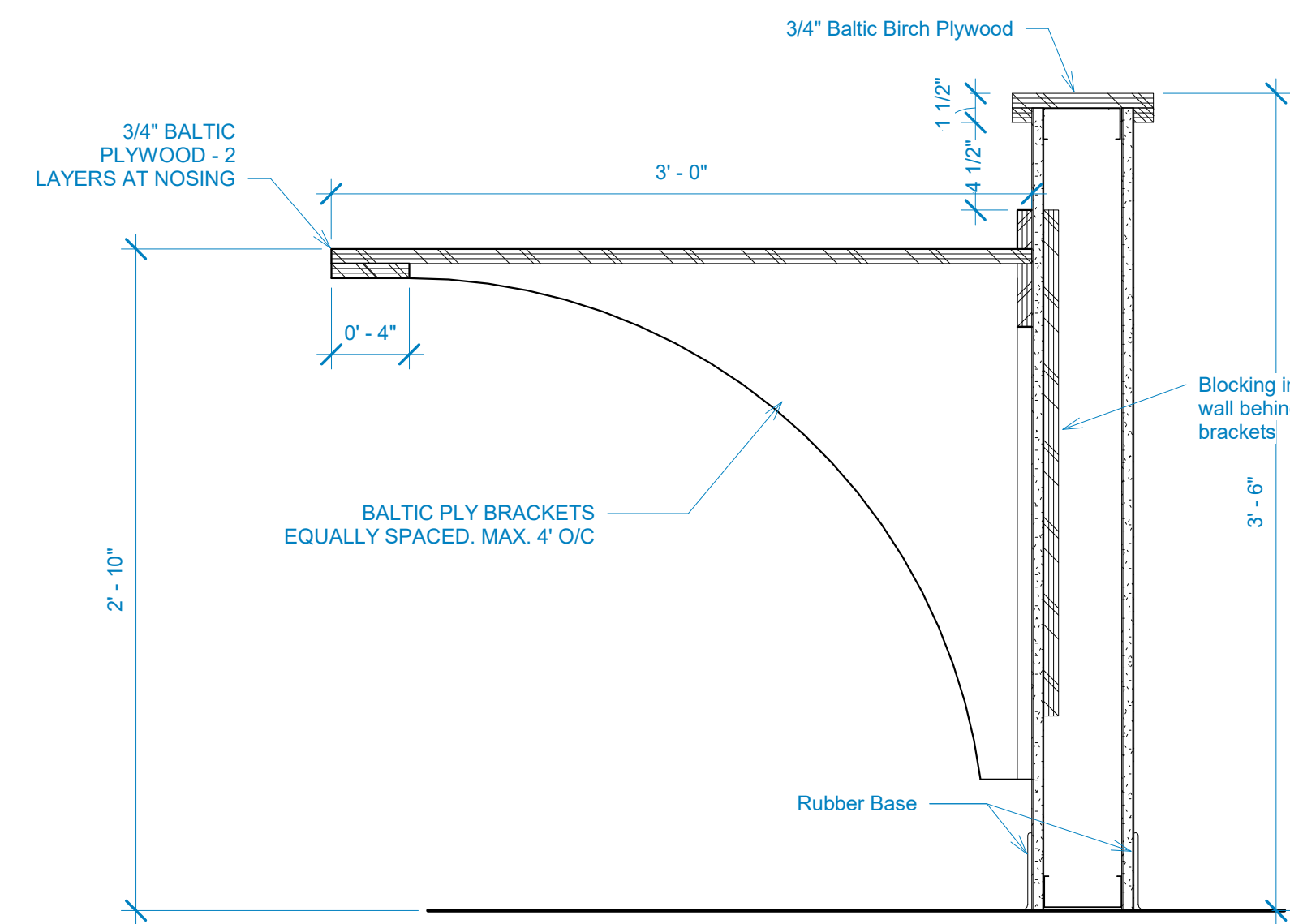


TABLE COVER - SECTION VIEW

5 TABLE COVER
1" = 1'-0"



2 Bench & Half Wall Section
1 1/2" = 1'-0"

- NOTES:
1. THE INTENT OF TABLE TOP IS TO PROVIDE A PORTABLE WORK SURFACE THAT WILL FIT SECURELY OVER THE STUDENT WORK TABLES TO COVER THEM FOR CLAY WORK.
 2. TABLE COVERS BY THIS CONTRACT. TABLES BY OTHERS (ORDERED FROM CATALOG)
 3. APPROXIMATE DIMENSIONS OF TABLES ARE 4' BY 4'. COORDINATE EXACT DIMENSIONS WITH TABLES. ENSURE TIGHT FIT OF TABLE COVERS. PROVIDE SHOP DRAWINGS INCLUDING DIMENSIONS.
 - 4.



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DATE: JUNE 2020

PROJECT TITLE

COLE HARBOUR ARTS LAB

Project Number

SHEET TITLE

DETAILS

A130

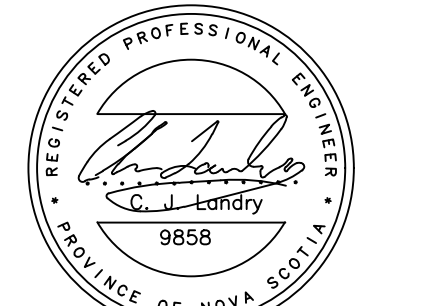
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DATE # ISSUE

2020.06.08 1 ISSUED FOR TENDER



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DRAWN BY: STAFF

REVIEWED BY: STAFF

DATE: 2020.04.24

PROJECT TITLE

COLE HARBOUR ARTS LAB

Project Number

SHEET TITLE

FLOOR PLAN AIR DISTRIBUTION AND SPRINKLERS

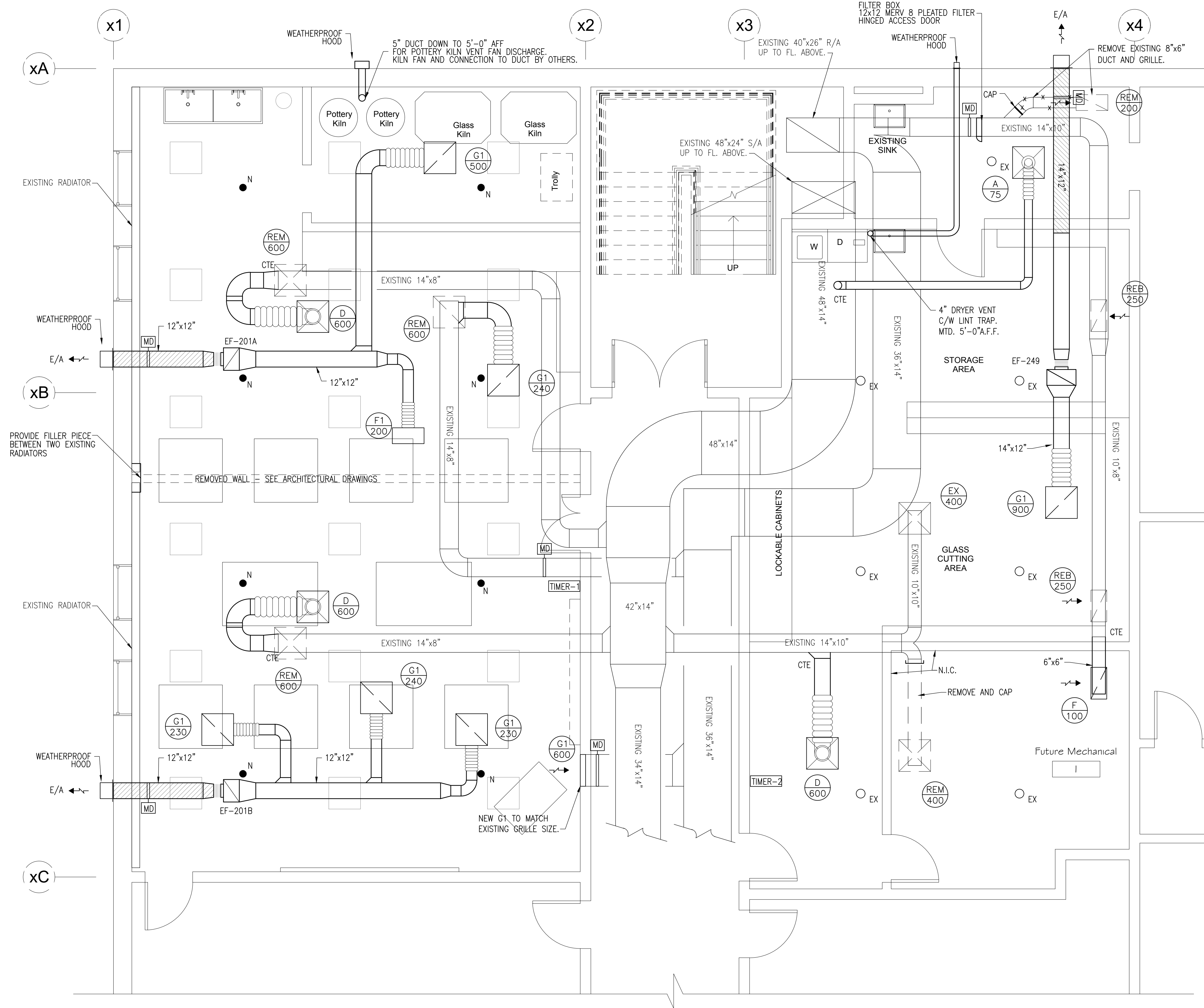
M-101

SPRINKLER NOTES

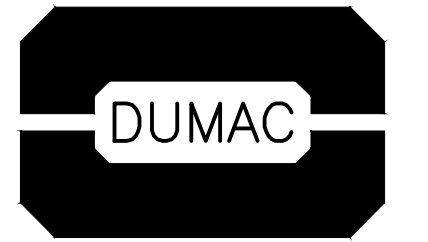
- ALL WORK SHALL CONFORM TO THE LATEST REQUIREMENTS OF THE NATIONAL BUILDING CODE - 2010, NFPA-13 - 2013, PROVINCIAL AND MUNICIPAL CODES.
- SPRINKLER CONTRACTOR IS NOT TO CHANGE PIPE SIZES WITHOUT WRITTEN CONSENT FROM THE MECHANICAL CONSULTANT.
- CO-ORDINATE THIS WORK WITH THE WORK OF THE OTHER TRADES.
- ALL SPRINKLER PIPE IN ROOMS WITH CEILINGS SHALL BE INSTALLED ABOVE CEILINGS.
- ALL NEW SPRINKLERS TO MAINTAIN PIPE SCHEDULE REQUIREMENTS AS PER NFPA 13.
- SPRINKLER CONTRACTOR SHALL ALLOW FOR UP TO (4) ADDITIONAL HEADS INCLUDING ANY ADJUSTMENTS REQUIRED IN THE SPRINKLER PIPING TO ACCOMMODATE ANY ADDITIONAL HEADS. THESE DO NOT ACCOUNT FOR HEADS UNDER DUCTS ETC.
- SPRINKLER CONTRACTOR TO ENSURE THAT THE SPRINKLER SYSTEM IS IN OPERATION THROUGHOUT AT THE END OF EACH WORKDAY.
- COORD. INSTALLATION WITH OTHER TRADES AND STRUCTURE.
- SPRINKLERS U/S OF STAIRS TO BE INTERMEDIATE LEVEL TYPE C/W HEAD GUARDS.
- ALL AREAS PROTECTED BY SPRINKLER SYSTEM TO BE MAINTAINED AT MIN. 40 DEG F AND PROTECTED FROM FREEZING.

LEGEND

- - REMOVE EXISTING SPRINKLER. INSTALL NEW QUICK RESPONSE SPRINKLER HEAD IN SAME LOCATION.



1 FLOOR PLAN - AIR DISTRIBUTION & SPRINKLERS
 M-101 SCALE 1/4"=1'-0"



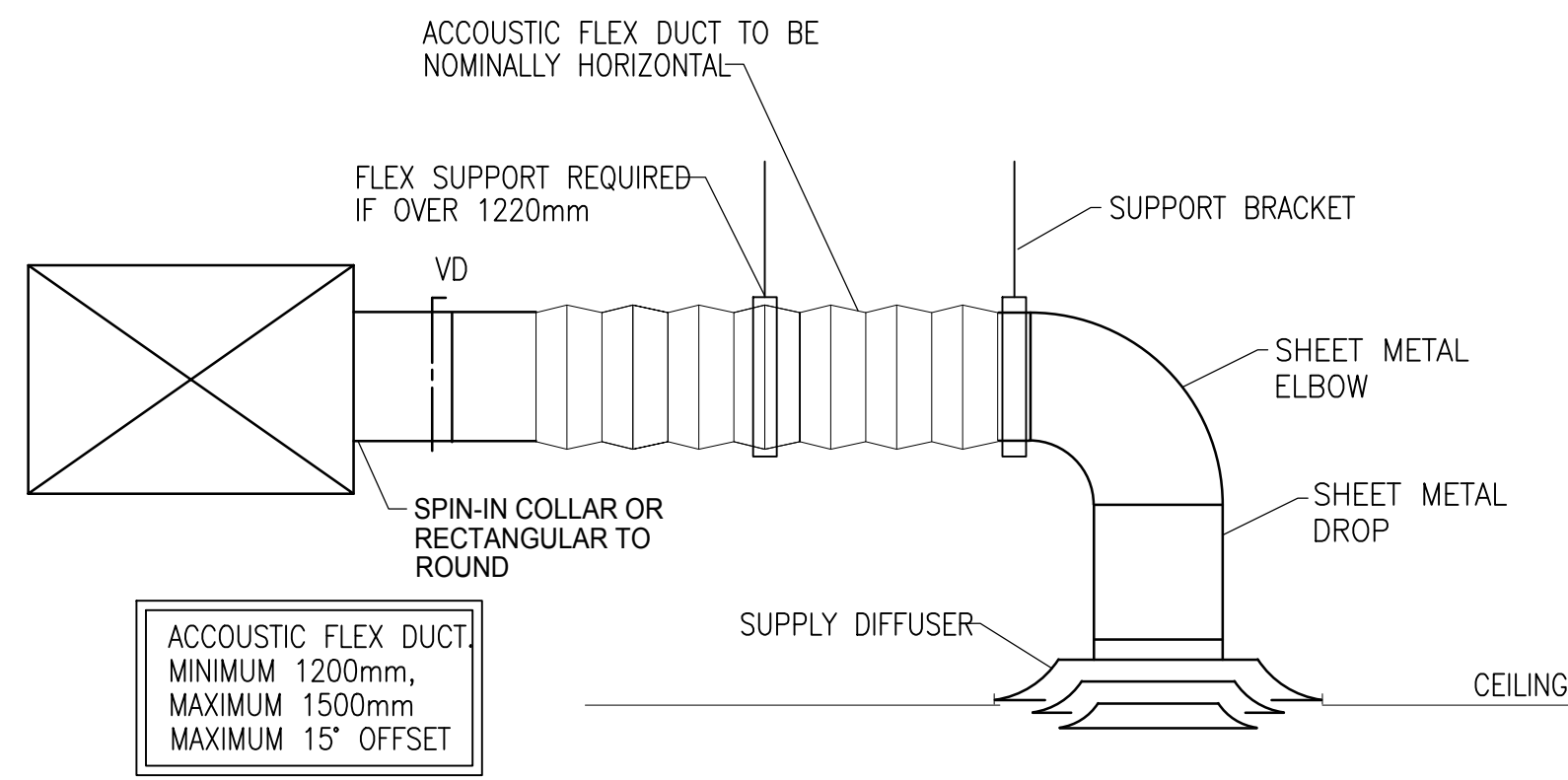
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FAN AND DAMPER SCHEDULE

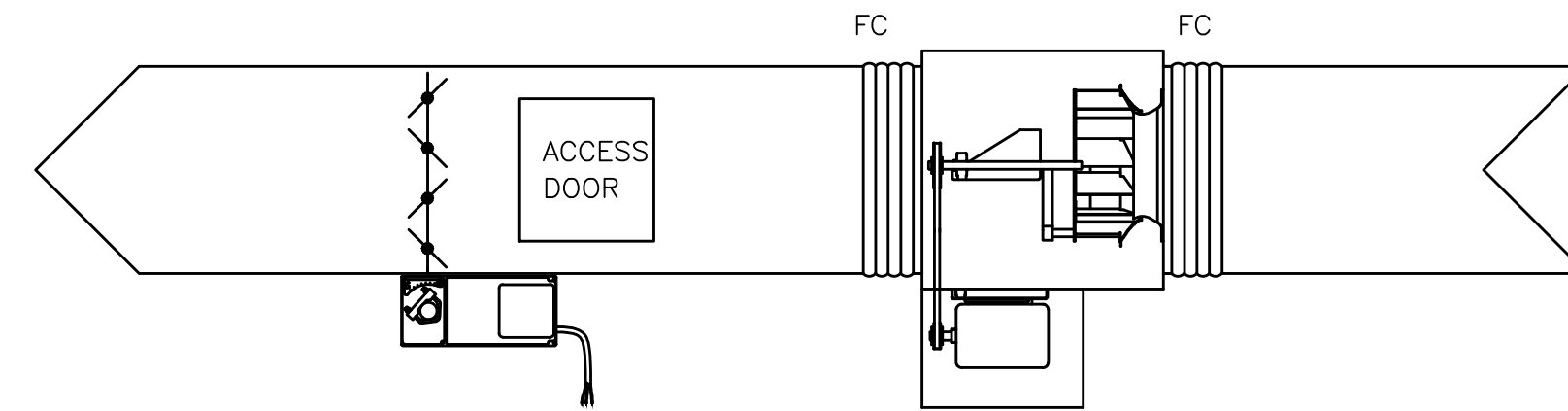
SYMBOL	SERVES	LOCATION	STANDARD OF ACCEPTANCE		AIRFLOW		DRIVE	RPM	BHP	VOLTAGE	CONTROL DAMPER	DAMPER MOTOR	BDD	DISC	SONES	ACCESSORIES AND/OR REMARKS
			MANUFACTURER	MODEL#	CFM	S.P. (INCH)										
EF-201A	KILNS & ART ROOM	ART RM 201 CEILING	LOREN COOK	GN-740	700	0.25"	DIRECT	1506	307 WATTS	120/1Ø	Y	Y	N	Y	5.5	GEMINI ISOLATION KIT, FACTORY-WIRED FAN SPEED CONTROLLER
EF-201B	KILNS & ART ROOM	ART RM 201 CEILING	LOREN COOK	GN-740	700	0.25"	DIRECT	1506	307 WATTS	120/1Ø	Y	Y	N	Y	5.5	GEMINI ISOLATION KIT, FACTORY-WIRED FAN SPEED CONTROLLER
EF-249	GLASS CUTTING & STORAGE	ART RM 249 CEILING	LOREN COOK	GNV-700	900	0.25"	ECM DIRECT	1730	295 WATTS	120/1Ø	Y	Y	N	Y	8.0	GEMINI ISOLATION KIT, FACTORY-WIRED FAN SPEED CONTROLLER

DIFFUSER SCHEDULE

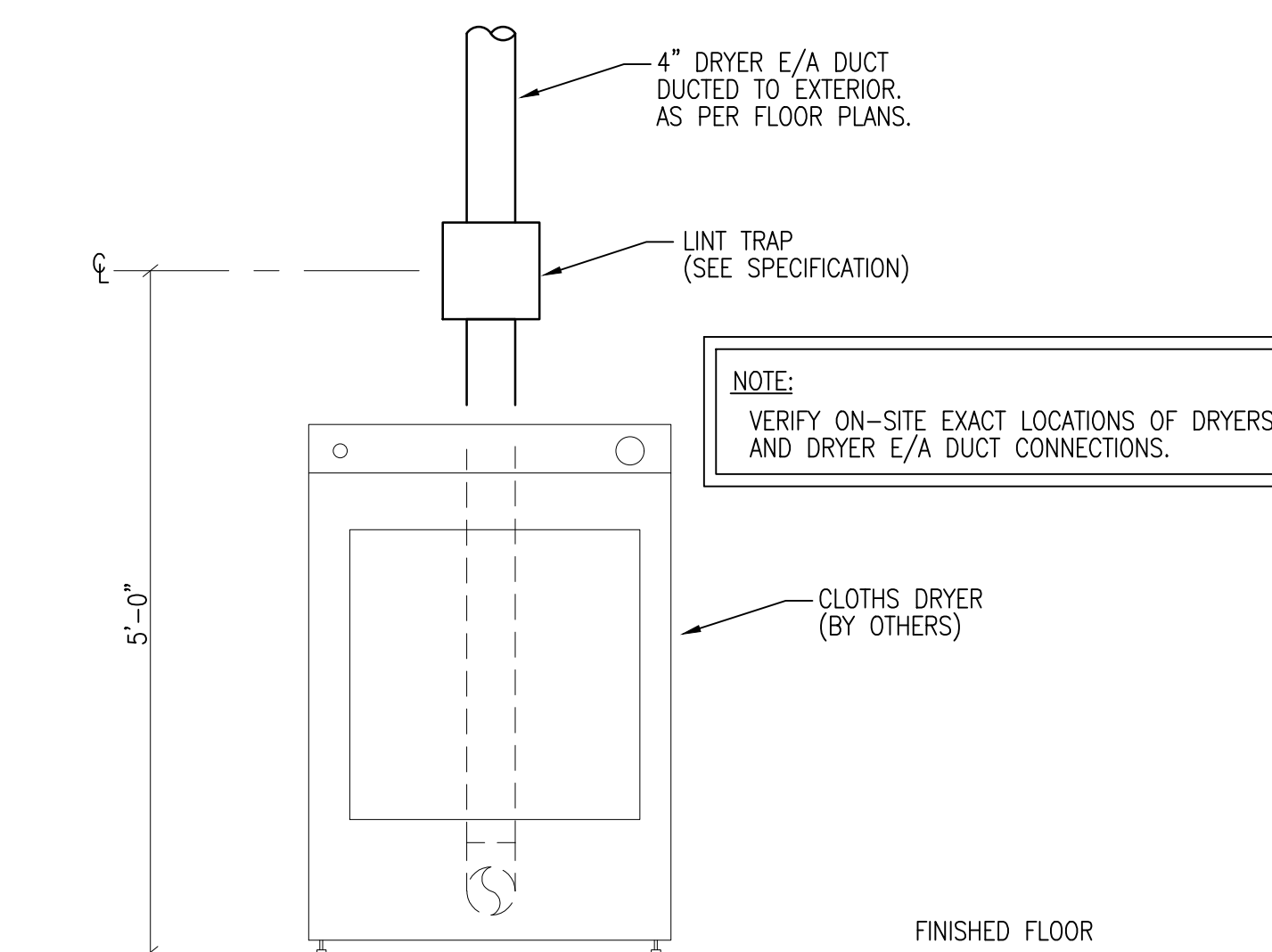
SYMBOL	SERVICE	STANDARD OF ACCEPTANCE		AIRFLOW CFM	NECK SIZE	MODULE SIZE	ACCESSORIES AND/OR REMARKS
		PRICE	MODEL				
A	SUPPLY	PRICE	SCD	0-100	6	24x24	BALANCING DAMPER IN BRANCH DUCT
C	SUPPLY	PRICE	SCD	226-400	10	24x24	BALANCING DAMPER IN BRANCH DUCT
D	SUPPLY	PRICE	SCD	401-600	12	24x24	BALANCING DAMPER IN BRANCH DUCT
F	RETURN/EXHAUST	PRICE	PDDR	0-235	-	12x24	BALANCING DAMPER IN BRANCH DUCT
G	RETURN/EXHAUST	PRICE	PDDR	236-550	-	24x24	BALANCING DAMPER IN BRANCH DUCT
F1	FILTERED RETURN/EXHAUST	PRICE	10-FR	0-235	-	12x24	BALANCING DAMPER IN BRANCH DUCT
G1	FILTERED RETURN/EXHAUST	PRICE	10-FR	236-550	-	24x24	BALANCING DAMPER IN BRANCH DUCT



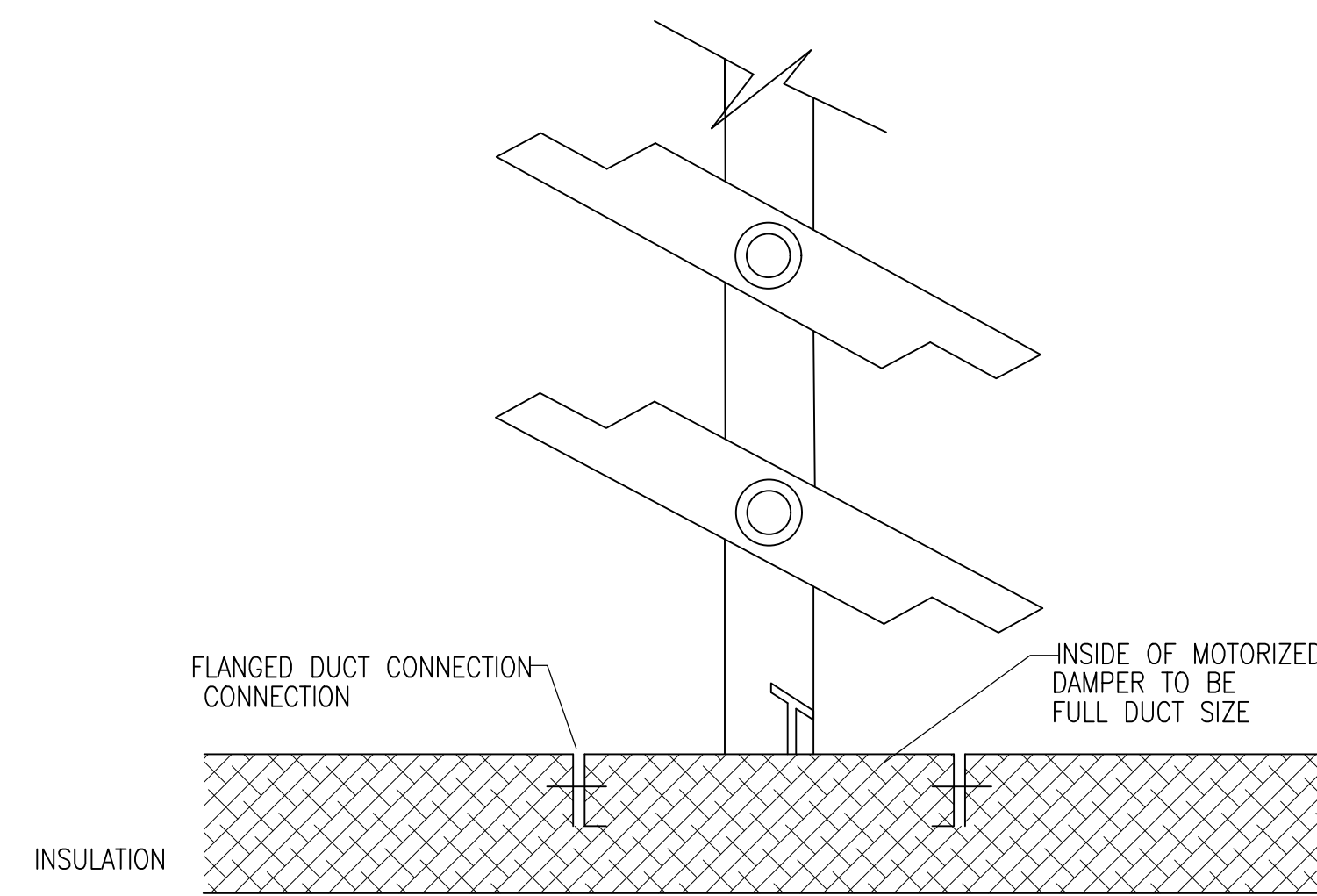
1 TYPICAL SUPPLY DIFFUSER CONNECTIONS
 MV601 NTS



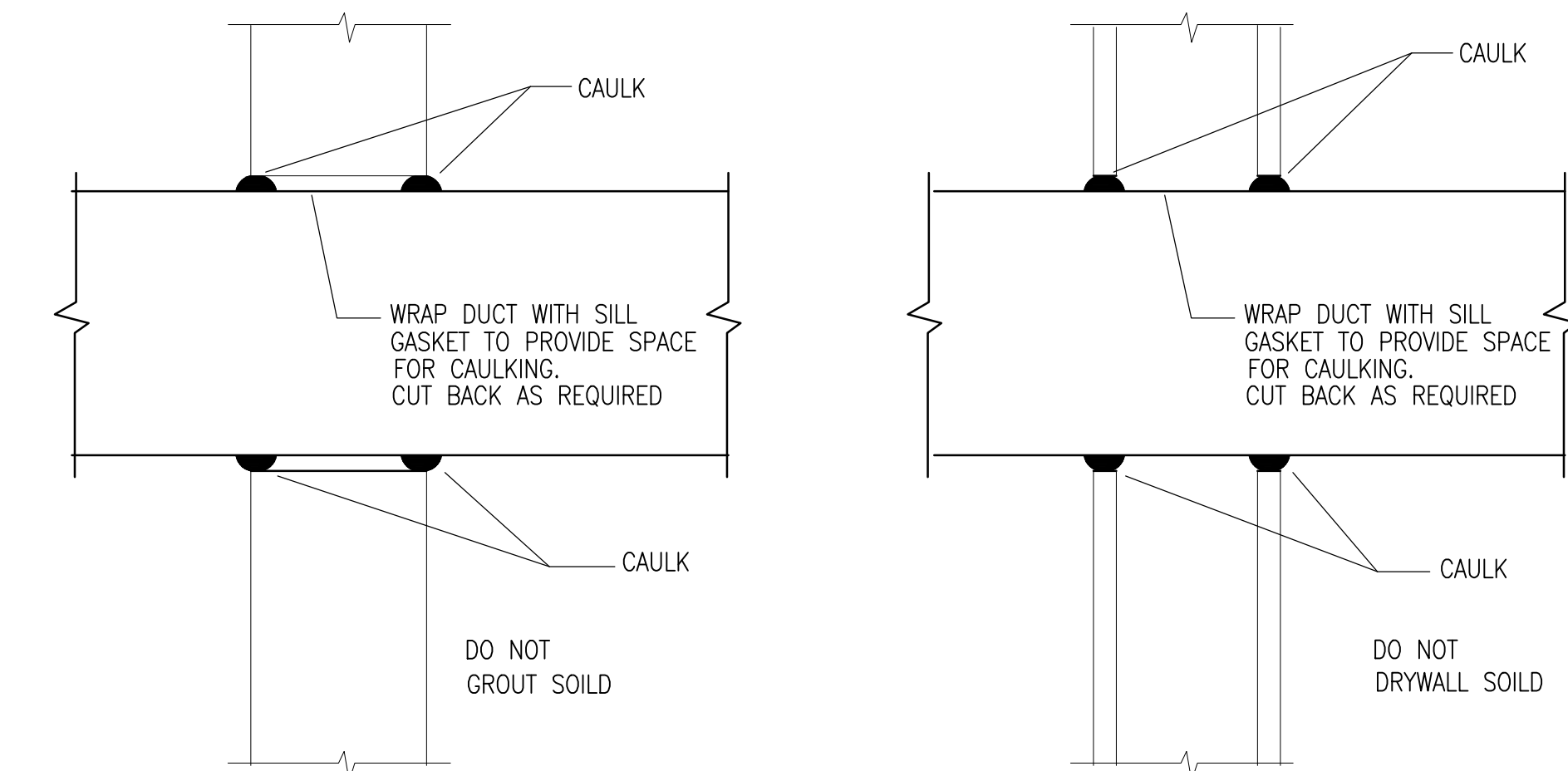
2 DAMPER & ACCESS LOCATIONS FOR FANS
 (DAMPERS BY MECHANICAL CONTRACTOR)
 (DAMPER MOTORS BY CONTROLS CONTRACTOR)
 MV601 NTS



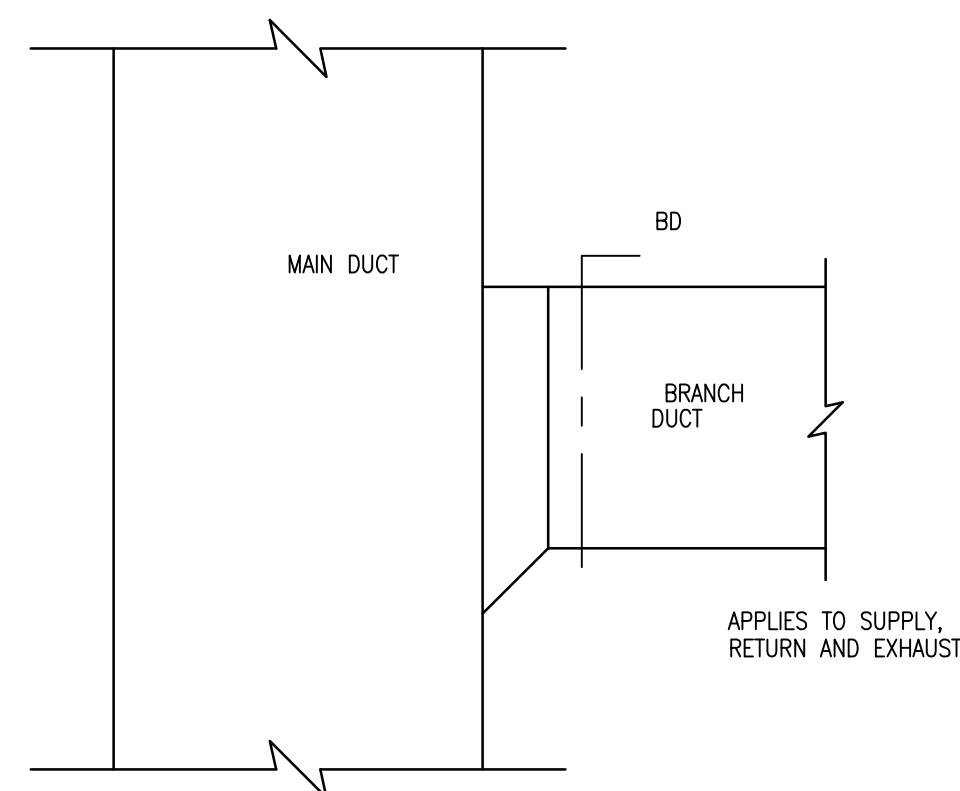
3 CLOTHES DRYER VENT DETAIL
 MV601 NTS



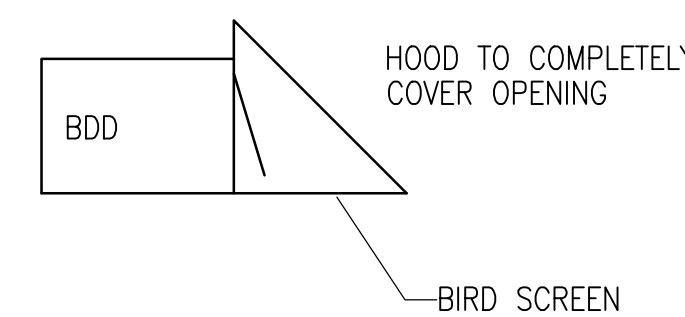
4 MOTORIZED DAMPER SUPPLIED BY MECHANICAL CONTRACTOR
 *** DAMPER ACTUATORS BY CONTROLS CONTRACTOR
 MV601 NTS



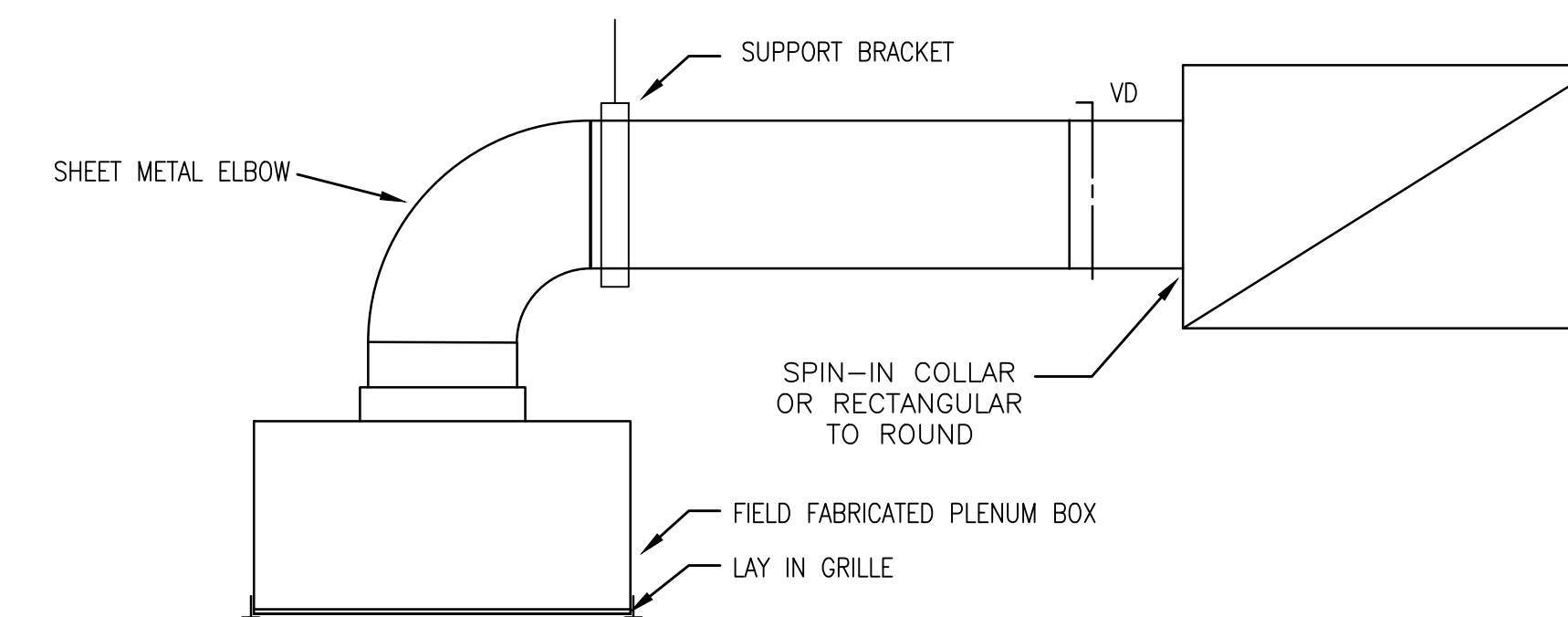
5 DUCT IN UNRATED WALL
 MV601 NTS



6 RECTANGULAR BRANCH CONNECTION DETAIL
 MV601 NTS



7 WALL CAP
 MV601 NTS



8 RETURN GRILLES 'F' & 'G' DETAILS
 MV601 NTS

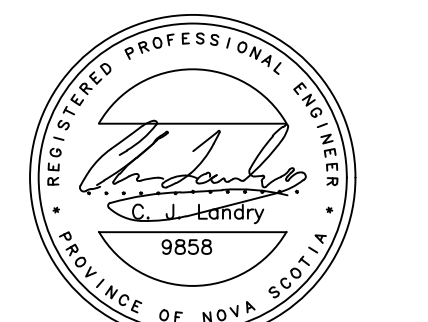
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IF DIMENSION DOES NOT MEASURE 1\"/>

DATE # ISSUE

2020.06.08 1 ISSUED FOR TENDER



SCALE: AS INDICATED

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REVIEWED BY: STAFF

DATE: 2020.04.24

PROJECT TITLE

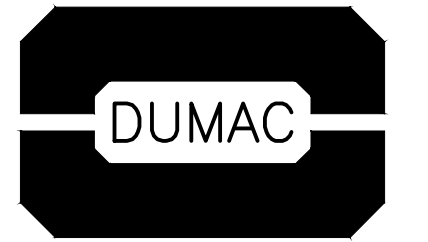
COLE HARBOUR ARTS LAB

Project Number

SHEET TITLE

SCHEDULES & DETAILS AIR DISTRIBUTION

MV601



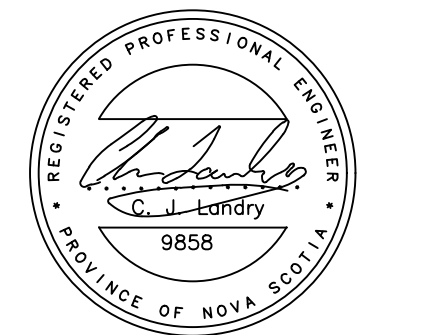
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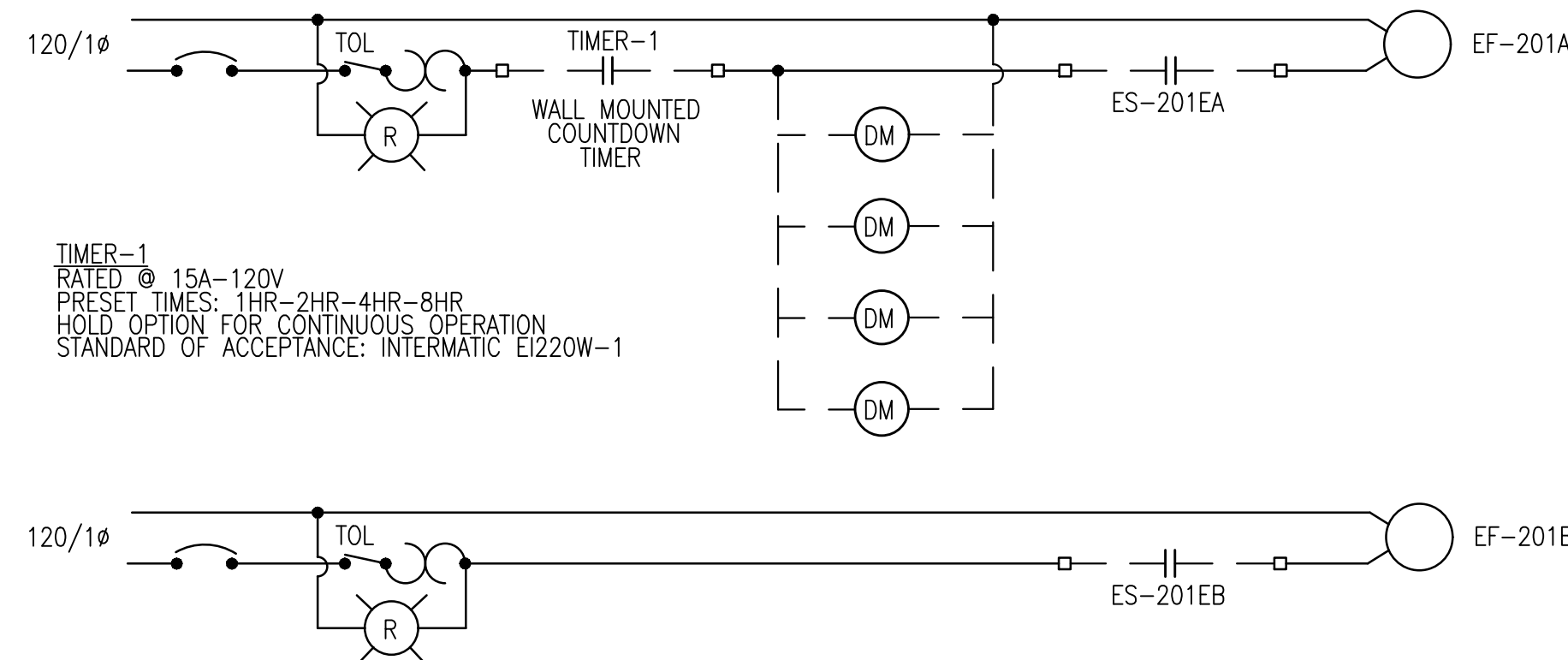
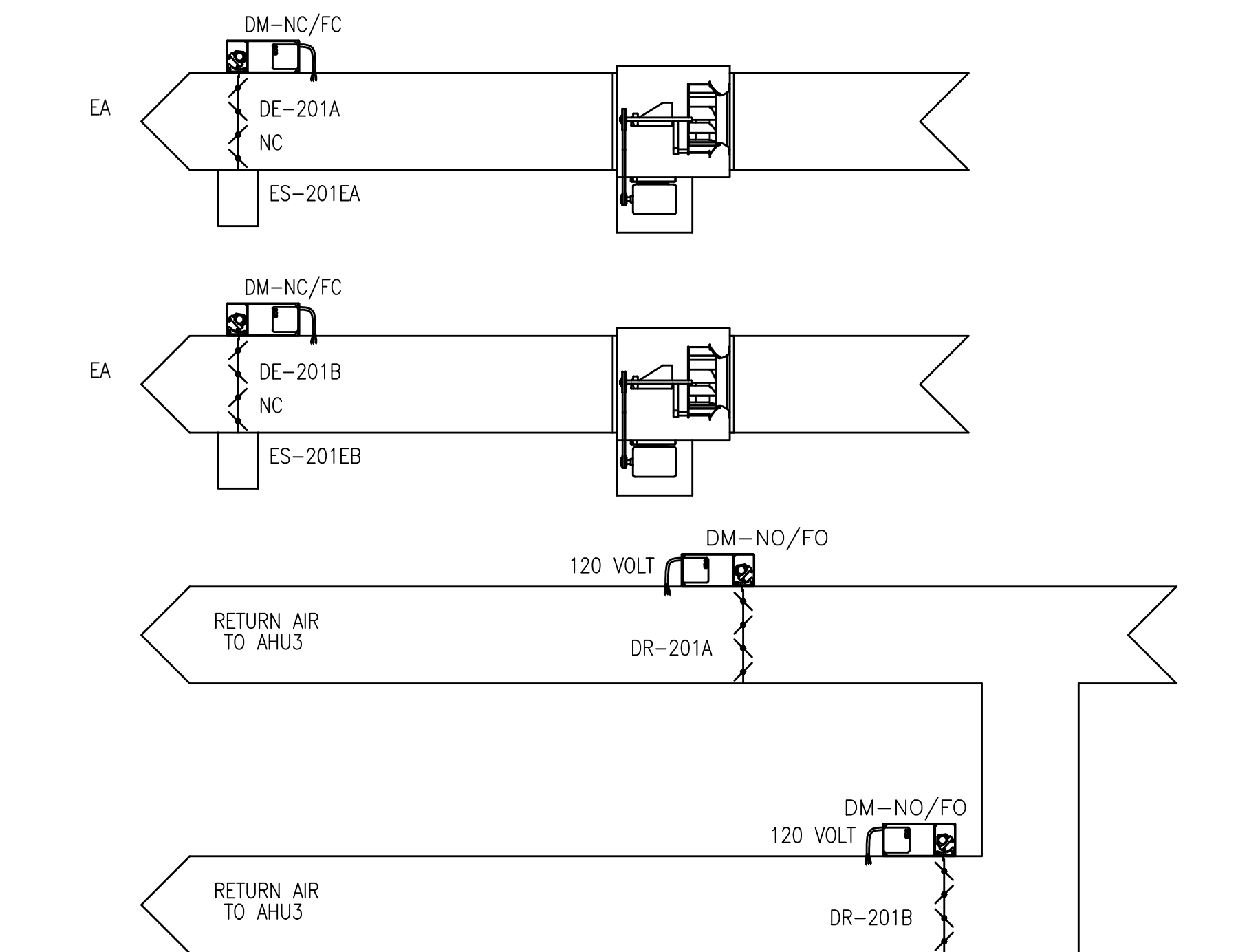
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COLE HARBOUR ARTS LAB

Project Number

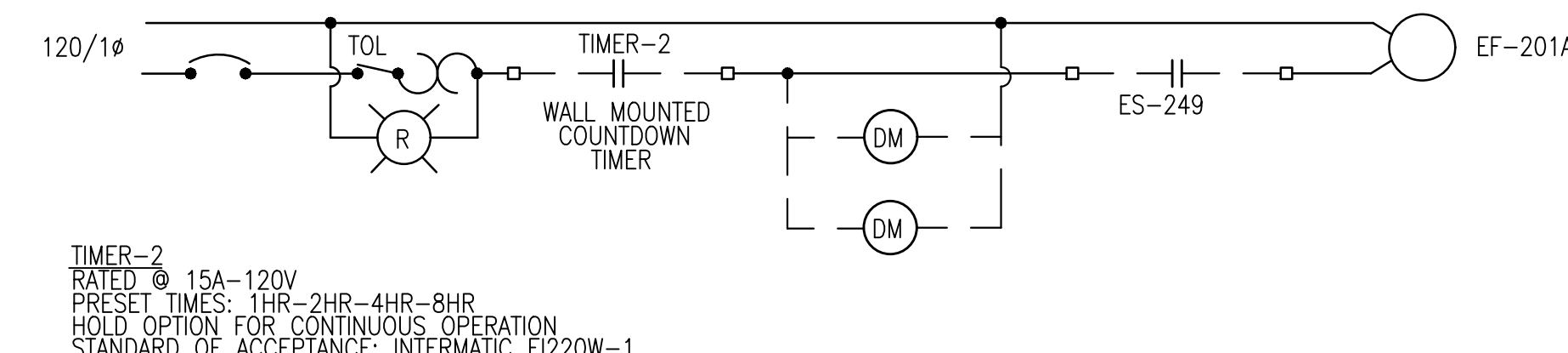
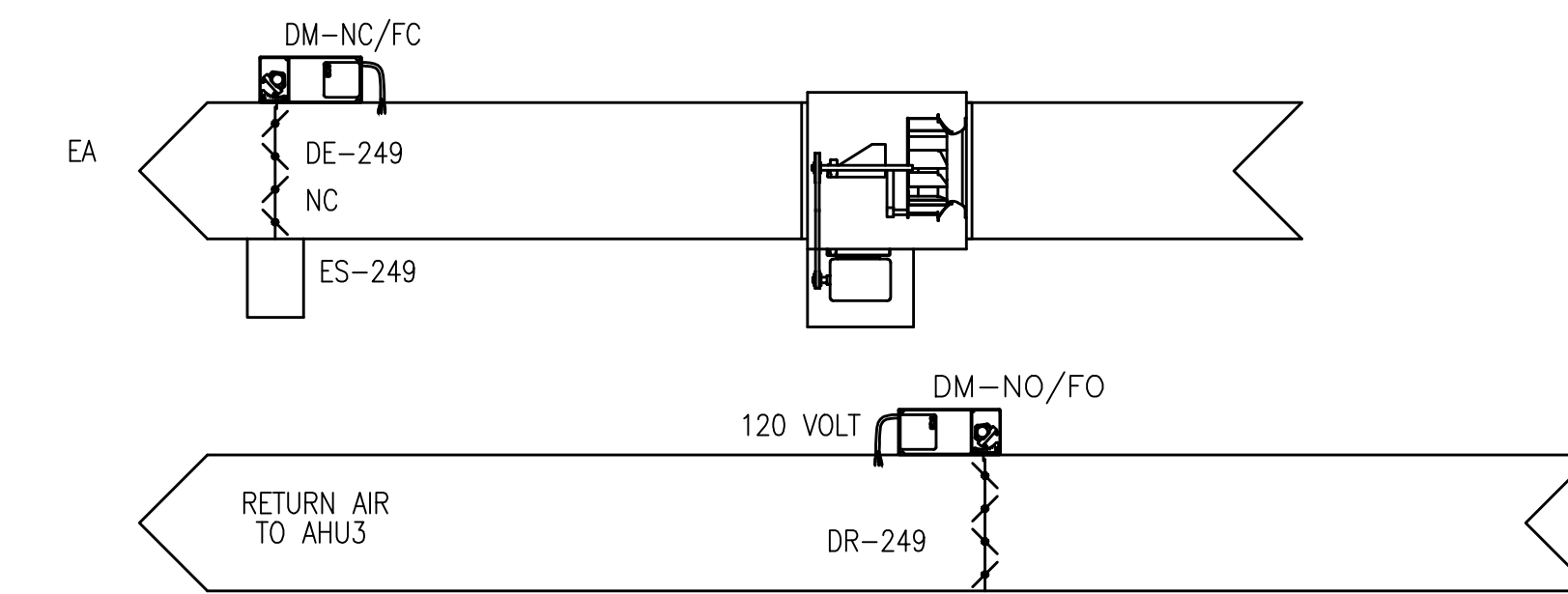
SHEET TITLE
MECHANICAL CONTROLS

MC601



SEQUENCE OF OPERATION
 EXHAUST MODE IS ENGAGED MANUALLY AT TIMER 1.
 WHEN TIMER ENGAGES:
 EXHAUST FAN DAMPER MOTORS ARE POWERED OPEN
 RETURN DUCT DAMPER MOTORS ARE POWERED CLOSED
 WHEN EXHAUST FAN END SWITCHES MAKE, EXHAUST FANS START

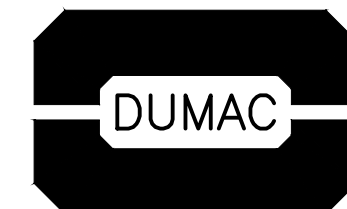
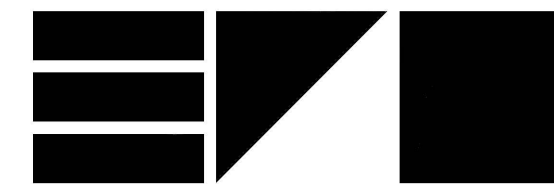
1 ART ROOM 201 VENTILATION CONTROLS
 MC601 NTS



SEQUENCE OF OPERATION
 EXHAUST MODE IS ENGAGED MANUALLY AT TIMER 2.
 WHEN TIMER ENGAGES:
 EXHAUST FAN DAMPER MOTORS ARE POWERED OPEN
 RETURN DUCT DAMPER MOTORS ARE POWERED CLOSED
 WHEN EXHAUST FAN END SWITCHES MAKE, EXHAUST FANS START

2 ART ROOM 249 VENTILATION CONTROLS
 MC601 NTS

————— WIRING BY ELECTRICAL CONTRACTOR
 - - - - - WIRING BY MECHANICAL CONTRACTOR



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CONSULTING ENGINEERS
752 BEDFORD HIGHWAY
HALIFAX, N.S.

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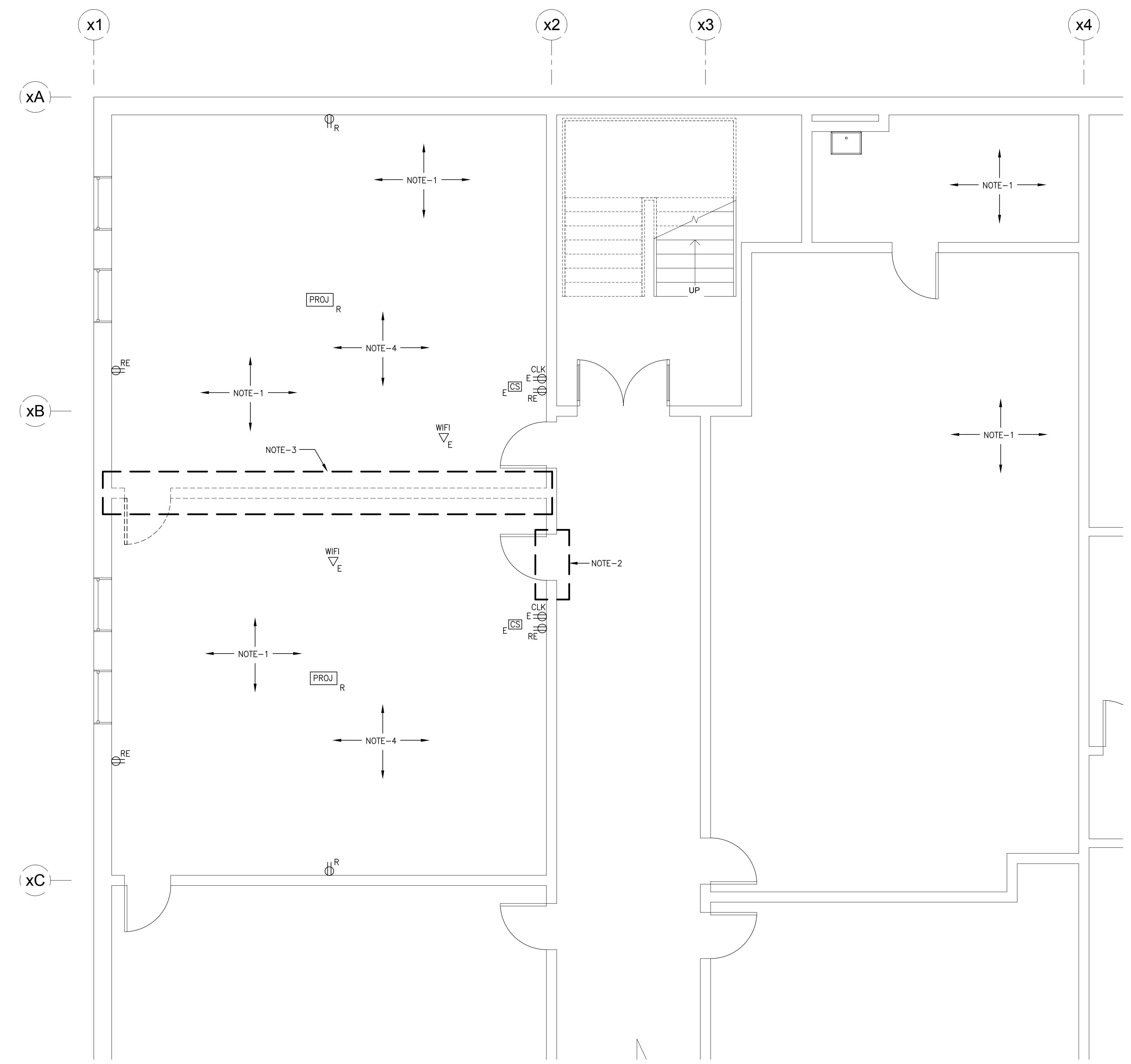


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PROJECT TITLE
COLE HARBOUR ARTS LAB

Project Number
SHEET TITLE
EXISTING FLOOR PLAN ELECTRICAL DEMOLITION

ED101



NOTE-1:
ELECTRICAL CONTRACTOR TO DISCONNECT, RELOCATE/RE-ROUTE AND RECONNECT EXISTING ELECTRICAL EQUIPMENT ABOVE CEILING WHICH MAY CONFLICT WITH THE INSTALLATION OF NEW EXHAUST FANS AND DUCTWORK. EXTEND EXISTING CIRCUITRY AS REQUIRED. COORDINATE WITH MECHANICAL. VERIFY EXISTING EQUIPMENT ON SITE PRIOR TO CLOSE OF TENDER.

NOTE-2:
ELECTRICAL CONTRACTOR TO DISCONNECT, RE-ROUTE AND RECONNECT ANY EXISTING ELECTRICAL WHICH MAY CONFLICT WITH THE MODIFICATION OF EXISTING DOOR OPENING. EXTEND EXISTING CIRCUITRY AS REQUIRED. COORDINATE WITH ARCHITECTURAL DRAWINGS.

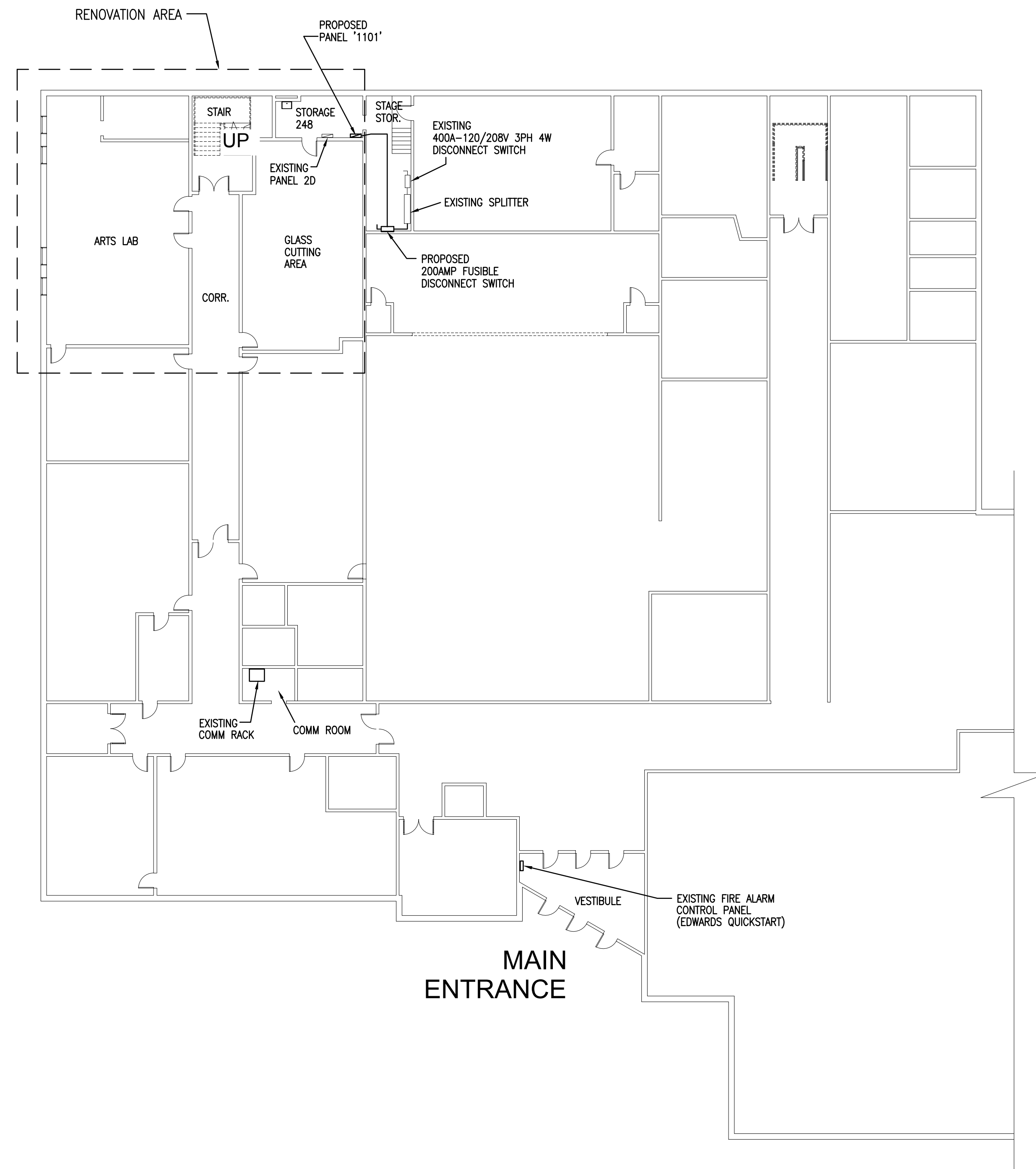
NOTE-3:
ELECTRICAL CONTRACTOR TO DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL EQUIPMENT WITHIN THE WALL BEING REMOVED (IE: DEVICES, BOXES, CONDUIT, WIRE, ETC). ENSURE ANY EXISTING SERVICES PASSING THRU DEMOLISHED WALL TO FEED OTHER AREAS OF BUILDING STAY ENERGIZED. RE-ROUTE AND EXTEND EXISTING CIRCUITRY AS REQUIRED.

NOTE-4:
ELECTRICAL CONTRACTOR TO DISCONNECT AND REMOVE EXISTING CLASSROOM LIGHTING FIXTURES. REMOVE ALL ASSOCIATED REDUNDANT CONDUIT, BOXES, WIRE, SWITCHES, ETC.

1 EXISTING FLOOR PLAN – ELECTRICAL DEMOLITION
ED101 SCALE 1/4"=1'-0"

ELECTRICAL LEGEND:

- '1' LIGHTING FIXTURE. REFER TO FIXTURE SCHEDULE
- \$3 125V, 20AMP THREE-WAY TOGGLE SWITCH
- \$D3 COMBINATION 3-WAY, LINE VOLTAGE/0-10V DIMMER SWITCH. REFER TO DETAIL 2/EL101.
- \$ER EXISTING LIGHTING SWITCH TO BE DISCONNECTED, RELOCATED AND RECONNECTED. EXTEND EXISTING CIRCUITRY AS REQUIRED.
- CLK EXISTING CLOCK RECEPTACLE TO REMAIN.
- RE- EXISTING 5-15R RECEPTACLE TO BE REPLACED WITH NEW 120V, 5-15R DUPLEX RECEPTACLE. INSTALL NEW STAINLESS STEEL COVERPLATE.
- R- EXISTING RECEPTACLE TO BE DISCONNECTED AND REMOVED. REMOVE ALL ASSOCIATED REDUNDANT BOXES, CONDUIT, WIRE, ETC. ENSURE ALL EXISTING TO REMAIN DEVICES FED FROM THE SAME CIRCUIT STAY ENERGIZED. RE-ROUTE/REWIRE EXISTING CIRCUITRY AS REQUIRED.
- ER- EXISTING RECEPTACLE TO BE DISCONNECTED, RELOCATED AND RECONNECTED. EXTEND EXISTING CIRCUITRY AS REQUIRED.
- ⊖ 125V, 5-15R RECEPTACLE MOUNTED 18" (450mm) AFF.
- ⊖ 125V, 5-20R RECEPTACLE MOUNTED 18" (450mm) AFF.
- ⊖ 250V, 6-30R RECEPTACLE FOR GLASS KILN. VERIFY EXACT MOUNTING HEIGHT WITH KILN MANUFACTURER.
- ⊖ 125V, 5-20R RECEPTACLE MOUNTED ABOVE COUNTER MANUFACTURER: HUBBELL HBL5352WH ACCEPTABLE ALTERNATES: LEGRAND, LEVITON.
- P 125V, 5-15R RECEPTACLE WALL MOUNTED ABOVE CEILING FOR FUTURE WALL PROJECTOR
- ⊖ 14-30R DRYER RECEPTACLE
- W 125V, 5-15R WASHER RECEPTACLE
- KF 125V, 5-15R RECEPTACLE FOR KILN FAN. VERIFY EXACT MOUNTING LOCATION WITH KILN MANUFACTURER.
- C 125V, 5-15R RECEPTACLE MOUNTED ABOVE CEILING FOR FUTURE CEILING PROJECTOR
- \$TOL MANUAL MOTOR STARTER C/W RED ON PILOT LIGHT
- NF □ NON-FUSED DISCONNECT SWITCH
- FUSIBLE DISCONNECT SWITCH
- △ DIRECT CONNECTION
- ▭ BRANCH CIRCUIT PANEL BOARD
- ES EMERGENCY STOP PUSHBUTTON. REFER TO WIRING DETAIL 4/EP601.
- CS EXISTING PUBLIC ADDRESS SWITCH/SPEAKER TO REMAIN.
- PROJ EXISTING CEILING PROJECTOR TO BE DISCONNECTED REMOVED AND TURNED OVER TO OWNER. REMOVE ALL ASSOCIATED REDUNDANT ABOVE CEILING CONDUIT, BOXES, WIRING, DEVICES, ETC.
- WIFI EXISTING CEILING MOUNTED WIFI UNIT AND ASSOCIATED CABLING TO REMAIN.
- ▽ DUAL DATA OUTLET MOUNTED 18" (450mm) AFF. RUN 2x CAT 6 FT6 CABLES BACK TO COMM RACK. SEE DETAIL 2/EP601. PROVIDE OUTLET BOX C/W 1" TO ACCESSIBLE CEILING SPACE.
- ▽ DATA OUTLET WALL MOUNTED ABOVE CEILING FOR FUTURE WALL PROJECTOR. RUN 1x CAT 6 FT6 CABLE BACK TO COMM RACK. SEE DETAIL 2/EP601.
- ▽ DATA OUTLET MOUNTED ABOVE CEILING FOR FUTURE CEILING PROJECTOR. RUN 1x CAT 6 FT6 CABLE BACK TO COMM RACK. SEE DETAIL 2/EP601.
- ⊖ MULTI-MEDIA OUTLET MOUNTED AT 18" (450mm) AFF. ELECTRICAL CONTRACTOR TO PROVIDE EMPTY OUTLET BOX C/W 1" TO ACCESSIBLE CEILING SPACE C/W PULL CORD.
- 36W EMERGENCY BATTERY UNIT RECESSED IN T-BAR CEILING 36 WATTS, 12 VOLTS C/W 2x 5 WATT LED HEADS
- 2x5 WATTx12V EMERGENCY REMOTE HEADS-CEILING MOUNTED
- D.C. EMERGENCY LIGHTING D.C. WIRING RUN 2#12 RW90 Cu+12B IN 16mmC
- R FIRE ALARM SYSTEM ADDRESSIBLE RELAY REFER TO DETAIL 3/EP601.
- H FIRE ALARM SYSTEM ADDRESSIBLE HEAT DETECTOR REFER TO DETAIL 3/EP601.
- TM TIMER CONTROLLER SUPPLIED BY MECHANICAL CONTRACTOR. INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR. REFER TO WIRING DETAILS 1 AND 2 ON DRAWING MV601.



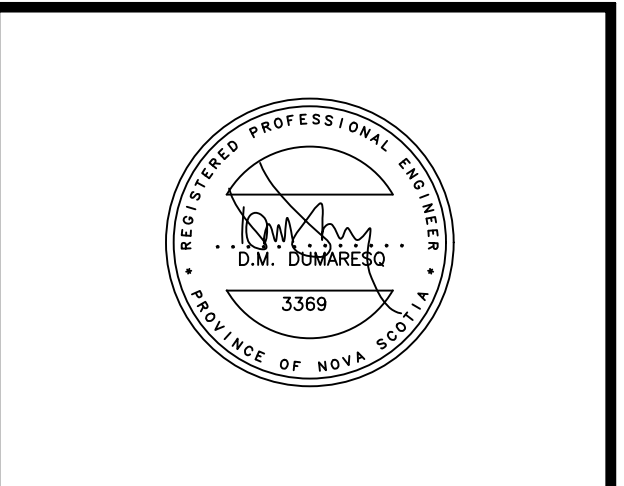
1 PARTIAL ELECTRICAL KEY PLAN-MAIN FLOOR
E-101 APPROXIMATE SCALE 1/16"=1'-0"

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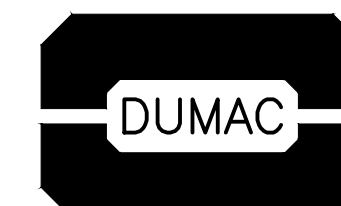
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Project Number	
SHEET TITLE	ELECTRICAL KEY PLAN AND LEGEND

E-101



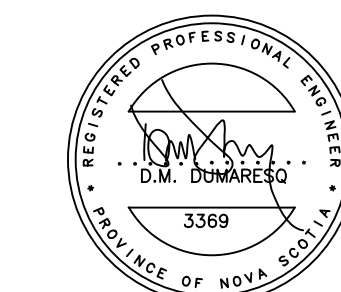
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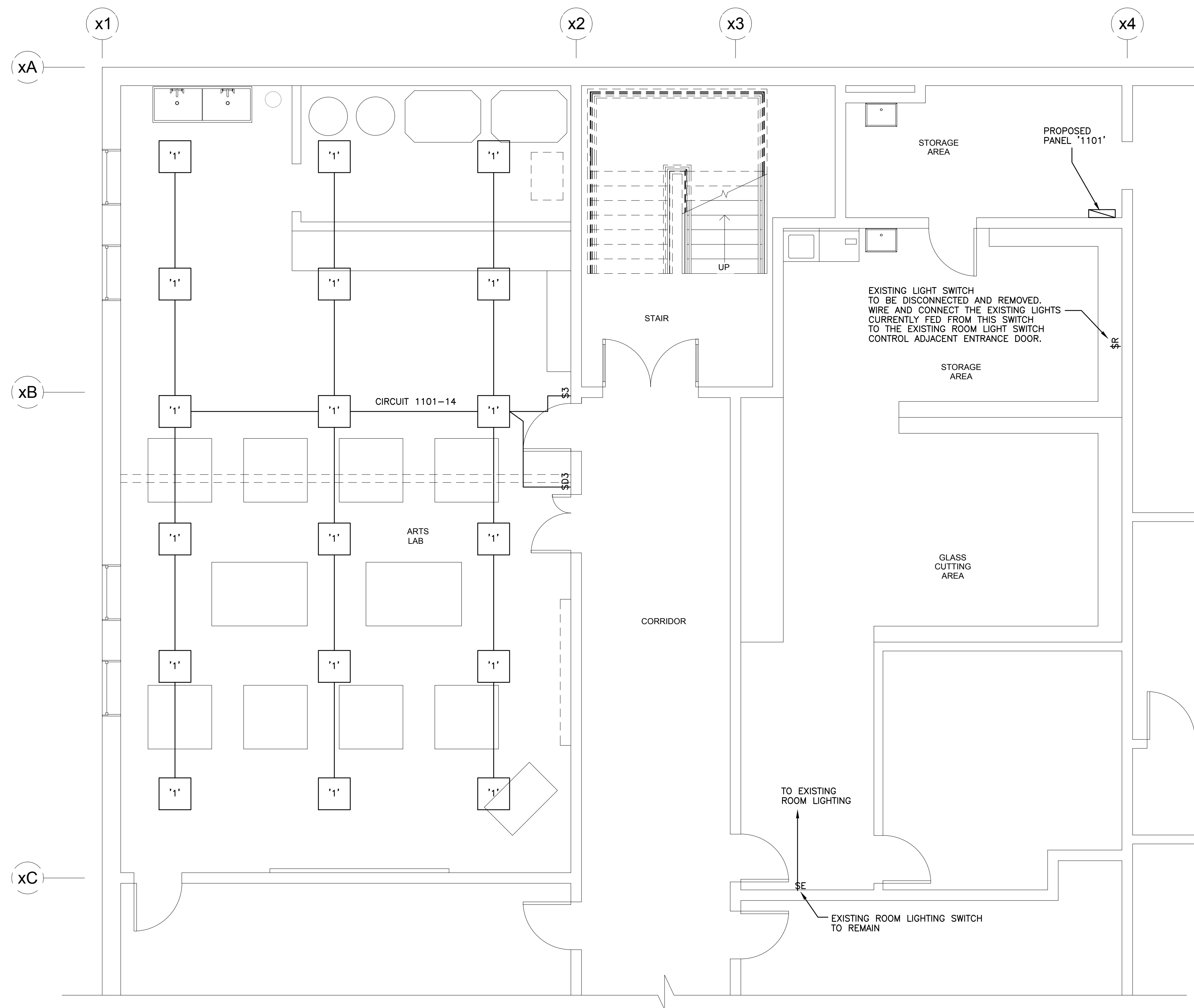
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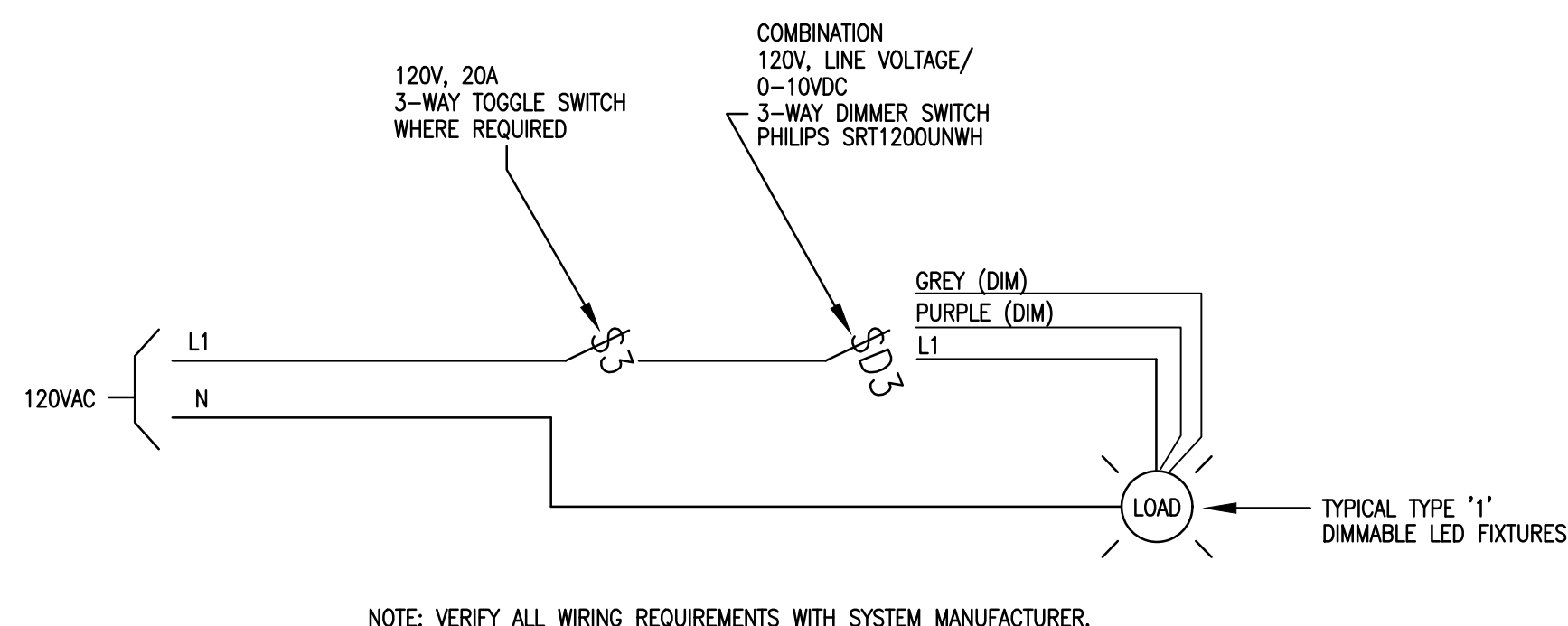
SHEET TITLE

FLOOR PLAN LIGHTING

EL101

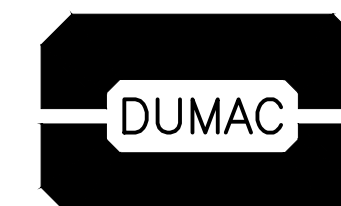


1 FLOOR PLAN - LIGHTING
EL101 SCALE 1/4"=1'-0"



2 LIGHTING CONTROL WIRING DETAIL
EL101 N.T.S. (CLASSROOM LIGHTING)

FIXTURE SCHEDULE							
TYPE	STANDARD OF ACCEPTANCE MANUFACTURER CAT No.	DESCRIPTION	LAMP	VOLTS	MOUNTING	REMARKS	ALTERNATES
1	PHILIPS 2FXP-45L-835-2-DS-UNV-DIM	RECESSED 24"x24" LED FLAT PANEL	4500 LUMENS 3500K	120V	RECESSED IN T-BAR	0-10VDC DIMMING	GE, EATON, ACCUTY



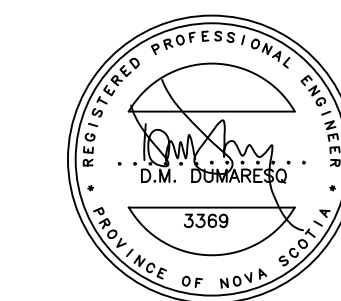
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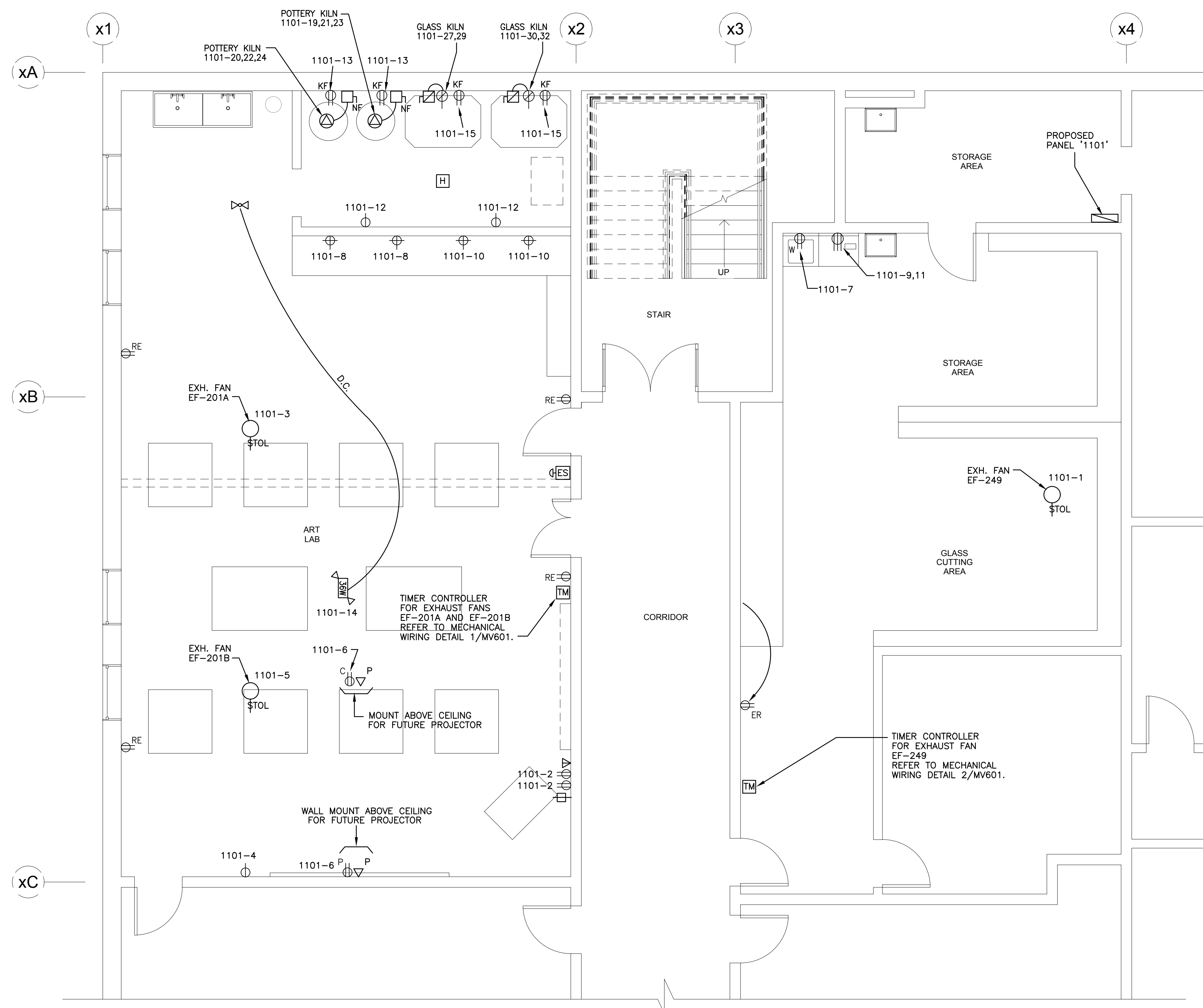
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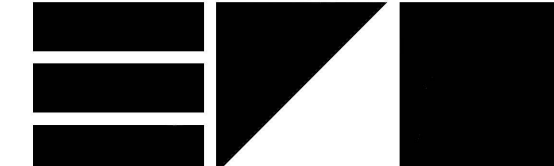
Project Number
 SHEET TITLE

FLOOR PLAN POWER AND SYSTEMS

EP101



1 FLOOR PLAN - POWER AND SYSTEMS
 EP101 SCALE 1/4"=1'-0"



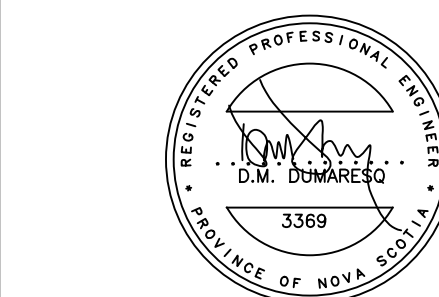
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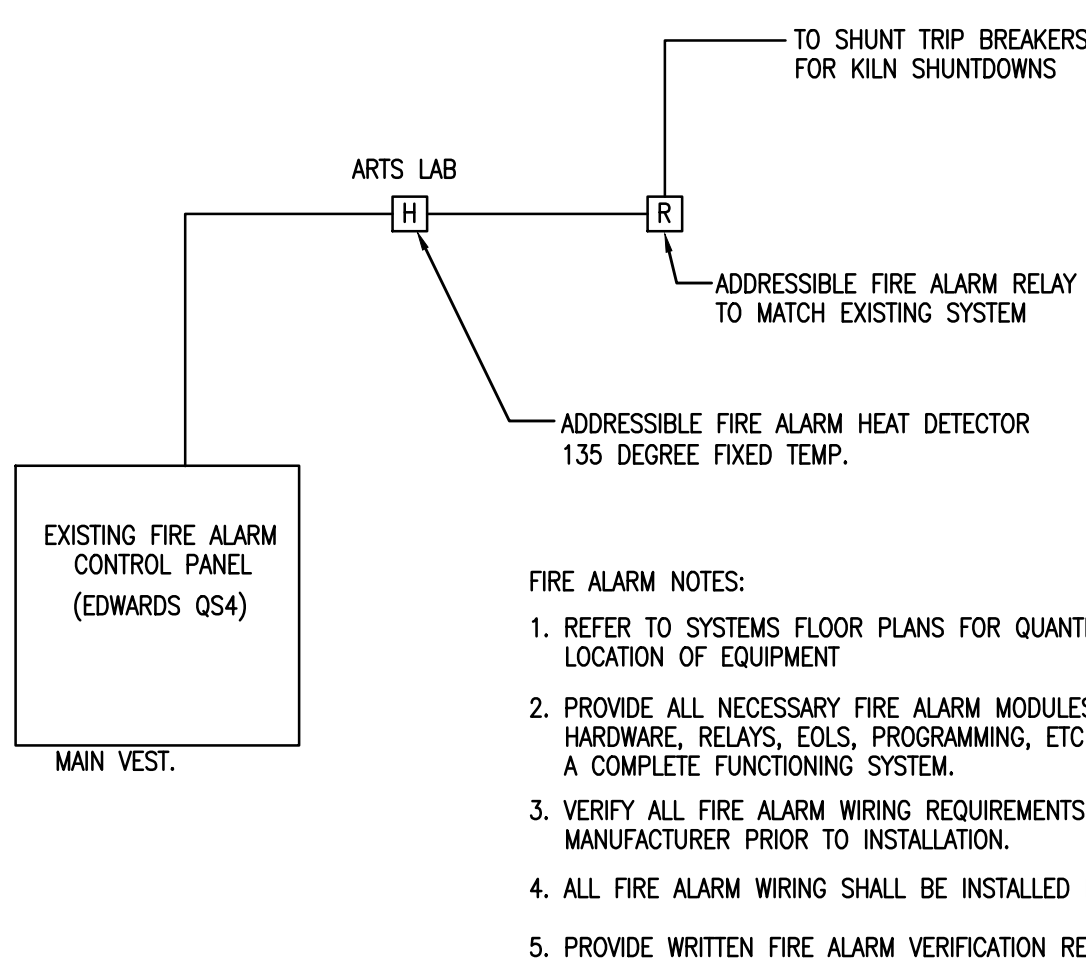
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PANEL SCHEDULE AND RISER DIAGRAMS

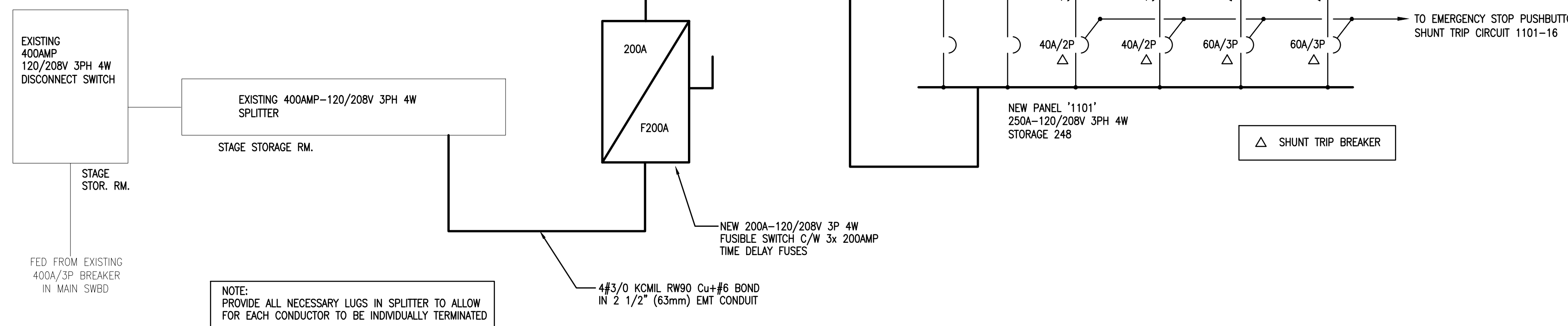
EP601



- FIRE ALARM NOTES:**
- REFER TO SYSTEMS FLOOR PLANS FOR QUANTITIES AND LOCATION OF EQUIPMENT
 - PROVIDE ALL NECESSARY FIRE ALARM MODULES, TERMINATION HARDWARE, RELAYS, EOLS, PROGRAMMING, ETC TO MAKE FOR A COMPLETE FUNCTIONING SYSTEM.
 - VERIFY ALL FIRE ALARM WIRING REQUIREMENTS WITH SYSTEM MANUFACTURER PRIOR TO INSTALLATION.
 - ALL FIRE ALARM WIRING SHALL BE INSTALLED IN CONDUIT.
 - PROVIDE WRITTEN FIRE ALARM VERIFICATION REPORT.

3 PARTIAL FIRE ALARM RISER DIAGRAM

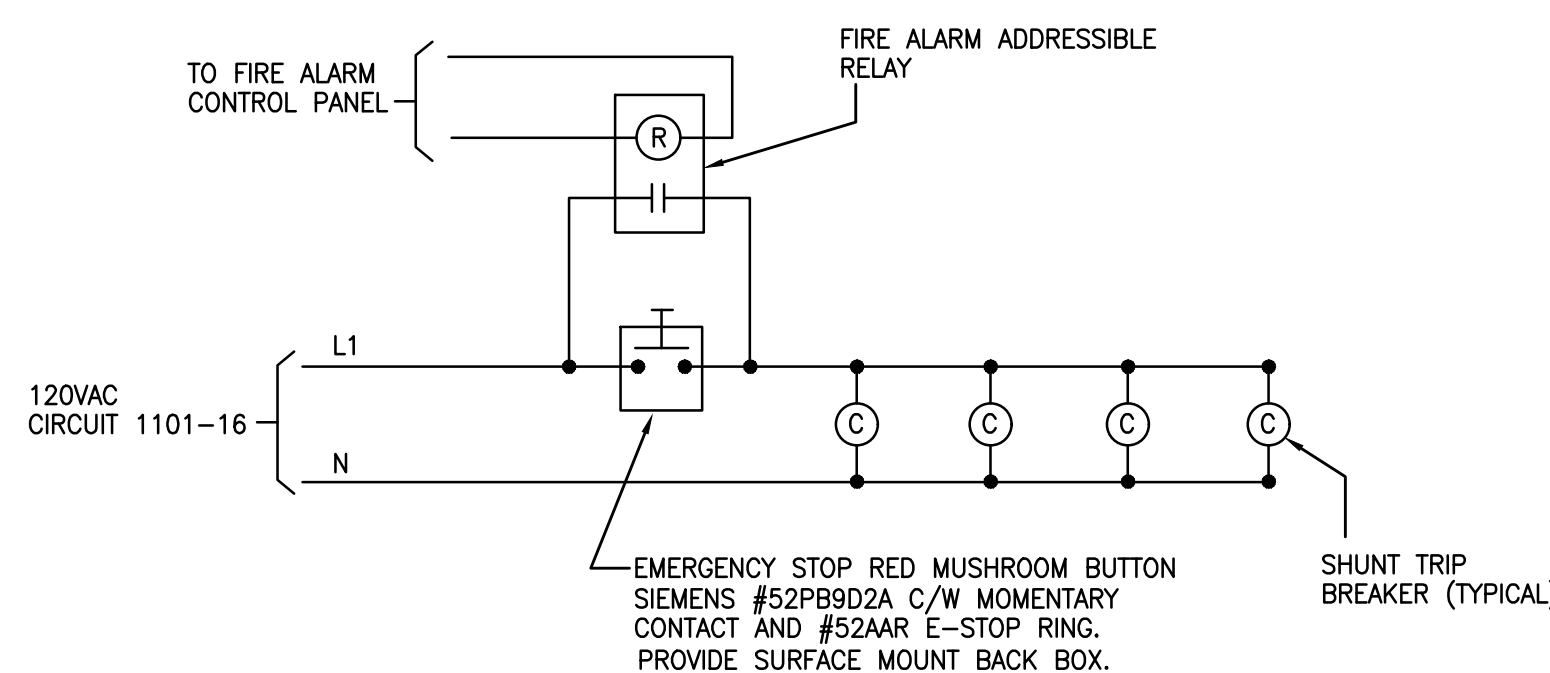
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NOTE: PROVIDE ALL NECESSARY LUGS IN SPLITTER TO ALLOW FOR EACH CONDUCTOR TO BE INDIVIDUALLY TERMINATED

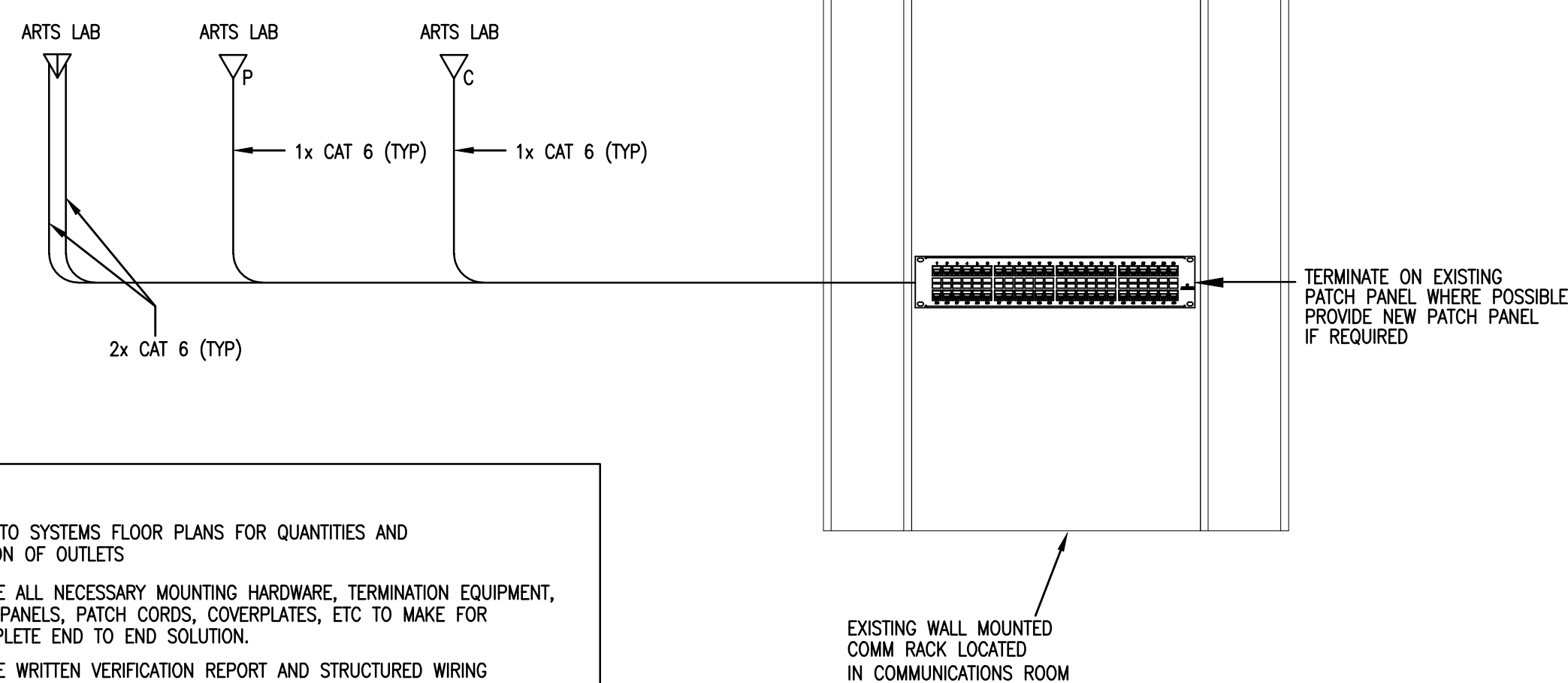
1 PARTIAL POWER RISER DIAGRAM

EP601 NOT TO SCALE



4 SHUNT TRIP BREAKER WIRING DETAIL

EP601 NOT TO SCALE



- NOTES:**
- REFER TO SYSTEMS FLOOR PLANS FOR QUANTITIES AND LOCATION OF OUTLETS
 - PROVIDE ALL NECESSARY MOUNTING HARDWARE, TERMINATION EQUIPMENT, PATCH PANELS, PATCH CORDS, COVERPLATES, ETC TO MAKE FOR A COMPLETE END TO END SOLUTION.
 - PROVIDE WRITTEN VERIFICATION REPORT AND STRUCTURED WIRING WARRANTY CERTIFICATE.

2 PARTIAL STRUCTURED WIRING RISER DIAGRAM

EP601 NOT TO SCALE

DESIGNATION	WATTS			CIR. No.	BKR NO	NEW '1101' STORAGE 24B			TYPE MAINS	250	AMPS
	A	B	C			A	B	C			
EXHAUST FAN EF-249	400			1	15A						
EXHAUST FAN EF-201A		400		3	15A						
EXHAUST FAN EF-201B			400	5	15A						
RECEPT-WASHER	800			7	15A						
RECEPT-DRYER		2500		9	2P						
RECEPT-KILN FAN	300		2500	11	30A						
RECEPT-KILN FAN		300		13	15A						
				15	15A						
				17							
	4800			19	3P						
		4800		21	60						
			4800	23	-						
				25	-						
				27	2P						
	3600			29	40A						
		3600		31	-						
				33	-						
				35	15A						
				37	15A						
				39	15A						
				41	15A						
#A' TOTAL	20,000										
#B' TOTAL	17,300										
#C' TOTAL	16,900										
TOTAL LOAD	54.2 KW		150.5 AMP								

● GFCI BREAKER
△ SHUNT TRIP BREAKER

EACH LIGHTING CIRCUIT SHALL HAVE SEPARATE NEUTRAL