Halifax
Regional Centre for Education

RFT #4235

Boiler Replacement and Control Upgrades
Tantallon Sr. Elementary School

RFT Closing Date: Friday May 24, 2024
RFT Closing Time: 2:00 PM (ATL)

Ready-for-Takeover Date: Friday August 30, 2024

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

Operations Contact:
Gary Mannette, Project Manager
Cell: (902) 497-8542
Email: gmannette@hrce.ca

School Location:
Tantallon Sr. Elementary
3 French Village Station Rd
Upper Tantallon, NS, B3Z 1E4

Mandatory Site Meeting for Bidders:
Thursday May 16, 2024, at 3:00 pm
Tantallon Sr. Elementary
Please meet at School Entrance

RFT submissions will be accepted only by email at: hrcetenders@hrce.ca

Please take note of HRCE's new RFT submission email address: hrcetenders@hrce.ca

To obtain documents, please download from the HRCE's Website:
http://www.hrce.ca/about-hrce/financial-services/purchasing/tenders/tender-listing

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.

The Terms and Conditions of the RFT Package, including but not limited to the Contract Type and Supplementary Conditions have been modified. It is the Proponent's Responsibility to review all sections of the RFT prior to submitting a Proposal/Bid.

Division 25 INTEGRATED AUTOMATION

DRAWING LIST

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 **Boiler Replacement and Controls Upgrade** at **Tantallon Sr. Elementary**, to remove and replace the heating piping and equipment, provide additional controls, install propane tank farm, demo old jr. elementary fuel tank, and relocate the existing above tank as noted on the drawings and specifications prepared by **Dumac Energy Limited.** This includes removal of hazardous materials required to complete the above work scope. Reference the Hazardous Building Material Assessment for Tantallon Sr. Elementary School included in the Appendices.

1.2 It is the intent of the Halifax Regional Centre for Education (HRCE) to have all work completed, to the point of Ready-for-Takeover, prior to **August 30, 2024**. It is expected that a timely award of this contract will enable the Contractor to facilitate shop drawing review and ordering of materials to allow commencement of work immediately after contract execution.

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.

1.4 The HRCE **has transitioned** from the CCDC-2, 2008 contract to the **CCDC-2, 2020** contract and will use the CCDC-2, 2020 for this work. A copy of the Standard Construction Contract CCDC 2 – 2020 is available upon request and will form part of the Contract Documents.

1.5 The HRCE Supplementary General Conditions for the CCDC-2, 2020 applicable to this Work is available for review under Section 0073 00 of the RFT document.

2.0 List of Drawings

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 B3B 1X7

Don Walpola, Buyer
Office: (902) 464-2000 ext 2223
dwalpola@hrce.ca

Consultant:

Dumac Energy Limited
752 Bedford Hwy,
Halifax, NS B3M 2L9

Greg Spears
Office: (902) 457-1300
greg@dumac.ns.ca

END OF SECTION 00 05 00

SECTION 00 21 13 – INFORMATION FOR PROPONENTS

Invitation:

1. Bid Call

1.1. The Halifax Regional Centre for Education (HRCE) will receive offers in the form of a bid from proponents which is signed and electronically 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 received date and time. The email address to submit submissions and amendments is **hrcetenders@hrce.ca**. Both files should be submitted in Adobe (.pdf) format. If the electronic submission is larger than 20MB, proponents have the option of sharing files from google drive to **hrcetenders@gnspes.ca.** If you encounter difficulties kindly contact the HRCE Procurement team for further clarification.

1.2. Bids received after the closing time/date will not be considered.

1.3. Proponents are to submit completed Request for Tender (RFT) documents by email.

The electronic file should be named:

"**Boiler Replacement and Controls Upgrade_4235_Proponent Name**".

1.4. Bids will be opened at the time indicated on the cover sheet of this document. Effective April 1, 2014 public openings are no longer held for any Tenders or RFTs relating to goods, services or construction for the HRCE. All bid submissions are subject to evaluation after opening and before award of contract. The successful proponent and award amount will be posted on the Procurement Services website (http://novascotia.ca/tenders/tenders/ns-tenders.aspx) after award.

1.5. Amendments to the submitted offer will be permitted if received by email prior to bid closing and if endorsed by the same party or parties who signed and executed the offer.

1.6. Bid submissions **will not** be accepted by fax, mail, courier or hand delivery.

2. Intent

2.1. The intent of this Request for Tender (RFT) is to obtain an offer to perform all work associated with ***RFT #4235, Boiler Replacement and Controls Upgrade*** at ***Tantallon Sr. Elementary*** for a Stipulated Price Contract in accordance with the Contract Documents.

2.2. The HRCE **has transitioned** from the CCDC-2, 2008 contract to the **CCDC-2, 2020** contract and will use the CCDC-2, 2020 for this work. A copy of the Standard Construction Contract CCDC 2 – 2020 is available upon request and will form part of the contract documents.

2.3. The HRCE Supplementary General Conditions for the CCDC-2, 2020, applicable to this work is available for review under Section 0073 00 of the RFT document.

2.4. Ready-for-Takeover of the project is to be achieved on or before **August 30, 2024**, provided the contract is awarded within ten (10) business days after the RFT closing.

2.4.1. In the event that the contract is not awarded within ten (10) business days of closing, the Ready-for-Takeover Date will be extended by one (1) business day, for every business day that passes, until the contract has been officially awarded.

2.4.2. Receipt of the award letter by the successful contractor does not constitute approval to begin work on site.

2.5. The HRCE does not guarantee the award of all areas, phases or any portion thereof.

2.6. The HRCE reserves the right to award individual areas or phases to one contractor or between multiple contractors.

2.7. The HRCE reserves the right to reduce the scope of work if the stipulated bid amount exceeds the budget for the relevant project.

3. Scope of work

3.1. Refer to Section 00 00 15 – Description of Work and List of Drawings and Section 01 11 00 Summary of Work.

4. Availability

4.1. RFT documents can be obtained as per the directions on the cover sheet of this document.

4.2. RFT 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 Construction Association of Nova Scotia (CANS), Halifax, NS.

5.2. Upon receipt of bid documents, proponents should verify that documents are complete. Proponents should notify the HRCE Procurement by email at dwalpola@hrce.ca, should the documents be incomplete, or upon finding discrepancies or omissions in the bid documents.

5.3. Bidders shall become fully aware of the content of all tender documents for the preparation of the Bidder's submission.

6. Clarification and Addenda

6.1. Proponents must notify Don Walpola, Buyer, by email at dwalpola@hrce.ca no less than **five (5)** working days before the RFT 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 produced in the form of an addendum, a copy of which will be posted on the novascotia.ca/tenders and/or the HRCE website as applicable. It is the responsibility of the Bidder to ensure all addenda are received and acknowledged.

6.2. Addenda will be issued no less than three (3) business days before the RFT 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. Proponents are to complete Tender Form (section 00 41 13) acknowledging that addenda have been received.

6.5. Where HRCE publishes an Addendum or Addenda modifying the terms of the RFT/RFP documents, or changing the Project or Contract Documents in any manner, HRCE shall not be liable for an expense, cost, loss, or any form of damage or damages incurred or suffered, whether directly or indirectly, by any Supplier or any other person in connection with or in any way relating to or resulting from the publication of an Addendum or Addenda, regardless of whether the publication occurs prior to or after a Supplier has submitted an RFT/RFP submission.

6.6. Any Addendum and all Addenda issued by HRCE shall be become part of the Contract Documents, unless specifically excluded from the Contract Documents in writing published by HRCE, and shall be allowed for in determining the total contract price.

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 the RFT closing date and time. Bidders must forward their written requests by email to dwalpola@hrce.ca. Requests will be forward 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 product/system 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 Price Submission, including revisions to other work.

7.2.3. A later claim by the bidder 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 bidder 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 the above manner; otherwise, they will not be accepted.

8. Mandatory Bidders' Site Meeting (Site Assessment)

8.1. Bidders will be deemed to have familiarized themselves with the existing project site, 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 bidders' site meeting has been scheduled as per the information on the cover sheet of this document. All bidders are required to attend. Representatives of HRCE and the Consultant will be in attendance.

8.1.2. Bidders must register their presence with the HRCE stating the name of the contractor they represent. Failure to attend and register will lead to non-acceptance of the bid by HRCE. HRCE recommends that interested bidders ensure that their proposed subcontractors are in attendance at the mandatory site meeting.

9. Bidders Registration

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

10. Qualifications (Subcontractors/Other Tradespersons/Individuals)

10.1. Bidders are fully responsible to the HRCE for the acts/omissions of subcontractors and of persons directly or indirectly employed or retained by them. Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the HRCE. Subcontracting the contract shall not relieve the Bidder from any contractual obligations.

10.2. Bidders must provide subcontractors with a copy of the RFT documents making subcontractors aware that the HRCE is not responsible for any payments to subcontractors, and that all actions, directions or claims are solely between the bidder and the subcontractor.

10.3. The Contract, or any portion thereof, shall not be assigned nor sub-contracted without the prior written approval of HRCE, which approval may be withheld in the HRCE's sole discretion. When sub-contracting, successful bidder(s) must be prepared, if requested, to provide copies of billings from subcontractors.

10.4. Successful bidder(s) shall only use additional subcontractors during the course of the contract with the prior written approval of the HRCE.

10.5. The successful bidder(s) shall not re-assign the role of Project Manager to another individual other than the proposed Project Manager as indicated in the technical submission, without prior written approval from the HRCE.

10.6. The successful bidder(s) shall at all times enforce strict discipline and good order among their employees and subcontractors and shall avoid any unfit person or any person not skilled in the work assigned to the employee.

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

10.8. Refer to GC 3.6 of CCDC-2020.

11. Bid Submission

11.1. The email subject line or body must identify the name of the proponent/company and the RFT name and number.

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

12. Conditions of the Request for Tender (RFT) Process

12.1. Proponents shall take full cognizance of content of all Contract Documents in preparation of their bid. Section 00 41 13 – Price Submission Form, Subsection 5.0 references a complete list of Contract Documents.

13. Amendment or Withdrawal of Bids

13.1. Bid packages may be **withdrawn** from the RFT process in writing by email notification sent to the submission email address, prior to date and time of closing.

13.2. As previously stated in Section 00 21 13, item 1.6 - Amendments to the submitted offer will be permitted if received by email prior to the RFT closing time and if endorsed by the same party or parties who signed and executed the offer. If the amendment relates to the price, it must be labeled "Price Amendment" along with the RFT number of the project and the company name. The price amendment file must include the signed "Price Amendment Form" (Section 00 41 73).

13.3. A single page Price Amendment Form is provided immediately following the Price Submission Forms (Section 00 41 73).

13.3.1.1. The Price Amendment Form provided is the standard master form for submission of any price amendments for this project.

13.3.1.2. The Price Amendment Form must be copied and completed, as directed, for any price amendments submitted.

13.4. Price amendments shall not disclose either original or revised total price.

14. Bid Ineligibility (Reason for Rejection)

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

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

14.1.2. The bid is submitted by facsimile or regular mail or hand delivery.

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

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

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

14.1.6. All addenda have not been acknowledged.

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

14.1.8. The required bid security is not provided within the Price Submission file.

14.1.9. Proponent failed to attend bidders' mandatory site meeting.

15. Communications Affecting Bids

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

15.1.1. The technical submission or price submission forms submitted by facsimile or mail delivery or hand delivery are not acceptable and will be rejected.

16. Right to Accept or Reject any Tender

16.1. The HRCE reserves the right to reject any bid in its sole and absolute discretion for any reason whatsoever and the HRCE will not necessarily accept the lowest bid.

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

16.3. Without limiting the generality of any other provision herein, the HRCE reserves the right to accept or reject any bid in accordance with item #14 above (Bid Ineligibility).

16.4. 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 bid received by the HRCE. The HRCE reserves the right to reject any or all bids, or to accept any bid, or portion thereof, deemed in its best interest.

16.5. In the event that more than one proponent submit bids in an identical amount, the HRCE will flip a coin to determine the successful contractor.

16.6. 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.

17. Right to Cancel Competition/No Award

17.1. Issuing a RFT/RFT implies no obligation on HRCE to accept any submission, or a portion of any submission. The lowest or any RFT/RFT submission will not necessarily be accepted.

17.2. Without limiting the generality of the foregoing, an RFT/RFT may be cancelled in whole or in part by HRCE in its sole discretion, whether before or after the time for RFT/RFT submissions has closed, when:

17.2.1. the RFT/RFT submission price exceeds the funds allocated for the purchase;

17.2.2. there has been a material change in the procurement requirements after the RFT/RFT has been issued;

17.2.3. information has been received by HRCE after issuance of the RFT/RFT that HRCE believes has materially altered the procurement or the need of HRCE for the procurement; or

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 RFT/RFT submission is received in response to an RFT/RFT, the HRCE reserves the right to enter into negotiations with one or more suppliers in order to complete the procurement or to reject all Bids and re-issue the RFT/RFT on new or modified RFT/RFT Documents.

17.4. HRCE will be the sole judge of whether there is sufficient justification to cancel any RFT/RFT.

17.5. No action or liability will lie or reside against HRCE in its exercise of its rights under this section

18. Construction Contract Guidelines

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

19. Submission and Security Forms – Signatures

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

20. Bid Security

20.1. Proponents must submit within the sealed Price Submission file, 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). This bid security **must** accompany the Price Submission as an electronic file. HRCE will request an original hard copy from the successful proponent as required.

20.2. Where bid bond is provided as bid security:

20.2.1. The bond must be provided on the standard CCDC Bid Bond Form (latest version) in the amount of not less than ten percent (10%) of the Bid Price.

20.2.2. The bond must be submitted by the general contractor bidder, signed and sealed by the principal (Contractor) and Surety and shall be with an established Surety Company satisfactory to and approved by the HRCE.

20.2.3. The cost of providing the Bid Bond must be included in the Bid Price.

20.2.4. **A legible scanned copy of the bid bond or an electronic bid bond can be submitted with the bid via email. If requested by the HRCE, the vendor should be in agreement to provide the original bid bond without delay.**

20.3. Where a certified cheque or a bank draft is provided as bid security:

20.3.1. The certified cheque or bank draft must be endorsed in the name of HRCE, for a sum not less than ten percent (10%) of the amount of the Bid Price.

20.3.2. The cost of providing the certified cheque or bank draft must be included in the Bid Price.

20.4. Where the Irrevocable Standby Letter of Credit is used as bid security:

20.4.1. The letter must be endorsed in the name of HRCE, for a sum not less than ten percent (10%) of the Bid Price

20.4.2. 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).

20.4.3. The cost of providing the letter must be included in the Bid Price.

20.4.4. **A legible scanned copy of the bid bond or an electronic bid bond can be submitted with the bid via email. If requested by the HRCE, the vendor should be in agreement to provide the original bid bond without delay.**

20.5. Return of Bid Security:

20.5.1. The bid security of the unsuccessful proponents will be returned to them after the contract has been signed, or previous to such time, at the discretion of HRCE.

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

21. Contract Security (Performance Assurance) – Required for contracts valued over $100,000

21.1. The performance assurance forms must bear the bidder's original signature and name HRCE as the insured.

21.2. The successful contractor shall maintain performance assurance in force for a period of not less than twelve (12) months after Ready-for-Takeover is achieved.

21.3. Performance Assurance must be endorsed as specified for bid security.

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

21.5. Section 00 72 13 – General Conditions GC11.2 and Section 00 73 00 – Supplementary General Conditions for form of Contract Security. Proponents should reference the project documents for the amount of Contract Security and the alternate type of Contract Security if applicable.

21.6. Performance Assurance must be submitted as one of the following:

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

21.6.1.1. Within ten (10) days after notification of award of the Contract, the successful contractor must 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.

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

21.6.2. Where a certified cheque or bank draft is used as Contract Security:

21.6.2.1. The certified cheque or bank draft submitted during the bid period will be cashed and the amount retained by the HRCE shall serve as Performance Assurance**,** including the payment of all obligations arising under the Contract.

21.6.2.2. The value of the certified cheque or bank draft will be retained in lieu of the Performance Bond and Labour and Material Bonds, providing that, at Contract award, the successful contractor 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.

21.6.2.3. The amount remaining will be returned without interest after a period of not less than twelve (12) months after Ready-for-Takeover is achieved.

21.6.2.4. Where certified cheque or bank draft is used as Performance Assurance, the cost of providing the certified cheque or bank draft in the Contract price.

21.6.3. Where an Irrevocable Standby Letter or Credit is used as Contract Security:

21.6.3.1. The Irrevocable Standby Letter of Credit submitted during the bid period will be retained by the 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 intuition subject to the Uniform Customs and Practices for Documentary Credit (1993 revision) International Chamber of Commerce (Publication No. 500).

21.6.3.2. Where an Irrevocable Standby Letter of Credit is used as Performance Assurance, the cost of providing this letter should be included in the Contract Price. The contractor shall provide to the HRCE

documentation throughout the duration of the contract that the Irrevocable Standby Letter of Credit remains in full effect at all times as specified.

21.6.3.3. 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.

21.6.3.4. The Irrevocable Standby Letter of Credit is to be in effect for a period of not less than twelve (12) months after the Ready-for-Takeover is achieved.

22. Insurance

22.1. Proponents shall refer to project documents for the amount of insurance, the duration of coverage and alternate type of insurance; if applicable.

Section 00 72 13 -General Conditions of Contract,
Section GC 11.1 – Insurance, and
Section 00 73 00 – Supplementary General Conditions for form of Insurance.

22.2. The contractor shall carry such insurance as is required to protect the contractor, any sub-contractor, the HRCE, their agents and employees from all claims which may arise from the operations under this contract. The amounts of such insurance shall not be less than 22.3 below.

22.3. The General Contractor shall secure and maintain, at its expense, during the term of the insurance:

22.3.1. Wrap-Up Liability insurance must insure the general contractor(s) and all sub-contractors on this project:

22.3.1.1. including but not limited to, products liability and completed operations, contractual liability, owners and contractors' liability, attached machinery extension endorsement, and independent contractor, for a combined single limit of no less than $5,000,000 (five million dollars) per occurrence.

22.3.1.2. Wrap-Up Liability insurance is to include 24 months (2 years) of completed operations.

22.3.2. Commercial Auto Liability insurance covering all owned, non-owned and hired vehicles for a minimum combined single coverage of $2,000,000 (two million dollars) per occurrence.

22.3.3. Builders Risk: All risks in the amount of the contract Stipulated Bid Price. Insurance requirements as stipulated in the CCDC 2-2020.

22.3.4. Workers' Compensation to meet statuary requirements and/or Employers Liability, with limits of not less than $2,000,000 (two million dollars).

22.3.5. Contractors Pollution Liability Insurance limits of not less than $2,000,000 (two million dollars) per occurrence

22.4. Primary Insurance: The Contractor agrees that the insurance as required shall be primary and non-contributory.

22.5. No Limitation: The Contractor is responsible for determining whether the minimum insurance coverage amounts contained in this RFT are adequate to protect its interests. These minimum coverage amounts do not constitute limitations upon Supplier's Liability.

22.6. Endorsements – For the policies in item 22.3 above, there shall contain an endorsement naming the Halifax Regional Centre for Education and its affiliates as Additional Insured, and eliminating and removing any exclusion of liability for:

22.6.1. injury, including bodily injury and death to an employee of the insured or of the Halifax Regional Centre for Education, or

22.6.2. any obligation of the insured to indemnify, hold harmless, defend, or otherwise make contribution to the Halifax Regional Centre for Education because of damage arising out of injury, including bodily injury and death, to an employee of Halifax Regional Centre for Education.

22.7. The Contractor shall provide a certificate of insurance evidencing the above prior to work being performed. The HRCE also requires a complete copy of the Builder's Risk and Wrap-Up Liability policies, in addition to the Certificate of Liability Insurance.

22.8. 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.

22.9. Insurance documents (certificate and policies) shall be provided to the Purchasing Department within the timeframe indicated on the award letter. These documents are required before a purchase order will be issued. Work is not authorized and shall not commence until receipt of the purchase order.

23. Proof of Competency of Proponent

23.1. Any bidder 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.

23.1.1. The Nova Scotia Construction Safety Association or approved recognized association or program.

23.2. Bid Signing

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

23.3. Contract Time

23.3.1. The bidder, in submitting an offer, agrees to achieve Ready-for-Takeover of the work by the date indicated in the contract documents.

24. Offer Acceptance / Rejection

24.1. Duration of offer

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

24.2. Award/Selection/Acceptance of Offer

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

24.2.1.1. Compliance with bid requirements

24.2.1.2. Bid Price Submitted

24.2.1.3. All requirements stated in the tender package

24.2.2. The Owner's evaluation of any and all bids will be final

24.3. After acceptance by HRCE, the successful bidder shall be notified in writing of acceptance of the bid by way of an award letter.

25. Agreement

25.1. After acceptance, the HRCE and the successful proponent will enter into a CCDC-2, standard form of contract for the execution of the work.

25.2. A purchase order will be issued to the successful bidder once the contract has been signed and executed.

26. Post Award Submissions

26.1. Upon receipt of the award letter, the successful contractor will provide the following documents within five (05) business days:

26.1.1. A current Certificate of Recognition or Letter of Good Standing - The Contractor will supply a Certificate of Recognition issued jointly by the Workers' Compensation Board of Nova Scotia and an occupational health and safety organization approved by the Workers' Compensation Board of Nova Scotia (such as the Nova Scotia Construction Safety Association). These approved organizations are currently listed on the Workers' Compensation Board of Nova Scotia website (www.wcb.ns.ca). The contractor shall remain in good standing for the duration of the contract.

The Contractor shall supply the following:

26.1.1.1. Worker's Compensation Coverage – The Contractor shall supply a clearance letter from the Worker's Compensation Board of Nova Scotia, indicating the Contractor is assessed and in good standing;

26.1.1.2. All required contract security and insurance documentation;

26.1.1.3. A completed Schedule of Values (see Section 01 37 00);

26.1.1.4. A detailed Schedule of Work

26.1.1.5. A completed Safety Plan; and,

26.1.1.6. A detailed listing of subcontractors to be used.

26.1.2. 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.

26.1.2.1. The Contractor and subcontractors (if applicable) shall remain in good standing for the duration of the contract.

27. Taxes

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

27.2. HRCE is not exempt from HST. As a result, the aggregate amount of the bid for contracts is subject to HST; however, **prices submitted shall not include HST.**

27.3. 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 bid amount.**

27.4. Proponents 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.

27.5. Proponents are to note that prices indicated on the Price Submission Form and the amendments to the Price Submission Form shall not include Provincial Sales Taxes, the Federal Goods and Services Tax or the Harmonized Sales Tax.

27.6. Refer to CCDC-2 (Section 00 72 13) and Supplementary General Conditions (Section 00 73 00).

28. Purchase Orders

28.1. The official purchase order will not be issued by the HRCE Purchasing Department until the CCDC-2 Contract Documents have been fully executed.

29. Invoices

29.1. The purchase order number and HST number shall be noted on any/all invoices related to work performed under this contract.

29.2. Applications for progress payments should be submitted to HRCE's consultant and cc'd to **operations-invoices@hrce.ca** and HRCE's Project Manager.

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 B3B 1X7
ATTN: DON WALPOLA, BUYER

For: **#4235 Boiler Replacement and Control Upgrade – Tantallon Sr. Elementary**

Organization Name:	
Street Address:	
Email Address:	
Telephone:	
Authorized Signing Authority:	
Position Title:	

2. Proponent Declares:

2.1. That this submission was made without collusion or fraud.
2.2. That the proposed work was carefully examined.
2.3. That the Proponent is 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 RFT.

3. Proponent 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. The have carefully examined the site of the work described herein; have become familiar with local conditions and the character and the extent of the work; have carefully examined every part of the proposed Contract and thoroughly understand its stipulations, requirements and provisions.

3.3. The have determined the quality and quantity of materials required; have investigated the location and determined the source of supply of the materials required; have investigated labour conditions; and have 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 price, to execute the required contract within ten (10) days after notice of award.

3.5. They have noted that the Harmonized Sales Tax is excluded from the "Contract Price".

3.6. The 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.

3.7. To the hours of work, defined as: All work for HRCE is to be completed during hours when schools are unoccupied, unless otherwise indicated in writing by the Operations Manager or designate. Hours of work shall comply with local ordinances and bylaws for each site.

3.7.1. No work shall be conducted on weekends or statutory holidays without specific written approval from the Operations Manager or designate.

3.7.2. In the event that work is requested by HRCE during hours when schools are occupied, the work will be limited to work that is not disruptive to the school. There shall be no mechanical removals, no drilling, screwing or torch work during occupied hours without prior written approval from HRCE.

4. Owner Agrees

4.1. To examine this bid and in consideration, therefore, the proponent hereby agrees not to revoke this bid:

4.1.1. until some other proponent 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 Proponents, or

4.1.2. until ninety (90) days after the time fixed in the Information to Proponents for receiving bids has expired, or

4.1.3. Whichever first occurs; provided, however, that the Proponent may revoke this bid at any time before the time fixed as indicated in the section 00 21 13, item 13.1.

5. Contract Documents include:

The HRCE **has transitioned** from the CCDC-2, 2008 contract to the **CCDC-2, 2020** contract and will use the CCDC-2, 2020 for this work. A copy of the Standard Construction Contract CCDC 2 – 2020 is available upon request and will form part of the Contract Documents.

The HRCE Supplementary General Conditions for the CCDC-2, 2020 application to this Work is available for review under Section 0073 00 of the RFT document.

5.1.1. Cover Page
5.1.2. Table of Contents – Section 00 00 10
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 Proponents – Section 00 21 13
5.1.6. Price Submission Form – Section 00 41 13
5.1.7. Price Amendment Form (if applicable) – Section 00 41 73
5.1.8. Agreement Between Owner and Contractor (CCDC 2) – Section 00 52 00
5.1.9. Definitions (CCDC 2) – Section 00 52 13
5.1.10. General Conditions of the Stipulated Contract Price (CCDC 2) – Section 00 72 13
5.1.11. Supplementary General Conditions – Section 00 73 00
5.1.12. Specifications of Work (all applicable sections)
5.1.13. Drawing(s) – as applicable
5.1.14. Addenda issued by HRCE
5.1.15. Post Bid Addenda issued by the HRCE, where applicable.
5.1.16. Executed Contract

6. Price Submission - Contract Price:

6.1. The undersigned Proponent, 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 propose 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

#4235 Boiler Replacement and Control Upgrade – Tantallon Sr. Elementary

_____ /100 Dollars ($_____)

(HST Excluded)

Award will be subject to Budget Availability.

****HRCE reserves the Right to:**

Award to one or more contractors who bid

Accept bids on any or all sections of this work

Reduce the Scope of Work if the Bid amount Exceeds the Available Budget**

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 INDIVIDUAL PRICE – MECHANICAL SUB-SCOPES

The lump sum price provided in Section 6.2 represents the total price to complete the boiler replacement and control upgrade project in its entirety. The HRCE acknowledges that there are inherent costs savings and economies of scale achieved when awarding all workscopes to a single bidder.

In the event that partial award is required, please provide pricing per each individual section as listed below. Each price is to include all management costs (administration, mobilization, etc.) as required to perform the entirety of the work for that specific sub-scope of work. The HRCE acknowledges that management costs are higher on a per section basis, compared to management costs associated with all sections priced as one lump sum.

The expectation is that the pricing provided below represents the entire price to complete that specific sub-scope, should it be the only section awarded. The pricing provided here will not be used in the calculation of the RFP scoring, see Section 6.2 Lump Sum Price.

BOILER REPLACEMENT & BOILER CONTROLS

_____ **/100 Dollars ($_____)**

(HST Excluded)

SR. ELEMENTARY REMAINDER OF BUILDING CONTROLS

_____ **/100 Dollars ($_____)**

(HST Excluded)

UNDERGROUND OIL TANK DEMO, RELOCATION OF ABOVE GROUND TANK, AND PIPING: JR. ELEMENTARY

_____ **/100 Dollars ($_____)**

(HST Excluded)

7. Completion Time:

7.1. The proponent agrees to achieve Ready-for-Takeover on or before the following date:

7.1.1.1. **August 30, 2024**

7.1.1.2. The undersigned Proponent agrees, if awarded the Contract, to achieve the Ready-for-Takeover Date providing the contract is awarded within ten (10) business days of RFT closing time.

8. Addenda Acknowledgement

We have received and noted the following addenda:

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.

Subcontractor/Suppliers/Manufacturers	**Service/Material**
Site Works	
Electrical	
Mechanical	

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 Proponent declares that this bid is made without connection to any other person(s) submitting pricing for the same work and is in all respects fair and without collusion or fraud.

RFT #4235 Boiler Replacement and Controls Upgrade – Tantallon Sr. Elementary

SIGNATURE:

SIGNED AND DELIVERED
in the presence of:

_____
Witness

CONTRACTOR

_____
Company name

_____
Signature of Signing Officer

_____
Name and Title (printed)

_____
Date

11. Acknowledgement of Student Safety

The Halifax Regional Centre for Education (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.

The HRCE reserves the right to demand, at any time, during the full term of the project a Criminal Record Check and/or a Child Abuse Registry Check, on any personnel authorized by the Contractor to be on HRCE work/school sites.

By signing below you are confirming that you understand and will abide by this mandatory HRCE requirement.

_____
Company name

_____
Witness

_____
Signature of Signing Officer

_____
Name and Title (printed)

_____
Date

END OF SECTION 00 41 13

SECTION 00 41 73 - PRICE AMENDMENT FORM
#4235 Boiler Replacement and Controls Upgrade
Tantallon Sr. Elementary

Note: to be completed and forwarded for each Price amendment prior to RFT closing time and date as detailed on the cover sheet of the RFT document and any applicable addenda.

Lump Sum Price Amendment – Section 00 41 13 Price Submission form, Article 6.1. Contract Price

Increase Price by		**Decrease Price By**	
Amount (excluding HST)	**$**	**Amount** (excluding HST)	**$**

It is the Proponent's responsibility to ensure the table above is legible.

Submitted by:

_____

Company Name (please print as it appears on original RFT file)

_____

Authorized Proponent's Name (please print as it appears on Price Submission Form)

_____

Authorized Proponent's Signature

Date

_____

END OF SECTION 00 41 73

SECTION 00 52 00 - AGREEMENT BETWEEN OWNER AND CONTRACTOR

CCDC 2 – 2020

(A copy of Section 00 52 00, Standard Construction Contract CCDC 2 – 2020 (5 pages) is available upon request, otherwise, will form part of the contract sets to the successful bidder)

END OF SECTION 00 52 00

SECTION 00 52 13 - DEFINITIONS

CCDC 2 - 2020

(A copy of section 00 52 13, Standard Construction Contract CCDC 2 – 2020 (2 pages) is available upon request, otherwise, will form part of the contract sets to the successful bidder)

END OF SECTION 00 52 13

SECTION 00 72 13 - GENERAL CONDITIONS

OF THE STIPULATED PRICE CONTRACT

CCDC 2 - 2020

(A copy of section 00 72 13, Standard Construction Contract CCDC 2 – 2020 (22 pages) is available upon request, otherwise, will form part of the contract sets to the successful bidder)

END OF SECTION 00 72 13

SECTION 00 73 00 - SUPPLEMENTARY GENERAL CONDITIONS CCDC2 – 2020

The Canadian Standard Construction Document for Stipulated Price Contract (CCDC 2, 2020 version), Definitions and General Conditions governing same, shall be used by the project. The following Supplementary General Conditions (the "**Supplementary 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.

2 ARTICLE A-5 PAYMENT

Change 5.2.1 to delete the letter "s" from the word "rates".

Change 5.2.1(1) to read: "1% per annum above the prime rate."

Delete 5.2.1(2) in its entirety.

Delete 5.2.2. in its entirety.

DEFINITIONS

Add the following defined term to the Definitions:

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.

3 GC 1.1 CONTRACT DOCUMENTS

Add to the end of subparagraph 1.1.6.2:

1.1.6.2 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 13.1.1.3.

Add subparagraph 1.1.4.1:

1.1.4.1 Notwithstanding GC 1.1.4, should one or more conflict exist between Contract Documents and any work is done without consulting the Consultant for correction, Additional information, or a finding, the Contractor shall assume full and sole responsibility for any Additional costs incurred related to the conflict(s).

4 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.

5 PART 3 EXECUTION OF THE WORK

6 GC 3.1 CONTROL OF THE WORK

Add new paragraphs 3.1.3 and 3.1.4:

3.1.3 Prior to commencing individual procurement, fabrication, and construction activities, the Contractor shall verify, at the Place of the 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.

3.1.4 The Contractor shall make all reasonable efforts to ensure that the Work is carried out in a continuous manner. The Contractor shall not knowingly permit Construction Equipment and/or Products to be stored at the Place of Work when they are not being used in connection with or implemented into the Work, except in accordance with paragraph 3.7.7.1.

7 GC 3.6 SUBCONTRACTORS AND SUPPLIERS

Add the following paragraph 3.6.7:

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

8 GC 3.7 LABOUR AND PRODUCTS

Add the following paragraph 3.7.4:

3.7.4 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.

Add the following paragraph 3.7.5:

3.7.5 The Contractor shall confine Construction Equipment, Temporary Work, storage of Products, waste products and debris, and operations of employees and Subcontractors to limits indicated by laws, ordinances, permits, or the Contract Documents and shall not unreasonably encumber the Place of the Work.

Add the following paragraph 3.7.6:

3.7.6 The Contractor shall maintain the Work in a safe and tidy condition and free from accumulation of waste products and debris.

Add the following paragraphs 3.7.7.1 and 3.7.7.2:

3.7.7 .1 The Contractor shall not permit Products or Construction Equipment to be stored at the Place of Work unless:

(i) the Products and/or Construction Equipment are used within fourteen (14) days of their arrival at the Place of Work; or

(ii) the Owner provides written permission for Products and/or Construction Equipment to be stored at the Place of Work, in which case the Contractor shall comply with the written instructions provided by the Owner in that regard, and said permission may be withdrawn by the Owner upon five (5) business days' notice, in which case the Contractor will be solely responsible for any costs, losses, or damages the Contractor incurs in connection the withdrawal of said permission;

.2 Notwithstanding any other provision of the Contract Documents, and subject only to the provisions of any Payment Legislation, the Owner shall not be liable to pay any amount greater than 25% of the actual cost of any Products and/or costs associated with Construction Equipment that is/are stored at the Place of Work and not used within 14 days of their arrival at the Place of Work. The Owner shall only become liable to pay for the remainder of said Products and/or costs of said Construction Equipment after those Products and/or Construction Equipment are actually used at the Place of Work and is/are invoiced in accordance with the terms of the Contract Documents.

Add the following paragraphs 3.7.8.1., 3.7.8.2, 3.7.8.3, and 3.7.8.4:

3.7.8 The Contactor shall:

.1 furnish competent and adequate labour and staff, who shall be in attendance at the Place of Work at all times, as necessary, for the proper administration, co-ordination, supervision, and superintendence of the Work;

.2 organize the procurement of all Products and Construction Equipment so that labour and staff will be available at the requisite times to complete the Work in accordance with GC 3.4 Construction Schedule;

.3 keep an adequate force of skilled workers at the Place of Work, as necessary, to complete the Work in accordance with all requirements of the Contract Documents and in accordance with GC 3.4 Construction Schedule; and

.4 provide the Owner, Project Manager, and Consultant, with the names, work addresses, and telephone numbers of the appointed representative of the Contract and other responsible field persons who may be contacted during non-working hours.

9 GC 3.8 SHOP DRAWINGS AND OTHER SUBMITTALS

Add the words “AND OTHER SUBMITTALS” to the Title after SHOP DRAWINGS in GC 3.8.

Add “and Submittals” after each instance of the words “Shop Drawings” in paragraphs 3.8.1, 3.8.2, 3.8.3, 3.8.3.2, 3.8.5, 3.8.6, and 3.8.7.

Add the following paragraph 3.8.1.1:

3.8.1.1 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 3.8.4.1:

3.8.4.1 The following paragraph shall apply to each Shop Drawing and Submittal reviewed in connection with the project. The Consultant’s review conducted pursuant to GC 3.8.3 shall not imply that the Consultant has approved the detailed design inherent in the Shop Drawings or Submittals, responsibility for which shall remain with the Contractor submitting same. The Contractor is responsible for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the work of all sub trades.

Delete the following words in paragraph 3.8.7:

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

Add new GC 3.9 as follows:

10 GC 3.9 CONTRACTOR RESPONSIBILITY FOR WATER TIGHTNESS

GC 3.9 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 3.10 as follows:

11 GC 3.10 PERFORMANCE BY CONTRACTOR

GC 3.10 In performing the Work and all 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.

12 GC 4.1 CASH ALLOWANCES

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 3.4, at which items called for under cash allowances and items that are specified to be purchased by the Owner and installed or hooked up by the Contractor are required to be at the Place of the Work 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.

13 GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

Delete section GC 5.1 in its entirety.

14 GC 5.2 APPLICATION FOR PROGRESS PAYMENT

Add to paragraph 5.2.1, ", the Project Manager, " after the word "Owner".

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 therein. The form of the Statutory Declaration, Waiver of Lien, or receipt shall meet the approval of the Consultant.

Add the following paragraph 5.2.9:

5.2.9 The reference to payment for Products delivered to the Place of the Work in Article 5.2.8 shall not be construed as covering day-to-day financing of the Project. Products delivered to the Place of the Work shall be construed to mean major items of equipment or quantities of items that are essential for the expedient conduct of the Work.

Add the following paragraph 5.2.10:

5.2.10 The Contractor shall submit all applications for payment and invoices (with supporting documents as required by the Contract Documents) to the Owner via the following email address: operations-invoices@hrce.ca

15 GC 5.3 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 5.3.1.2 as follows:

5.3.1.2 Delete "28" and replace with "30."

16 GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK AND PAYMENT OF HOLDBACK

Add the following paragraph 5.4.7:

5.4.7. 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.

Add the following subparagraph 5.4.8:

5.4.8 After the issuance of a certificate of Substantial Performance of the Work by the Consultant, the Contractor shall promptly submit to the Consultant and the Owner (i) a Certificate from a barrister stating that there are no Builders' Liens filed relating to the Work and (ii) a Clearance Letter from the Workers' Compensation Board.

17 GC 5.5 FINAL PAYMENT

Add the following subparagraphs 5.5.1.1, 5.5.1.2, 5.5.1.3, and 5.5.1.4:

5.5.1.1 The Contractor's application for final payment is considered to be valid only when all of 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, deficiencies have been completed, and the Place of Work is (i) free of waste products and debris, and (ii) clean and suitable for use or occupancy by the Owner.

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.

5.5.1.2 If Work is deemed incomplete by the Consultant, the Contractor shall complete outstanding items and request re-inspection.

5.5.1.3 If, within sixty (60) days after the issuance by the Consultant of the Certificate of 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 Documents and subject to the provisions of the Builders' Lien legislation of Nova Scotia.

5.5.1.4 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 when Ready-For-Takeover has been attained and the Contractor shall promptly 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 reasonably 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.

18 GC 6.2 CHANGE ORDER

Add the following paragraphs 6.2.3, 6.2.4, 6.2.5, 6.2.5, 6.2.6, 6.2.7, and 6.2.8:

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. The Contractor acknowledges that failure to do so will result in foreseeable delay to the approval and payment of changes in the Work and foreseeable Additional costs to the Owner.

6.2.5 Quotation for changes shall be priced in sufficient detail (GC 6.6 applies).

6.2.6 Consultant shall, within five (5) working days, notify the Contractor whether estimates are accepted by Owner or further information is required. Acceptance of the Owner shall be indicated in writing, and a signed copy of the Contemplated Change Order form shall be returned to the Contractor.

6.2.7 The Contractor shall take reasonable measures to stop Work or minimize the Work in areas affected by or related to the contemplated change(s).

6.2.8 For each change in the Work, the Contract Price shall be increased by the net cost of that change in the Work, plus the following mark-ups for all overhead and profits:

a. a 10% mark-up on the direct cost of the net change in the Work for change work performed by the Contractor's own forces; and

b. a 5% mark-up on the change work performed by Subcontractors.

Credits for reduced or Deleted portions of the Work shall be the actual cost of that Work, without Addition or subtraction of any amount by the Contractor for overhead and profit, and shall be included in the actual cost of the net change.

19 GC 6.3 CHANGE DIRECTIVE

Delete paragraph 6.3.6.3 of GC 6.3 and replace with:

6.3.6.3. The Contractor's percentage fee referred to in paragraphs 6.3.6.1 and 6.3.6.2 shall be calculated and determined applying the following percentage mark-ups for overhead and profit:

a. a 10% mark-up on the direct cost of the net change in the Work for change work performed by the Contractor's own forces; and

b. a 5% mark-up on the change work performed by Subcontractors.

Add to GC 6.3 the following paragraphs 6.3.14 and 6.3.15:

6.3.14 If unit prices are set out in the Contract or subsequently agreed upon, then the unit process alone shall govern in relation to determining the cost of any item for a Change Directive.

6.3.15 Payment of the cost of performing work attributable to a Change Directive shall be made only if and to the extent that the Contractor has taken all reasonable steps to mitigate and minimize the impact of the change and the resulting cost.

20 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 3.10, 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 anything which could reasonably have been ascertained by the Contractor by such careful investigation undertaken prior to the submission of the bid.

21 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 Ready-for-Takeover date stated in Article A-1 herein (subject to any adjustment in accordance with the Contract Documents) and any later, actual date Ready-for-Takeover is attained by the Contractor.

Add new paragraph 6.5.7:

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

22 GC6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

Add the following to the end of paragraph 6.6.1, deleting the "." after the word "Consultant":

"in no case more than 10 Working Days from the event or series of events giving rise to the claim".

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.

Add the following paragraph 6.6.7:

6.6.7 If the Contractor claims for an increase in the Contract Price pursuant to this GC 6.6, the amount of any such claim shall be limited to the amount determined in accordance with the methods of quantification set out in paragraphs 6.3.6, 6.3.7, and 6.3.14 of GC 6.3, and the Contractor shall promptly submit a detailed breakdown of all labour, materials, overhead, and profits claimed, including those of Subcontractors. Contemporaneous records are required to support a claim for an increase in the Contract Price, and the Owner retains the right to verify all submitted records through an independent audit. The Owner is not liable for costs not so substantiated. Any mark-up for overhead and profit on the claimed amount under this GC 6.6 shall be limited to the amounts provided for under GC 6.3.6.3, as Amended by these Supplementary Conditions.

23 GC 8.3 NEGOTIATION, MEDIATION, AND ARBITRATION

Add the following paragraphs 8.3.9, 8.3.10, 8.3.11, 8.3.12, 8.3.13, 8.3.14, and 8.3.15:

8.3.9 Within five (5) days of receiving a Notice in Writing requesting arbitration, the party receiving the notice shall give the Consultant a written notice containing:

a. a copy of the Notice in Writing requesting arbitration;

b. a copy of supplementary conditions 8.2.9 to 8.2.14 of this contract, and;

c. a concise description of 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.

8.3.10 The Owner and the Contractor agree that the Consultant may elect, within ten (10) days of receipt of the notice under paragraph 8.3.9, to become a full party to the arbitration under paragraph 8.3.6 if the Consultant:

a. has a vested or contingent financial interest in the outcome of the arbitration;

b. gives the notice of its 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 8.3.6, and;

d. agrees to be bound by the arbitral award made in the arbitration.

8.3.11 If an election is made under paragraph 8.3.10, the Consultant may participate in the appointment of the arbitrator and, notwithstanding the rules referred to in paragraph 8.3.6, 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.

8.3.12 The arbitrator in the arbitration in which the Consultant has elected under paragraph 8.3.10 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 8.3.10, and;

b. make any procedural order considered necessary to facilitate the Addition of the Consultant as a party to the arbitration.

8.3.13 The provisions of paragraph 8.3.9 shall apply mutatis mutandis to written notice to be given by the Consultant to any sub-consultant.

8.3.14 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 8.3.10, and is deemed to be bound by the arbitration proceeding.

8.3.15 An application for arbitration shall be accompanied by security in the amount of $1,000 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.

24 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 or omissions in the Contract Documents which the Contractor could not have discovered applying the standard of care described in paragraph 3.10.

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 the Work exercising the degree of care and skill described in paragraph 3.10.

25 GC 9.2 TOXIC AND HAXARDOUS 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 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 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, human health and safety or the environment, or material damage to the property of the Owner or others,

26 GC 9.4 Construction Safety

Add to the end of paragraph 9.4.1:

The Contractor shall be responsible for and ensure the safety of not only the workers, Subcontractors, tradespeople, and Suppliers, and their equipment, but also of all other persons who enter the Place of Work whether during working hours or not, and for that purpose shall erect

such hoardings and signs and shall employ such safety measures as may be necessary to ensure the safety of such persons.

Delete paragraph 9.4.5 and replace with:

The Contractor shall be responsible for the cost to comply with any public health order(s) affecting the performance of the Work issued pursuant to the Health Protection act (Nova Scotia) or pursuant to any similar legislation, whether Federal or Provincial.

27 GC 9.5 MOULD

Add in subparagraph 9.5.3.4:

9.5.3.4 “and the Consultant” after “Contractor”

28 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. The Contractor’s HST registration number must appear on all invoices.

29 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 3.10, the”

30 GC 10.4 WORKERS' COMPENSATION

Add the following paragraphs 10.4.2, 10.4.3, 10.4.4, and 10.4.5:

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

10.4.3 The Contractor’s registration with the 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 its registration renewal one month prior to the expiration of the current certificate.

10.4.4 The Contractor shall furnish evidence of coverage under the Worker’s Compensation Act of Nova Scotia and a clearance Certificate providing proof of registration with the Worker’s Compensation Board prior to commencement of the 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.

10.4.5 The Contractor shall also maintain a Certificate of Recognition (COR) from a safety audit company recognized by the Workers' Compensation Board, such as the Nova Scotia Construction Safety Association, for the duration of the Contract. The Contractor shall provide a copy of its COR to the Owner and Consultant prior to commencement of the Work and shall provide a copy of its COR to the Owner or Consultant upon request.

GC 11.1 INSURANCE

Delete sentences and replace with the following in subparagraph 11.1.1.1:

11.1.1.1 **Delete**: "General liability insurance shall be maintained from the commencement of the Work until one year from the date of Ready-for-Takeover. Liability coverage shall be provided for completed operations hazards from the date of Ready-for-Takeover on an ongoing basis for a period of 6 years following Ready-for-Takeover" **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 Ready-for-Takeover".

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, broad form property damage, broad form 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 ten million dollars ($10,000,000) is required with regard to operations of owned and non-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 to be 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 Ready-for-Takeover being attained, 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 Ready-for-Takeover;

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 supplemented as follows:

11.1.2 In addition, within seven (7) working days after notification of award or in any event prior to payment of the first progress claim, the Contractor shall submit certified true copies of each insurance policy to the Owner's Contract Authority. 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.

31 GC 11.2 CONTRACT SECURITY

Add the following paragraphs 11.2.1, 11.2.2, and subparagraph 11.2.2.1:

11.2.1 The Contractor shall, prior to commencement of the *Work* or within the specified time, provide to the *Owner* and the Consultant the *Contract* security specified in the *Contract Documents*.

11.2.2 If the *Contract Documents* require surety bonds to be provided, such bonds shall be issued by a duly licensed surety company authorized to transact the business of suretyship in the province or territory of the *Place of the Work* and shall be maintained in good standing until the fulfillment of the *Contract*. The form of such bonds shall be in accordance with the latest edition of the CCDC approved bond forms, or in such other form as specified by the Owner.

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 Ready-for-Takeover.

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. The Contract shall 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).

32 GC 12.3 WARRANTY

In paragraph 12.3.2, delete from the first line the word, "The" and substitute the words:

12.3.2 "Subject to paragraph 3.10, 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.

33 GC 13.3 INDEMNIFICATION

Add the following paragraph 13.1.1.3:

13.1.1.3 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 t Ready-for-Takeover, or within such shorter such period as may be prescribed by any limitation statute or the province or territory of the Place of the Work.

END OF SECTION 00 73 00

SECTION 01 11 00 - HRCE SUMMARY OF WORK

1. Project Location & General Scope

1.1. Tantallon Sr. Elementary, 3 French Village Station Rd. Upper Tantallon , NS, B3Z 1E4

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 contract.

3. General Conditions

3.1. Halifax Regional Centre for Education and CCDC-2 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 Contact 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.

8.4. Removal of insulation on roof drains inside the building 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 (at the cost of the contractor) 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. All security on site shall be coordinated through HRCE using an HRCE preferred vendor.

12.12. The contractor is responsible for the cost of security for all project materials.

12.13. If access to the project site is required inside the building, HRCE will provide security personnel at its own cost.

12.14. 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.

12.15. 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.

12.16. 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.

12.17. Where applicable, a hot work permit will be required to be completed and approved by HRCE 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.

12.18. 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.

12.19. 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.

12.20. Adhesives / Torch Work - All adhesive use and torch work must be completed after school hours. Contractor must assign a designated fire watch as indicated above in 12.17.

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 effect 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.** Obligee 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. Bid 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:

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:

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:

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:

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, mold, fumes, lead or asbestos exposure may and have been identified, (Reference Hazardous Building Materials Assessment in Appendices).

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 window replacement, 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 Y2 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. A site specific HBMA has been provided in the Appendices for Tantallon Sr. Elementary. Asbestos containing material within the areas of work is present and will be required to be removed to complete the project workscope as per the contract documents. Contractors shall follow HRCE's Asbestos Management Program, (AMP), and all other applicable safety measures listed within the contract documents.

5.2. 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.

5.3. 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:

#_____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_____

List new Contractors on Site below:

_____
_____
_____
_____
_____
_____

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

_____
(Contractor Project Manager)

Certified by

_____
(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.

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 ***#4235 - Boiler Replacement and Controls Upgrade – Tantallon Sr. Elementary***

Architect .....

Contractor .....

Date .....

Halifax Regional Centre for Education – Schedule of Values		
Contract Item	**Percentage**	**Dollar Value**
Mobilization, bonding / insurance, safety , set up and schedule	10	
Boiler and heating system decommissioned	30	
New boiler and system installed	30	
Commissioning and balancing	20	
Close out documentation including copy of warranty	10	
Total	**100 %**	

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 lows 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 Performance 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 Performance 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 Contract Documents provided the Consultant 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 in accordance with GC 5.4 and the Contract Documents.

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. Subject to the provisions of the Contract Documents, 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 the Ready-for-Takeover date.

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

Pre-Closing Reminder to Proponents:

- Please ensure that the submission instructions are followed carefully as noted in Section 00 21 13 – Information to Proponents to ensure your bid is compliant.
- Required Bid Security – (10% of the Contract price before HST) – Please include a copy of your bid security in with your Tender Form.
- Insurance Certificate
- Please submit your bid to the *NEW* submission email address: hrcetenders@hrce.ca
- The HRCE has transitioned from the CCDC-2, 2008 contract to the **CCDC-2, 2020** contract and will use the CCDC-2, 2020 for this work. A copy of the Standard Construction Contract CCDC 2 – 2020 is available upon request and will form part of the contract documents.
- The HRCE Supplementary General Conditions for the CCDC-2, 2020 applicable for this work is available for review under Section 0073 00 of the RFT document.

Post Award Document Requirements:

- Certificate of Recognition from a safety audit organization, jointly signed with the WCB
- Workers' Compensation Board Letter of Good Standing.
- Contract Security documentation – if required
- Complete Insurance Certificate – As identified in the RFT.
- Schedule of Values
- Detailed Schedule of Work
- Site Specific Safety Plan
- Hazard Assessment
- Listing of subcontractors
- Warranty information

The award letter will list the specific documents required and provide a submission timeframe.

A purchase order will be issued only after receipt of all required items.

Work is not authorized until purchase order is issued

SPECIFICATION INDEX

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 RELATED SECTIONS THAT ARE PART OF DIVISION 20 TO 25 WORK

.1 Section 25 01 11 BAS: Start-Up and Verification

.2 Section 25 05 01 BAS: General Requirements

.3 Section 25 10 02 BAS: Operator Interface

.4 Section 25 30 02 BAS: Field Control Devices

.5 Section 25 30 03 BAS Field Installation

1.3 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.

1.4 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, domestic hot water, tempered hot water and domestic hot water recirculation.

.4 "Hydronic" includes hot water heating, chilled water and glycol supply and return piping.

.5 “Provide” will mean “Supply and install”.

1.5 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
  - .3 CAN/CSA B149.1 Natural Gas and Propane Installation Code.
  - .4 CSA B139 Installation Code for Oil Burning Equipment.
  - .5 CSA B51 Boiler, Pressure Vessel, and Pressure Piping Code.
  - .6 CSA C22.1 Canadian Electrical Code, Part 1 Safety Standard for Electrical Installations.
  - .7 CAN/CSA C390- Test methods, marking requirements, and energy efficiency levels for three-phase induction motors
  - .8 NFPA 13 Installation of Sprinkler Systems.
  - .9 Provincial Petroleum Storage Regulations.
  - .10 SMACNA HVAC Air Duct Leakage Test Manual.
  - .11 SMACNA Round Industrial Duct Construction Standards
  - .12 SMACNA HVAC Duct Construction Standards - Metal and Flexible.
  - .13 ULC-S505, Fusible Links for Fire Protection Service.
  - .14 CAN/ULC-S102 Test for Surface Burning Characteristics of Building Materials and Assemblies
  - .15 CAN/ULC S110 Test for Air Ducts.
  - .16 TIAC Mechanical Insulation Best Practice Guide

1.6 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.

1.7 ANCHOR BOLTS AND TEMPLATES

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

1.8 COORDINATION

.1 Closely coordinate the installation of Plumbing System piping and placement of Plumbing System equipment with other Trade Contractors, including but not limited to, Structural steel Contractor, Ceiling Contractor, Sprinkler Contractor, Heating Contractor, Air Distribution Contractor, Controls Contractor and Electrical Contractor

.2 Closely coordinate the installation of Heating System piping and placement of Heating System equipment with other Trade Contractors, including but not limited to, Structural steel Contractor, Ceiling Contractor, Sprinkler Contractor, Plumbing Contractor, Air Distribution Contractor, Controls Contractor and Electrical Contractor

.3 Closely coordinate the installation of Air Distribution System piping and placement of Air Distribution System equipment with other Trade Contractors, including but not limited to, Structural steel Contractor, Ceiling Contractor, Sprinkler Contractor, Plumbing Contractor, Heating Contractor, Controls Contractor and Electrical Contractor

.4 Closely coordinate the installation of Controls System and placement of Controls System equipment with other Trade Contractors, including but not limited to, Structural steel Contractor, Ceiling Contractor, Sprinkler Contractor, Plumbing Contractor, Heating Contractor, Air Distribution Contractor and Electrical Contractor.

1.9 ELECTRICAL

.1 Electrical work to conform to Electrical Contract including the following:
- .1 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 Power supply to boilers is by Electrical Contractor. Field wiring of boiler components is the responsibility of Mechanical Contractor.

.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.

1.10 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.

1.11 CUTTING AND PATCHING

.1 Refer to Division 01.

1.12 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 drawings 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 Standard of Acceptance, including mechanical and electrical connections and physical dimensions and weights. Other listed Acceptable Manufacturers chosen by the Contractor for use on this project, which necessitates changes in service connections to perform the specified functions, differs in dimensions or weights, may be used, however, any required modifications or additions to the project and other trade contractors resulting from this shall be done at no additional cost to the Owner.

1.13 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.

1.14 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.

1.15 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Collect and separate plastic, paper packaging and corrugated cardboard.

1.16 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.

1.17 OWNER SUPPLIED EQUIPMENT OR PRE-TENDERED EQUIPMENT

.1 Preform 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 3 phase motors, 745 Watts (1.0 HP) and larger: Minimum (NEMA Premium) nominal efficiency in accordance with CAN/CSA C390 "*Test Methods, Marking Requirements and Energy Efficiency Levels for Three-Phase Induction Motors*"

.4 Definite Purpose Inverter-Ready Motors and meet NEMA MG 1 Part 31.4.4.2.
- .1 Suitable for current and/or future variable frequency drives (VFD's).
- .2 Exceptions: Sump pumps, wet rotor pumps, multi speed pumps, ECM pumps, oil and gas burners, unit heaters, cabinet heaters, cabinet fans and where noted.

.5 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.

.6 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.

.7 Service factor 1.15.

.8 Totally enclosed fan cooled (TEFC) where specified.

2.4 BELT DRIVES

.1 Fit reinforced belts in sheaves matched to drive. Multiple belts to be matched sets.

.2 Use cast iron or steel sheaves secured to shafts with removable keys unless otherwise specified.

.3 For motors under 7.5kW (10 HP): standard adjustable pitch drive sheaves, having plus or minus 10% range. Use mid-position of range for specified r/min.

.4 For motors 7.5kW (10 HP) and over: sheaves with split tapered bushing and keyway having fixed pitch unless specifically required for item concerned. Provide sheaves of correct size to suit balancing.

.5 Minimum drive rating: 1.5 times nameplate rating on motor. Keep overhung loads within manufacturer's design requirements on prime mover shafts.

.6 Tension belts to manufacturer's recommendations before start-up and after first (100) hours of operation using calibrated belt tensioning gauge. Submit report showing the recommended and actual tension on all units.

2.5 GUARDS

.1 Provide guards for unprotected drives.

.2 Provide means to permit lubrication and use of test instruments with guards in place.

.3 Guards for belt drives:
- .1 Expanded metal screen welded to steel frame.
- .2 Minimum 1.3 mm (18 Ga.) thick sheet metal tops and bottoms.
- .3 38 mm (1 1/2") diameter holes on both shaft centers for insertion of tachometer.
- .4 Removable for servicing.

.4 Install belt guards to allow movement of motors for adjusting belt tension.

.5 Guard for flexible coupling:
- .1 "U" shaped, minimum 1.6 mm (16 Ga.) thick galvanized mild steel.
- .2 Securely fasten in place.
- .3 Removable for servicing.

2.6 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.

.5 Mount exterior base mounted equipment on chamfered edge reinforced housekeeping pads, supplied by General Contractor.
- .1 Minimum 300 mm (12") high and minimum 100 mm (4") larger all around than equipment.
- .2 Provide detailed drawing to Others showing location of pads.
- .3 Ensure bases are level prior to placement of equipment.

2.7 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

2.8 PIPE PENETRATION THROUGH WALLS AND FLOOR

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

.2 Provide cast in place temporary collar, core drill slab or sleeve all sprinkler piping, drainage waste piping, plumbing vent piping, domestic water and hydronic pipes penetration through floors.

.3 Provide cylindrical Sleeve all sprinkler piping, drainage waste and vent piping, domestic water, hydronic pipes and control conduits through all mechanical room slabs above grade.

.4 For all sprinkler piping, drainage waste piping, plumbing vent piping, domestic water, hydronic pipes 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.

.5 For all sprinkler piping, drainage waste piping, plumbing vent piping, domestic water, hydronic pipes 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.

.6 Insulation on domestic cold water piping and hydronic piping to be continuous through Walls and Floor.

.7 Ensure no contact between copper tube / pipe and ferrous sleeve or concrete.

.8 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.

2.9 PIPE SLEEVES

.1 For floors other rooms, provide 1.6 mm (16 Ga.) galvanized round sleeves with tack welded longitudinal joints, retaining tabs, terminating flush with floor.

.2 For walls, provide 1.6 mm (16 Ga.) galvanized round sleeves with tack welded longitudinal joints.

.3 Center sleeves on centerline of pipe.

2.10 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 non rated 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.

2.11 ESCUTCHEONS

.1 On pipes passing through walls, partitions, floors and ceilings in finished areas.

.2 Chrome or nickel plated brass or Type 302 stainless steel, split piece type.
- .1 Standard of Acceptance:
  - .1 Grinnell Fig 2 and 13.

.3 Outside diameter to cover opening or sleeve.

.4 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 Test domestic hot, recirculation and cold water piping at 1 1/2 times system operating pressure or minimum 860 kPa (125 psig), whichever is greater. Maintain test pressure without loss for a minimum of 2 hours otherwise specified.

.7 Test backflow preventers in accordance with manufacturer's recommendation and the requirements of the local water utility.

.8 Test gas piping to CAN/CGA B149.1 Natural Gas and Propane Installation Code.

.9 Hydronic Piping:
- .1 Maintain test pressure without loss for 4 h unless otherwise specified.
- .2 Hydraulically test hydronic piping systems at 1 1/2 times system operating pressure or minimum 860 kPa (125 psig), whichever is greater.

.10 Equipment: test as specified in relevant sections.

.11 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures of test medium.

.12 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 BACnet

.1 When equipment is specified to be supplied with a communication card and is to be connected to the BAS network and "communicate to the BAS" using the BACnet standard, the equipment includes:
- .1 BACnet communication media
  - .1 For unitary equipment, BACnet communication over RS485 2- wire network and a 76,800 baud rate is acceptable.
  - .2 For major mechanical equipment BACnet communication over an Ethernet is acceptable.
- .2 Equipment shop drawings are to include:
  - .1 Job specific wiring diagrams with details on interface wiring including, wire type and detailed wire termination drawings.
  - .2 Details on site specific addressing requirements and confirmation there will be no conflicts with the existing system architecture.
  - .3 Details as to what type of information can be read from the device and also what type of information can be written or defined from the BAS.
  - .4 Specified or intended sequence of the equipment and how the equipment will operate to meet your sequence a building requirements.
- .3 Complete with all configuration and programming software. Including any specific cables and proprietary software required to connect to and program the equipment. The owner will have full access to the equipment sequence at turnover of project. Equipment sequence is to be fully programmable by the Factory Trained Authorized Manufacturer Service Technician on site.
- .4 Field start-up to be performed by Factory Trained Authorized Manufacturer Service Technician.
- .5 Factory Trained Authorized Manufacturer Service Technician to be on site for start-up, commissioning and be available for technical support when required during the installation, setup and customer training.

.2 BAS ready equipment.
- .1 Complete with a terminal strip and receive direct hardwired control commands from the BAS.
- .2 BAS will directly control the equipment using analog and digital signals. This will allow the BACnet BAS to have direct control of the equipment and sequence. The only internal controls are the high/low safety limits that are “hardwired” inside the equipment.

3.6 MAINTENANCE SERVICE CONTRACT

.1 For Building Warranty Period.

.2 Refer to Section 25 05 01 BAS: General Requirements for Control Maintenance Contract.

.3 Provide all labor and materials for maintenance of all mechanical equipment supplied by this division except Section 25 05 01 BAS: General Requirements.

.4 Notify Owner 24 hours in advance of each visit.

.5 Provide written report to Owner and Consultant.

.6 Lubricate all fans, pumps and mechanical equipment in accordance with manufacturer's recommendations.

.7 Check, setup and calibrate all unit mounted controls.

.8 Check all belt drives and adjust and/or replace belts as required.

.9 Provide itemized maintenance check list to allow Owners verification of work done and time on site.

.10 Provide all labor and materials for maintenance of all mechanical equipment supplied by this Division except Section 25 05 01 BAS: General Requirements including but not limited to the following:

.1 Lubricate all pumps and mechanical equipment in accordance with manufacturer's recommendations.

.2 Include a minimum two minor service visits for inspection and lubricate as required.

.11 Provide itemized maintenance check list for Owner’s verification of work done and time on site. Written report to the Owner and Consultant to summarize work done, list material used and time on site. Report to be issued following each service with invoice.

3.7 ALTERNATIVES

.1 Refer to Division 1

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 Submit electronic copies of shop drawings. In addition to the electronic shop drawing.

.4 Shop drawings that consist of technical data sheets (letter size) and larger detail drawing, such as, sprinkler, controls, etc., to be submitted in separate packages. Data sheets separated from detail drawings.

.5 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.

.6 Assembled in groups by individual **Specification Section** and bound in sets.

.7 Where possible, submit all items specified in one section as one shop drawing package.

.8 On cover/front page indicate total number of pages in submission.

.9 Consecutively number each page.

.10 Shop Drawings to list components that are shipped loose.

.11 Shop Drawings to include **Project Specific** wiring diagrams.

.12 Shop Drawings for items with BACnet® control to include **Project Specific** list of BACnet® read/write variables. Also refer to Section 20 05 01 Mechanical General Requirements and Section 25 05 02 BAS: Submittals

.13 Fill in and attach "Shop Drawing Submittal Form" from Division 1. When "Shop Drawing Submittal Form" not part of Division 1 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: _____

.14 Installation and Operation Manuals to be submitted to the contractor independent of shop drawing submission.

.15 Section 22 42 01 Plumbing Specialties and Accessories.
- .1 Floor Drains.
- .2 Cleanouts.
- .3 Water Hammer Arrestors.
- .4 Backflow Preventers.
- .5 Water Make-Up Assembly.
- .6 Trap Seal Primers.

.16 Section 22 42 03 Plumbing Fixtures.
- .1 Label each sheet as to fixture type.
- .2 Plumbing fixture and trim: Maximum 2 pages per component.
- .3 Indicate roughing-in dimensions incorporating dimensions indicated on drawings.

.17 Section 22 10 10 Plumbing Pumps
- .1 Pump Performance Curves.

.18 Section 23 05 19 Thermometers and Pressure Gauges
- .1 Direct reading thermometers.
- .2 Remote Reading Thermometers.
- .3 Pressure Gauges.

.19 Section 23 05 23 Valves
- .1 Gas Valves
- .2 Valves NPS 2 and under
- .3 Valves NPS 2-1/2 and over for Hydronic
- .4 Grooved Valves NPS 2-1/2 and over for Hydronic
- .5 Grooved Valves NPS 2-1/2 and over for Domestic Water
- .6 Drain Valves
- .7 Circuit Balancing Valves.
  - .1 Provide schedule showing size, flow and pressure drop.

.20 Section 23 05 29 Hangers and Supports
- .1 Upper attachments for ducts.
- .2 Upper attachments for pipes.
- .3 Pipe hangers
- .4 Description of where each type of upper attachment and hanger will be utilized

.21 Section 23 07 00 Mechanical Thermal Insulation
- .1 Each type of insulation
- .2 Canvas

.22 Section 23 11 13 Oil Piping and Storage Tank
- .1 Oil tank accessories
- .2 Oil tank monitor

.23 Section 23 11 23 Facility Gas Piping
- .1 Copy of information being submitted for gas permit in accordance with fuel safety act including but not limited to the following:
  - .1 Business name, building name and civic address.
  - .2 Propane tank/cylinder size, clearances to buildings, building openings and property lines where applicable. Engineered drawing for bases of horizontal tanks.
  - .3 Use of areas adjacent to propane supply containers (lawn, parking, etc.).
  - .4 Vehicle impact protection barrier type and clearances.
  - .5 Regulator and line pressure relief locations and pressure settings.
  - .6 Where piping or tubing is located below grade, indicate size, material used, type of fittings, length of run, depth below grade and protection method.
  - .7 Arrangement of building piping/tubing, material used, size, type of fittings, length of runs, supports and identification method.
  - .8 Location of all shut-off valves and the make and model number of valve to be used.
  - .9 Flexible connectors make and model number.
  - .10 Appliance arrangement along with the individual make, model and BTU/hr input of each appliance.
  - .11 Venting arrangement of vented appliances including material used, size and length of vent, method of insulating and vent termination.
  - .12 Combustion air method.

.24 Section 23 21 23 Hydronic Pumps.
- .1 Pump Performance Curves.

.25 Section 23 21 13 Hydronic Systems
- .1 Roll groove coupling and fittings.
- .2 Press coupling and fittings.
- .3 Rolled Groove Valves

.26 Section 23 21 14 Hydronic Specialties
- .1 Air Separators.
- .2 Suction Diffusers.
- .3 Flo-Control Valves.

.27 Section 23 25 00 HVAC Water Treatment Systems.

.28 Section 23 52 01 Condensing Boilers.
- .1 Accessories
- .2 Field wiring diagram specific to project.
- .3 Wiring Diagram specific to project showing control transformer, remote panel, etc. Submit manufacturer's detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices or ancillaries, accessories, controllers.

.29 Section 23 51 00 Breeching, Chimneys and Stacks.

.30 Section 24 33 15 Dampers – Operating

.31 Section 25 05 01 BAS: General Requirements.
- .1 Refer to Section 25 05 02 BAS: Submittals
- .2 Copy of Control Wiring Electrical Wiring Permit
- .3 Variable frequency A/C motor drives.
  - .1 Detailed description of all components in the VFD package including line and load reactor impedance ratings and/or filter design type, VFD current, Hp, and voltage rating.
  - .2 Harmonic specification compliance calculations.
  - .3 Dimensional drawing and schematic wiring diagram show all VFD package component connections and all digital and analog inputs and outputs to be connected to the control system.

.32 Shop drawings and product data shall show:
- .1 Mounting arrangements.
- .2 Operating and maintenance clearances, e.g. access door swing spaces.

.33 Shop drawings and product data shall be accompanied by:
- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify as to current model production.
- .5 Certification of compliance to applicable codes.
- .6 Wiring diagrams and electrical characteristics specified for unit supplied.

1.3 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 project specific equipment, such as plumbing fixtures, DHW tanks, heating equipment, pumps, control panels, control valves, etc.

.5 General material which is not considered project specific such as piping, fittings, control conduit, control wire, ductwork, 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 mechanical contractor and the General Contractor.

1.4 PROGRESS ESTIMATES

.1 Refer to General Conditions of Contract.

.2 Submit monthly progress estimates broken down as follows:
- .1 Section 20 05 03 Common Work Results for Mechanical Contract Closeout.
  - .1 Minimum 1% of mechanical contract for items included with application for Substantial Performance certificate.
  - .2 Minimum 1% of mechanical contract for items included with application for release of final payment
- .2 Section 22 11 16 Domestic Water Piping and Section 22 13 17 Drainage Waste and Vent Piping Rough-In
- .3 Section 22 10 10 Plumbing Pumps
- .4 Section 22 42 01 Plumbing Specialties and Accessories
- .5 Section 22 42 03 Plumbing Fixtures
- .6 Section 23 07 00 Mechanical Thermal Insulation
- .7 Section 23 11 23 Gas Piping
- .8 Section 23 21 23 Hydronic Pumps and Section 23 21 14, Hydronic Specialties
- .9 Section 23 21 13 Hydronic Systems
- .10 Section 23 11 13 Facility Fuel Oil - Piping and Storage Tank
- .11 Section 23 52 01 Condensing Boilers and Section 23 51 00, Breeching, Chimneys and Stacks.
- .12 Section 24 33 00 Ductwork and 24 33 00, Air Ductwork Accessories
- .13 Section 24 05 93 Balancing of Mechanical Systems.
- .14 Section 25 05 01 BAS: General Requirements.
  - .1 BAS Control Rough-in.
  - .2 BAS Control Equipment and Installation
  - .3 BAS Control Programming and verification.
  - .4 BAS Control Maintenance Contract.
    - .1 Minimum $1200 per quarterly visit to be billed following each visit.
- .15 Maintenance Service during warranty period to be billed following each visit.

.3 The first mechanical progress estimate may be withheld until such time as the shop drawings, interference drawings, progress estimate break down and hourly labor rate are submitted.

.4 Claims for Material on Site to have itemized list which are updated monthly.

1.5 CONTRACT CHANGES

.1 Hourly Labor Rates
- .1 Refer to General Conditions of Contract.
- .2 Submit separate hourly labor rate for each of the following:
  - .1 Sprinkler Installer
  - .2 Insulator
  - .3 Plumber
  - .4 Heating Installer
  - .5 Sheet metal Installer.
  - .6 BAS Control Electrician.
  - .7 BAS Control Technician

.3 Total Payroll costs as follows:

Base Rate	$
Vacation and Holiday Pay	$
Apprentice Council	$
Promotion fund	$
Training and Union Fund	$
Pension	$
Safety Training	$
Health Benefits	$
Liability Insurance	$
Worker's Compensation Board	$
Employment Insurance	$
CPP	$
Safety Equipment	$
SUBTOTAL	$
Small Tools 5% of Subtotal	$
Site Supervision 5% of Subtotal	$
TOTAL	**$**

.4 Overhead and Fee as per General Condition of Contract.

.2 Contract Changes
- .1 Less than $1,000.00, provide lump sump price.
- .2 Over $1,000 provide breakdown showing the following:
  - .1 Labour hours times hourly labor rate.
  - .2 List of Materials with unit costs.
- .3 Provide breakdown for credit materials and labour.

1.6 PROJECT SCHEDULE

.1 Refer to General Conditions of Contract.

.2 In co-operation with General Contractor submit a mechanical schedule broken down as follows:
- .1 Mechanical Thermal Insulation
- .2 Plumbing Rough-In
- .3 Plumbing Fixtures and Equipment Installation
- .4 Hydronic Rough-In
- .5 Hydronic Equipment and Installation
- .6 Oil Tank removals and Relocation
- .7 Boilers and Chimney
- .8 Air Distribution Rough-In
- .9 Air Distribution Equipment and Installation
- .10 BAS Control Rough-in.
- .11 BAS Control Equipment and Installation
- .12 BAS Control Programming and verification.
- .13 Testing Adjusting and Balancing (TAB) of Mechanical Systems
- .14 Submittal of Contract Close Out Documentation.

1.7 START UP REPORT MANUAL

.1 Custom designed and contain material pertinent to this project only and to provide full and complete coverage of subjects referred to in this section.

.2 Operating and maintenance manual to be approved by and final copies deposited with Consultant before final inspection.

.3 Organize by specification section.

.4 Conform to requirements of Division 01, supplemented and modified by requirements specified in this section.

.5 Start Up and Performance data to include:
- .1 Equipment manufacturer's performance data sheets with point of operation as left after commissioning is complete.
- .2 Start up and verification reports
- .3 Testing, adjusting and balancing reports as specified in Section 24 05 93, Testing, Adjusting and Balancing (TAB) of Mechanical Systems.

.6 Submittals:
- .1 Submit a copy of the complete Start Up Report Manual to Consultant for Review.
- .2 Start Up Report Manual Part 1
  - .1 Start up and verification reports as required with application for substantial performance certificate as per Section 20 05 03, Common Work Results for Mechanical Contract Closeout.
- .3 Start Up Report Manual Part 2
  - .1 Start up and verification reports as required with application for release of final payment as per Section 20 05 03, Common Work Results for Mechanical Contract Closeout.
- .4 Submission of individual data will not be accepted unless so directed by Consultant.
- .5 Make changes as required and re-submit as directed by Consultant.
- .6 Refer to Division 01 for quantity of Manuals (minimum 2).
- .7 Hard-back, 25 mm (1") 3 ring, D-ring binders.
- .8 Binders to be 2/3 maximum full.
- .9 Provide index to full volume in each binder.
- .10 Identify contents of each manual on cover and spine.
- .11 Include names, addresses, telephone numbers of each sub-contractor having installed equipment, local representative for each item of equipment, each system.
- .12 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.

1.8 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 Provide Maintenance Program Schedule in table format (See Below) for each mechanical system and each piece of mechanical equipment including all items for which shop drawings have been submitted. Reference specification sections. List piece of equipment, items to be checked and frequency, tab in manual and page within section.

EQUIPMENT	ITEMS TO BE CHECKED	FREQUENCY	TAB & PAGE
Section 22 42 01 Plumbing Specialties	Clean and confirm flow from trap primer.	Monthly or as required.	22 42 01

.6 Conform to requirements of Division 01, supplemented and modified by requirements specified in this section.

.7 Project records and O&M manuals specified in this section are to be completely separate entity from those specified in Division 01.

.8 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.

.9 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.

.10 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.

.11 Provide maintenance data for the following:
- .1 Section 22 42 03 Plumbing Fixtures:
  - .1 Thermostatic Mixing Valves
- .2 Section 22 10 10 Plumbing Pumps
- .3 Section 23 11 13 Oil Piping and Storage Tank
- .4 Section 23 21 23 Hydronic Pumps.
- .5 Section 23 25 00 HVAC Water Treatment Systems.
- .6 Section 23 52 01 Condensing Boilers

.12 Prepare and insert into operation and maintenance manual, additional data when need for same becomes apparent during demonstrations and instructions specified above.

1.9 SPARE PARTS AND MAINTENANCE MATERIAL

.1 Section 23 05 19 Thermometers and Pressure Gauges.
- .1 Two Thermometers. for each type and range
- .2 Two Pressure Gauges for each type and range.

.2 Section 23 21 23 Hydronic Pumps.
- .1 One set of mechanical seals for each size of pump.

1.10 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 20 05 02 Mechanical Submittals.
- .1 Maintenance Materials and Spare Parts.
- .2 Operation and Maintenance Manuals.
- .3 As Built drawings.

.3 Section 20 05 03 Common Work Results for Mechanical Contract Closeout.
- .1 Confirmation of Demonstration and Operating and Maintenance Instruction.

.4 Section 20 91 13 Mechanical Systems Testing and Verification
- .1 Form V-22 10 10 - DHW Recirculation Pump
- .2 Form V-22 42 01 – Cleanouts
- .3 Form V-22 42 01 - Floor Drains
- .4 Form V-22 42 01 - Trap Primers
- .5 Form V-22 42 03 - Mop Sink
- .6 Form V-23 11 13 - Facility Fuel-Oil Piping and Storage Tank
- .7 Form V-23 21 23 - Hydronic Pumps
- .8 Form V-23 52 00 - Boiler

.5 Section 22 11 16 Domestic Water Piping.
- .1 Confirmation of disinfection of Water System.

.6 Section 23 21 14 Hydronic Specialties.
- .1 Glycol percentage test report.

.7 Section 22 42 03 Plumbing Fixtures.
- .1 Thermostatic control mixing valve test report.

.8 Section 23 11 23 Gas Piping
- .1 Gas system test report

.9 Section 23 21 23 Hydronic Pumps.
- .1 For each Variable Frequency Drive, perform output waveform tests. Submit test results to the Consultant.

.10 Section 23 52 01 Condensing Boilers.
- .1 Factory Boiler Test Report.
- .2 On-site Boiler Test Report.
- .3 Test boiler prior to installation of jacket at two (2) times the boiler back pressure.

.11 Section 24 05 93 Balancing (TAB) of Mechanical Systems.
- .1 TAB Report.

.12 Section 25 05 01 BAS: General Requirements.
- .1 BAS Point by Point verification report
- .2 BAS start-up report including all field programmable software settings including demand expand setpoint and schedules.
- .3 Letter confirming maintenance contract during warranty period.
- .4 Printout of alarm limits.
- .5 Printout of program.
- .6 Copy of program on disks.
- .7 Final Inspection certificate from Inspection Authority for Control Wiring Electrical Wiring Permit
- .8 For each Variable Frequency Drive, perform output waveform tests. Submit test results to the Consultant.

.13 With application for substantial performance certificate
- .1 Section 20 05 02 Mechanical Submittals.
  - .1 Start Up Report Manual Part 1
  - .2 Operation and Maintenance Manuals.
- .2 Section 20 05 02 Mechanical Contract Closeout.
  - .1 Confirmation of Demonstration and Operating and Maintenance Instruction.
  - .2 Letter confirming testing and commissioning to satisfaction of Owner.
- .3 Section 20 91 13 Mechanical Systems Testing and Verification
  - .1 Form V-22 10 10 - DHW Recirculation Pump
  - .2 Form V-22 42 03 - Mop Sink
  - .3 Form V-23 11 13 - Facility Fuel-Oil Piping and Storage Tank
  - .4 Form V-23 21 23 - Hydronic Pumps
  - .5 Form V-23 52 00 – Boiler
- .4 Section 22 11 16 Domestic Water Piping.
  - .1 Confirmation of disinfection of Water System.
  - .2 Laboratory test report for potable water
- .5 Section 22 42 03 Plumbing Fixtures.
  - .1 Thermostatic Mixing Station Test Report.
- .6 Section 23 52 00 Heating Boilers.
  - .1 On site Boiler Test Report.
  - .2 Start-up Report.
- .7 Section 24 05 93 Balancing (TAB) for Mechanical Systems.
  - .1 TAB Report.
- .8 Section 25 05 01 BAS: General Requirements.
  - .1 BAS Point by Point verification report
  - .2 BAS start-up report including all field programmable software settings including demand expand setpoint and schedules.
  - .3 Final Inspection certificate from Inspection Authority for Control Wiring Electrical Wiring Permit.

.14 With application for release of final payment
- .1 Section 20 05 02 Common Work Results for Mechanical - Submittals.
  - .1 Start Up Report Manual Part 2
  - .2 Maintenance Materials and Spare Parts.
  - .3 AS Built drawings.
- .2 Section 20 91 13 Mechanical Systems Testing and Verification Forms not previously submitted.
- .3 Section 23 05 53 Mechanical Identification.
  - .1 Valve Chart.
- .4 Section 23 21 14 Hydronic Specialties.
  - .1 Glycol percentage test report.
- .5 Section 25 05 01 BAS: General Requirements.
  - .1 Letter confirming maintenance contract during warranty period.
  - .2 Printout of alarm limits.
  - .3 Printout of program.
  - .4 Copy of program on disks.

.15 During Warranty Period
- .1 20 05 01 Common Work Results for Mechanical - General.
  - .1 Maintenance Service Reports
- .2 Section 25 05 01 BAS: General Requirements
  - .1 Quarterly Control Maintenance report.

1.3 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTIONS

.1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting 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 Instruction duration time requirements at Substantial Performance as follows:
- .1 Plumbing: 2 hours.
- .2 Heating: 4 hours.
- .3 Boilers: 4 hours
- .4 Controls: 4 hours.

.4 Where deemed necessary, Owner may record these demonstrations on video tape for future reference.

.5 Utilize factory trained technicians for Variable frequency A/C motor drives.

1.4 EXTENDED WARRANTIES

.1 Section 23 52 01 Condensing Boilers.
- .1 For boilers, the non prorated warranty period is extended to ten (10) years. Signed by authorized representative of the original manufacturer.
- .2 For burner, controls and other included equipment, the non prorated warranty period is extended to two (2) years. Signed by authorized representative of the original manufacturer.

1.5 SERVICE DURING WARRANTY PERIOD

.1 Section 23 25 00 HVAC Water Treatment Systems
- .1 Letter confirming service during warranty period.

.2 Section 25 05 01 BAS: General Requirements.
- .1 Letter confirming maintenance contract during warranty period.

2 Products N/A

3 Execution

3.1 CLEANING

.1 Clean mechanical (building) systems in accordance with Division 01.

.2 Clean all pipe systems strainers.

.3 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.

3.2 VERIFICATION

.1 In context of this paragraph "verify" to include "demonstrate" to consultant.

.2 Timing: commission only after start-up deficiencies rectified.

.3 Access doors: verify size and location relative to items to be services.

.4 Adjust to suit site conditions, including, but not necessarily limited to, following:
- .1 Floor drains:
  - .1 Verify proper operation of trap primer.
  - .2 Verify security and removability of strainers.
- .2 Cleanouts:
  - .1 Verify covers are gastight, secure and easily removable.
  - .2 Verify that cleanout rods can properly reach as far as next cleanout.
- .3 Vacuum breakers:
  - .1 Verify installation of correct type to suit application.
  - .2 Adjust as necessary to ensure proper operation.
  - .3 Verify visibility of discharge.
- .4 Trap seal primers:
  - .1 Verify operation.
  - .2 Adjust flow rate to suit site conditions.
  - .3 Verify accessibility.
- .5 Heat pumps.
  - .1 Verify installation in accordance with manufacturer's recommendation.
  - .2 Verify accessibility.

.5 Boilers: Refer to Section 23 52 01 Condensing Boilers.

.6 Controls: Refer to Section 25 05 01 BAS: General Requirements.

.7 Verification reports:
- .1 Record all results on approved report forms.
- .2 Include signature of tester and supervisor.

.8 Verification:
- .1 Notify Consultant 24 hour before commencing tests.

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 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 20 05 02 Mechanical Submittals

2 Products

.1 Provide by Section 07 84 00 Firestopping

3 Execution

3.1 INSTALLATION

.1 Provide by Section 07 84 00 Firestopping

3.2 FIRESTOPPING

.1 Firestopping material and installation within annular space between pipes, ducts, insulation and adjacent fire separation

.2 Uninsulated unheated pipes not subject to movement: no special preparation.

.3 Uninsulated heated pipes subject to movement: wrap with non-combustible smooth material to permit pipe to move without damaging firestopping material.

.4 Insulated pipes and ducts: ensure integrity of insulation and vapor barrier at fire separation.

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 RELATED WORK

.1 General requirements: Division 1.

.2 Section 24 05 93 Testing, Adjusting and Balancing (TAB) of Mechanical Systems

1.4 GENERAL

.1 The verification of all Mechanical systems installed on this project is the responsibility of the Mechanical Contractor. 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 Mechanical contractor.

.2 The Mechanical contractor will provide assistance to the Owner's representatives and ensure that the manufacturer's representative is on site during functional performance testing.

.3 Tests shall be performed by qualified plumber, heating technicians, sheet metal technician, electricians or other technicians as required by the nature and complexity of the test.

1.5 QUALITY ASSURANCE

.1 Be 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.

.2 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

1.6 SCOPE

.1 Testing are called for throughout the individual specifications, however, this does not relieve this Division from providing all testing necessary to ensure that systems and equipment operate as required and that they interface other systems and equipment as required.

.2 Testing of manufactured systems or components shall be performed by factory trained technicians representing the manufacturer.

.3 Perform test by qualified technicians as required by the nature and complexity of the test.

1.7 SYSTEM PERFORMANCE VERIFICATION

.1 When systems are ready for performance verification, arrange a time with the Consultant.

.2 Tested systems prior to this demonstration and be confident that all systems will operate as required.

.3 Systems shall be ready for performance verification at the time prior to final inspection.

1.8 CLEANING

.1 Clean mechanical (building) systems in accordance with Division 1.

.2 Clean all pipe systems strainers.

.3 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.

1.9 CONTRACTOR'S RESPONSIBILITIES

.1 Prepare each system for testing and verification.

.2 Co-ordinate the efforts of testing and verification.

.3 Provide personnel to 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, 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 Consultant 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.

1.11 FINAL REPORT

.1 Assemble all testing data and verification reports and submit them to the Consultant.

.2 Each form shall bear signature of recorder, date of test, and all relevant information in clear and legible form.

.3 Identify each instrument used, and latest date of calibration of each.

.4 Include written confirmation by Owner's representatives that all verification, testing, instruction and demonstrations have been completed to the Owner's satisfaction.

2 Products N/A

3 Execution

3.1 SYSTEM PERFORMANCE VERIFICATION

.1 When systems are ready for performance verification, arrange a time with the Consultant.

.2 Tested systems prior to this demonstration and be confident that all systems will operate as required.

.3 Systems shall be ready for performance verification at the time prior to final inspection.

3.2 VERIFICATION

.1 In context of this paragraph "verify" to include "demonstrate" to consultant.

.2 Timing: verification only after start-up deficiencies rectified.

.3 Access doors: verify size and location relative to items to be services.

.4 Verification reports:
- .1 Record all results on approved report forms.
- .2 Include signature of tester and supervisor.

.5 Verification:
- .1 Notify Consultant 24 hr before commencing tests.

Form V-23 11 13 Facility Fuel-Oil Piping and Storage Tank

EQUIPMENT DETAILS: (Identification)
Pump # _____
Manufacturer: _____ Model: _____ Serial #: _____

PRE-REQUISITES: Heating System complete.

PROCEDURES: (Place checkmark in space provided)	*IN °C*	*OUT °C*
	_____	_____
1. Verify shut-off valve works by closing, then opening it.	_____	_____
2. Use balancing report to confirm unit flow.	_____	_____
3. Verify operation of levelometer.	_____	_____
4. Verify operation of oil tank vacuum monitor.	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

COMMENTS/EVALUATIONS:

_____

_____

_____

SIGN OFF:
Mechanical
Contractor: _____ Signature: _____ Date: _____

Form V-23 21 23 Hydronic Pumps

EQUIPMENT DETAILS: (Identification)
Hydronic Pump # _____
Manufacturer: _____ Model: _____ Serial #: _____
Hydronic Pump # _____
Manufacturer: _____ Model: _____ Serial #: _____
Hydronic Pump # _____
Manufacturer: _____ Model: _____ Serial #: _____

PRE-REQUISITES: Heating System complete.

PROCEDURES: (Place checkmark in space provided)	*Pump #* _____	*Pump #* _____	*Pump #* _____
1. Use balancing report to verify water flow with design.			
2. Verify shut-off valve works by closing, then opening it.	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

COMMENTS/EVALUATIONS:

_____

_____

_____

SIGN OFF:
Mechanical Contractor: _____ Signature: _____ Date: _____

Form V-22 42 01 - Floor Drains

EQUIPMENT DETAILS: (Identification)
Floor Drains
Manufacturer: _____

PRE-REQUISITES: Water available. Drainage pipe pressure tested. Trap Primer operational. Final sewer connection completed.

PROCEDURES: (Place checkmark in space provided)	*Room #*	*Room #*	*Room #*
	_____	_____	_____
.1 Verify security and removability of strainer.	_____	_____	_____
.2 Confirm floor drains are clear.	_____	_____	_____
.3 Served by Trap Primer #	_____	_____	_____
.4 Operate Trap Primer and Confirm flow at individual traps.	_____	_____	_____

PROCEDURES: (Place checkmark in space provided)	*Room #*	*Room #*	*Room #*
	_____	_____	_____
.1 Verify security and removability of strainer.	_____	_____	_____
.5 Confirm floor drains are clear.	_____	_____	_____
.6 Served by Trap Primer #	_____	_____	_____
.7 Operate Trap Primer and Confirm flow at individual traps.	_____	_____	_____

COMMENTS/EVALUATIONS:

_____

_____

_____

SIGN OFF:
Mechanical
Contractor: _____ Signature: _____ Date: _____

Form V-22 42 01 - Cleanouts

EQUIPMENT DETAILS: (Identification)
Cleanouts
Manufacturer: _____

PRE-REQUISITES: Drainage pipe pressure tested. Final sewer connection completed. Cleanouts for under slab drainage brought to floor level. Access doors installed for stack cleanouts. Access available for cleanouts in ceiling spaces.

PROCEDURES: (Place checkmark in space provided) Floor Cleanouts	*Left Wing*	*Center Wing*	*Right Wing*
.1 Verify cleanout is accessible.	_____	_____	_____
.8 Verified covers can easily be removed.	_____	_____	_____
.9 Verify cover is gas tight.	_____	_____	_____
.10 Verify that cleanout rod can properly reach as far as next cleanout.	_____	_____	_____

PROCEDURES: (Place checkmark in space provided) Above grade Cleanouts.	*Left Wing*	*Center Wing*	*Right Wing*
.1 Verify cleanout is accessible.	_____	_____	_____
.11 Verified covers can easily be removed.	_____	_____	_____
.12 Verify cover is gas tight.	_____	_____	_____

COMMENTS/EVALUATIONS:

_____

_____

_____

_____

SIGN OFF:
Mechanical Contractor: _____ **Signature:** _____ **Date:** _____

Form V-22 42 01 - Trap Primers

EQUIPMENT DETAILS: (Identification)
Trap Primer
Manufacturer: _____ Model: _____

PRE-REQUISITES: Water system operation. Drainage pipe pressure tested.
Final sewer connection completed. Power connected to trap primer.

PROCEDURES: (Place checkmark in space provided)		*TP#*	*TP#*	*TP#*
		_____	_____	_____
.1	*Number Trap Primer on record Drawings*	_____	_____	_____
.2	*Verify time setting.*	_____	_____	_____
.13	*Verify solenoid valve opens by visual inspection.*	_____	_____	_____
.14	*Operate Trap Primer*	_____	_____	_____
.15	*Verify that solenoid valve closes completely.*	_____	_____	_____

PROCEDURES: (Place checkmark in space provided)		*TP#*	*TP#*	*TP#*
		_____	_____	_____
.1	*Number Trap Primer on record Drawings*	_____	_____	_____
.2	*Verify time setting.*	_____	_____	_____
.16	*Verify solenoid valve opens by visual inspection.*	_____	_____	_____
.17	*Operate Trap Primer*	_____	_____	_____
.18	*Verify that solenoid valve closes completely.*	_____	_____	_____

COMMENTS/EVALUATIONS:

_____

_____

_____

SIGN OFF:
Mechanical Contractor: _____ Signature: _____ Date: _____

Form V-22 42 01 - Backflow Preventer

EQUIPMENT DETAILS: (Identification)
Backflow Preventer
Manufacturer: _____ Model: _____

PRE-REQUISITES: Water system operation, Drainage system operational.

PROCEDURES: (Place checkmark in space provided)	*BFP #*	*BFP #*	*BFP #*
	_____	_____	_____
.1 Verify installation of correct type to suit application.	_____	_____	_____
.19 Adjust as necessary to ensure proper operation.	_____	_____	_____
.20 Verify visibility of discharge.			
	_____	_____	_____

COMMENTS/EVALUATIONS:

_____

_____

_____

_____

SIGN OFF:
Mechanical
Contractor: _____ **Signature:** _____ **Date:** _____

Form V-22 42 03 - Mop Sink

EQUIPMENT DETAILS: (Identification)
Mop Sink
Manufacturer: _____ Model: _____
Faucet
Manufacturer: _____ Model: _____

PRE-REQUISITES: Domestic Hot and Cold Water system operational.
Drainage pipe pressure tested. Final sewer connection completed

PROCEDURES: (Place checkmark in space provided)	*Room*	*Room*	*Room*
.1 Verify faucet handle on left controls hot water and handle on right controls cold water.	_____	_____	_____
.21 Verify faucet handles properly labeled.	_____	_____	_____
.22 Verify supplies shut off water flow.	_____	_____	_____
.23 Verify drain functions.	_____	_____	_____
.24 Check water outlet for debris.	_____	_____	_____
.25 Record DHW temperature at faucet.	_____	_____	_____
.26 Verify vacuum breaker operation.			

COMMENTS/EVALUATIONS:

_____

_____

_____

_____

SIGN OFF:
Mechanical
Contractor: _____ **Signature:** _____ **Date:** _____

Form V-22 10 10 DHW Recirculation Pump

EQUIPMENT DETAILS: (Identification)
Recirculation Pump # _____
Manufacturer: _____ Model: _____ Serial #: _____

PRE-REQUISITES: Domestic water system complete.

PROCEDURES: (Place checkmark in space provided)	
1. Verify shut-off valve works by closing, then opening it.	_____
2. Use balancing report to confirm unit flow.	_____
3. DHWR Temperature.	_____

COMMENTS/EVALUATIONS:

_____

_____

_____

_____

SIGN OFF:
Mechanical
Contractor: _____ Signature: _____ Date: _____

Form V-23 52 00 - Boiler

EQUIPMENT DETAILS: (Identification)
Boiler
Boiler #_____ Manufacturer: _____ Model: _____
Serial #: _____ Relief Valve Model: _____
PRE-REQUISITES: Water available. Waste pipe pressure tested.
Hydronic System Complete.

PROCEDURES: (Place checkmark in space provided)		*Boiler*
.1	*Check water side of boiler*	_____
.2	*Check fire side of boiler.*	_____
.3	*Verify installation in accordance with manufacturer's recommendation.*	_____
.4	*Verify there is no unusual vibration.*	_____
.5	*Verify power is correct.*	_____
.6	*Verify rotation by "bumping" burner.*	_____
.7	*Verify lamecoid identification mechanically fastened.*	_____
.8	*Verify accessibility.*	_____
.9	*Verify shut-off valve works by closing, then opening it.*	_____
.10	*Verify makeup water operation.*	_____
.11	*Relief valve setting.*	_____
.12	*Verify relief valve operation.*	_____
.13	*Verify oil pressure.*	_____
.14	*Fire boiler and test all safety control operation.*	_____
.15	*Aquastat high limit setting.*	_____
.16	*Aquastat cut-in setting.*	_____
.17	*Aquastat cut-out setting*	_____
.18	*Stack temperature after 15 minutes of operation.*	_____

COMMENTS/EVALUATIONS:

_____

_____

_____

SIGN OFF:
Mechanical
Contractor: _____ Signature: _____ Date: _____

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 Non overloading design.

.2 Capacity: As per schedule on drawing.

.3 Motor: In accordance with Section 20 05 01 Common Work Results for Mechanical – General.

2.2 IN-LINE CIRCULATING PUMPS

.1 Construction: closed-coupled, in-line centrifugal, all bronze construction, stainless steel or alloy steel shaft, stainless steel or bronze shaft sleeve, two oil lubricated bronze sleeves or ball bearing. Design for 860 kPa (125 psi) WP and 105° C continuous service.

.2 Lead Free

.3 Shaft: alloy steel with bronze sleeve bearing, integral thrust collar.

.4 Seal assembly: mechanical for service to 107° C.

.5 Coupler: flexible self-aligning.

.6 Motor: resilient mounted, drip proof, sleeve bearing.

.7 Standard of Acceptance:
- .1 Bell & Gossett as per schedule on drawings.

.8 Acceptable Manufacturers:
- .1 Grunfos
- .2 S. A. Armstrong Ltd.
- .3 Taco

2.3 WET ROTOR TYPE

.1 Maintenance-free, in-line, single stage, wet rotor type with the motor mounted directly to the pump volute.

.2 Capable of operating continuously at temperatures from -10° C to 110° C for closed systems

.3 Maximum working pressure shall be 1000 kPa.

.4 Volute construction from lead free bronze or Stainless steel

.5 Impeller, impeller seal ring, rotor can, bearing plate, motor shaft, and rotor cladding constructed of stainless steel.

.6 Impeller secured directly to the motor shaft by means of a stainless steel tapered split cone and locking nut.

.7 Motor shaft with tungsten carbide bearing journals and supported by two aluminium oxide ceramic radial bearings.

.8 Motor shaft with a stainless steel mounted carbon thrust bearing.

.9 Motor:
- .1 Capability to operate on each of three speeds selected using a built-in, three-speed switch
- .2 Cooled and lubricated by the pumped fluid and require no scheduled maintenance.

.10 Standard of Acceptance:
- .1 Bell & Gossett as per schedule on drawings.

.11 Acceptable Manufacturers:
- .1 Grunfos
- .2 S. A. Armstrong Ltd.
- .3 Taco

3 Execution

3.1 INSTALLATION

.1 Make piping connections to pump and motor assembly and controls.

.2 Ensure pump and motor assembly do not support piping.

.3 Confirm pump rotation is correct.

.4 Set up and adjust all controls.

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 Above ground: copper tube, hard drawn, type L to ASTM B88.
- .2 Individual branch NPS ½ water lines, from main in ceiling to individual fixture:
  - .1 PEX Pressure Tubing to CAN/CSA-B137.5 with cold flare connections or Press flare connections as noted below
  - .2 All PEX Pressure Tubing and fittings to be by one Manufacturer.
  - .3 Bend supports, drop ear bend support with connection free stub out, etc.
  - .4 Acceptable Material:
    - .1 Uponor with ProPEX Connections.
    - .2 Rehau with Everloc Connections.
    - .3 ViegaPEX Ultra with PEX Press Connections.

.2 Trap Primer lines
- .1 Where exposed and concealed above grade: Copper tubing as above.
- .2 Below grade: PEX Pressure Tubing to CAN/CSA-B137.5 as above
  - .1 Acceptable Material:
    - .1 Uponor with ProPEX Connections.
    - .2 Rehau with Everloc Connections.
    - .3 ViegaPEX Ultra with PEX Press Connections.

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 FITTINGS FOR PEX

.1 At mains, provide tee fittings to serve multiple drops.

.2 For NPS ½ and NPS 3/4, provide bend supports where pipe direction changes in lieu of elbows.

.3 Bend supports, drop ear bend support with connection free stub out, etc.

.4 Provide copper to fixture supplies.

.5 To manufacturer's requirements.

.6 Refer to Mechanical Insulation specification for continuous insulation.

2.4 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.

2.5 JOINTS FOR PEX

.1 To manufacturer's requirements using tools recommended by PEX manufacturer.

2.6 HANGERS AND SUPPORTS

.1 Support as per manufacturer's requirements and National Plumbing Code of Canada.

.2 Copper
.1 As per Section 23 05 29 Hangers and Supports.

.3 PEX
.1 Utilize Uponor PEX-a Pipe Support for all NPS 1 and larger mains supported with hangers as per Section 23 05 29 Hangers and Supports.

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.

.1 bury continuous without joints.

3.2 PEX INSTALLATION

.1 In accordance with manufacturer's instructions unless otherwise indicated.

.2 Have a copy of manufacturer's instructions on site.

.3 Parallel to building lines.

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 DISINFECTION & TESTING

.1 Potable Water

.1 Flush out, disinfect and rinse to requirements of authority having jurisdiction.

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 Cast Iron Pipe: to CAN/CSA-B70 Cast Iron Soil Pipe, Fittings and Means of Joining.
- .1 Buried Sanitary Storm and vent minimum NPS 3, to CAN/CSA B-70 with one layer of bituminous coating. Product to be manufactured in ISO 9000 and ISO 14001 Facility
- .2 Above Ground Sanitary Storm and Vent to CSA B-70, Product to be manufactured in ISO 9000 and ISO 14001 Facility
- .3 Acceptable material for pipe.
  - .1 Bibby Ste-Croix: All sizes.
  - .2 Tyler: up to and including NPS 4
- .4 Hub & Spigot Joint.
  - .1 Self-locking positive compression EPDM gasket
  - .2 Acceptable material.
    - .1 Bibby Ste-Croix Bi-Seal.
    - .2 Tyler Ty-Seal.
- .5 Cast Iron Pipe Mechanical Joints: to and listed to CAN/ULC S-102.2-10 and CAN/CSA-B602 Mechanical couplings for drain, waste, and vent pipe and sewer pipe
- .6 Acceptable material.
  - .1 Bibby Ste-Croix
    - .1 Series 2000.
    - .2 Husky SD4000 Heavy Duty
  - .2 Tyler MJ (No hub) coupling.

.3 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

.3 SDR ≤ 35 PVC DWV up to and including NPS 6: solvent weld joints
.4 SDR ≤ 35 PVC DWV 8 and over: locked in gasket and integral bell joint.

	Copper	Cast Iron	PVC DWV	PVC DWV 25 -50	SDR ≤ 35 PVC DWV
Below Grade Sanitary & Vent	N/A	Y	Y	Y	N
Above Grade Sanitary& Vent	Y	Y	N	Y	N

2.2 ABOVE GRADE AND BURIED SANITARY SERVING BOILER ROOM

.1 Cast iron as described above.

2.3 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

2.4 HANGERS SUPPORTS

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

2.5 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 90^0 change in direction

.4 Cast Iron
.1 In accordance with manufacturer requirements.
.2 Torque coupling connections to manufacturer requirements.

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 CAST IRON BODY FLOOR DRAINS

.1 FD-1: Coated cast iron body with integral seepage pan, sediment bucket, membrane clamping collar and half 200 mm (8") round non-tilting secured grate (coated after cut).

.2 FD-F: Coated cast iron body with integral seepage pan, membrane clamping collar, nickel bronze adjustable head, integral oval funnel and round strainer (open at funnel).

.3 Acceptable material:

	Jay R. Smith	Mifab	Watts Drainage	Zurn
FD-1	2320-B-Half grate	F1320C-5 Half grate	FD-320-5-Half grate	Z-556Y-Half grate
FD-F	2005-3591 OT-NB	F1100-C-EG-1	FD-100-C-EG-1	ZN-415-BF

2.2 CLEANOUTS

.1 CO: For Floors: Cast iron body, round adjustable secured nickel bronze full 13 mm (1/2") thick top with neoprene gasket, cast iron membrane clamp collar, cast iron extension and gas tight ABS expansion plug.

.1 Acceptable Material:

.1 Jay R. Smith 4100S-F-C

.2 Mifab C1100-XR-1-34

.3 Watts CO-100-C-RX-1-34G

.4 Zurn Z-415-U-ZXN-1612-SP ZXN-415-CO-SP-Devcon 4NH

.2 For stacks, concealed in block wall: install a Malcolm style in a TY with face of cleanout within 50mm (2") of wall face. Provide access door.

.3 For stacks, concealed in drywall: Barrett style with access door.

.4 For exposed stacks: Barrett style.

.5 For nominally horizontal piping in ceiling space: Malcolm style (with access door where above non-accessible ceiling).

2.3 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

2.4 BACK FLOW PREVENTERS

.1 CSA B64.4 Certified.

.2 Reduced pressure zone backflow preventer.
- .1 NPS 3/4 to 2.
  - .1 Lead Free
  - .2 Bronze body construction.
  - .3 Quarter turn ball valve shut-offs.
  - .4 Bronze ball valve test cocks.
  - .5 Replaceable seats.
  - .6 Soft seat check valve
  - .7 Air gap piped to drain.
  - .8 Acceptable Material:
    - .1 Watts LF009 QT with 909 AG and LF601 Maxi-flo check valve.
    - .2 Wilkins 975XL with AG and 40XL In-Line Check Valve
    - .3 Apollo 4ALF with AGD and 61-100/200 In-Line Check Valve

2.5 HOSE BIBBS

.1 Ball valve in accordance with Section 23 05 23 with Cap & Chain.

.2 Lead Free Hose end vacuum breakers except where otherwise protected.
- .1 Acceptable Material:
  - .1 Watts No. 8P

2.6 TRAP SEAL PRIMERS

.1 Electronic solenoid valve with brass body, atmospheric vacuum breaker, inlet isolation valve, 24 hour timer, manual override switch, adjustable timer and manifold with NPS 5/8 compression for NPS ½ copper tube connections, galvanized steel wall box, prime coated access door with Allen key lock. 120 volt single point power connection. All internal piping to be copper. Valve and manifold inside enclosure.
- .1 Acceptable Material:
  - .1 Precision Plumbing Products PT-FM series-TMR-1-ADJ-120V

.2 Provide water hammer arrestor for each trap primer.

.3 Each trap seal primer connection to run independent to each floor drain.

.4 For floor drain in slab on grade, NPS 1/2 tubing connection between trap primer and floor drain.

.5 For floor drains above grade, NPS 1/2 tubing between primer and floor drain. Pipe to be in ceiling space.

.6 Provide trap seal primer connection to all floor drains except where floor drains connect to a primed running trap.

.7 Provide trap seal primer connection to all air handling unit drains connections.

2.7 TRAPS

.1 Deep seal traps.

2.8 VACUUM RELIEF VALVE

.1 Lead Free

.2 Tested and rated under ANSI Z21.22.

.3 Acceptable Material:
- .1 Watts LF N36 NPS 3/4.
- .2 Wilkins 34XL-VR10

3 Execution

3.1 CLEANOUTS

.1 In addition to those required by code, an easily accessible cleanout shall be provided at each 135 degree change in direction in soil or waste pipe and at the base of each stack.

.2 Bring cleanouts to wall or finished floor unless serviceable from below floor.

.3 Running trap cleanouts to extend to finish floor.

.4 For stacks with access door, locate centerline of cleanout a minimum of 300mm (12”) AFF.

.5 Building drain cleanout and stack base cleanouts: line size to maximum NPS 4.

3.2 BACK FLOW PREVENTERS

.1 Pipe discharge to nearest drain.

3.3 WATER MAKE-UP ASSEMBLY

.1 Pipe relief valve to nearest drain.

3.4 FLOOR DRAINS

.1 Refer to Architectural drawings for floor slope.

.2 Service fixtures as follows:

Fixture	Waste Minimum NPS	Vent NPS
Floor Drain	3	1 1/2

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 THERMOSTATIC CONTROL VALVE

.1 TV-M Master Mixer: Lead Free Thermostatic control with check stops, removable cartridge with strainer, thermal motor, rough bronze finish, built in limit stops. ASSE 1017
- .1 Application: DHW tanks
- .2 Standard of acceptance:
  - .1 Powers as per Schedule on drawings
- .3 Acceptable material
  - .1 Watts LFN170-M3 CSUT
  - .2 Leonard LV554-980-RF
  - .3 Acorn MV17-3
  - .4 Lawler 800

2.2 THERMOSTATIC MIXING STATION

.1 DHW-MS Master Mixer: Lead Free ASSE 1017 mixing station.
- .1 Application: DHW tanks
- .2 Digital motorized mixing valve
- .3 Microprocessor controller
- .4 15AMP relay for field supplied recirculation pump
- .5 Fully assembled (Piping and Wiring) at factory

.6 120 Volt Power supply
.7 Isolation valve on each water connection below
.8 Water Connections:
  .1 Domestic Hot Water In with check valve and isolation valve
  .2 Domestic Cold Water In with check valve and isolation valve
  .3 Return to heater Water In with check valve and isolation valve
  .4 Tempered Water Out with isolation valve
  .5 Hot Water Recirculation In with check valve and isolation valve.
.9 Operational capabilities:
  .1 +/- 1° C water temperature control
  .2 1° C minimum inlet to outlet water temperature differential
  .3 Automatic shutoff of hot water flow upon cold water inlet supply failure.
  .4 Automatic shutoff of hot water flow in the event of a power failure
  .5 Programmable set point range of 81-158° F (27-70° C)
  .6 Programmable thermal disinfection mode.
  .7 Programmable 1st level hi/lo temp alarm display.
  .8 Programmable temperature error level for safety shutdown.
.10 Connectivity capabilities:
  .1 SPCO relay outputs which are energized during operation.
  .2 LCD display which indicates: set point, delivered temperature, error codes and alarm conditions.
  .3 MODBUS 485 port for remote set point adjustment and remote operating temperature visibility.
  .4 RS485 Serial Port for connection to a performance matched hot water monitoring system.
.11 Standard of acceptance:
  .1 Powers IntelliStation
.12 Acceptable material
  .1 Lawlor Series 800 SEA
  .2 Armstrong Brain
  .3 PVI Digitemp
  .4 Leonard Nucleus digital mixing valve.

.2 MS-1: Floor mounted Stainless steel Mop Service sink with 450 mm (18”) integral splashguard on side (left or right as per plans) and back, 16 gauge, type 316 stainless steel. Polished satin finish, 250 mm (10") deep, radius coved bowl corners factory installed drain body with NPS 2 stainless steel dome strainer.
  .1 Nominal Size: 900 x 600 x 250 mm (36" x 24" x 10").
  .2 Acceptable Material:
    .1 Franke Commercial FSSR or FSSL223410-18/316-1

  .3 Control Valve: Single handle pressure balancing mixing control valve cycles from Cold to Hot, polished chrome plated finish trim, lever handle, service stops. NPS ½ Inline check valves as per section 23 05 23 Valves
    .1 Acceptable Material for Control Valve:
      .1 Chicago Faucet 17900-VOCCP with NPS ½ Inline check valves as per Section 23 05 23 Valves
      .2 Delta Commercial R10000-UNWS/T13H103.
      .3 Kohler K-T10277-4
      .4 Zurn Z3700–SS-MT-SSC –Z70000-SC spring check valves.

.4 Trim: wall mount lever handle diverter, 2 rigid wall spouts with top brace and garden hose end.
  .1 Acceptable Material for trim:
    .1 Delta Commercial 06059A/061058A/063046A.
    .2 Chicago Faucet two 140 mm Spouts with pail hook and wall brace and Symmons 4-458 lever handle Diverter.
    .3 Kohler K-10290-4 and CB060424A Spouts
    .4 Zurn two G61995 Spouts and Z-700-DV-3P Diverter.

.5 Wallmount vacuum breaker, NPS 1/2 with union and set screw wall flanges. Spill Resistant elevated vacuum breaker suitable for continuous pressure.
  .1 Acceptable Material for Spill Resistant Vacuum Breaker:
    .1 Watts 008QT.
    .2 Wilkins 460XL
    .3 Apollo SVB 4W

2.3 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.

2.4 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 Fixtures on outside walls to have supplies from floor; other fixtures to be served from wall.

.4 For other fixtures refer to drawings for mounting heights.

.5 Ensure floor mounted fixtures are on a level base continuous around perimeter.

.6 In accordance with National Building Code and National Plumbing Code of Canada.

.7 Caulk floor mounted mop sinks to floor and wall. Caulk stainless steel wall trim to sink and wall.

.8 Service fixtures as follows:

Fixture	Waste NPS	Vent NPS	Cold Water NPS	Hot Water NPS
Jan/ Mop Sink	2	1 1/2	1/2	1/2
Floor Drain	3	1 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 Vacuum breakers, backflow preventers: operation under all conditions.

.4 Thermostatic controls.
- .1 Verify temperature settings, operation of control, limit and safety controls.

3.3 THERMOSTATIC CONTROL VALVES

.1 Verify temperature settings, operation of control, limit and safety controls.

.2 Install in accordance to manufacturer's recommendations.

.3 Master mixing valve Manufacturer’s service technician to visit the site and adjust Master mixing valve at full demand and no DHW demand.

.4 Test and adjust each thermostatic control mixing valve. Set limit stops as follows:

	TEMPERATURE ^{o}F	TEMPERATURE ^{o}C
DHW Tank	140	60
Master Mixing Valve	120	49

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 Design point to be midpoint of scale or range.

.2 Dual Scale:
- .1 Water and Glycol Thermometers: 0 to 115° C, 30° to 240° F.
- .2 Pressure Gauges:
  - .1 Domestic water 0 to 700 kPa, 0 to 100 psi.
  - .2 Hydronic 0-400 kPa, 0 to 60 psi.
- .3 Air Thermometers: -30° to 40° C, -20° to 100° F.

.3 Direct Reading Thermometers
- .1 Industrial variable angle type 225 mm (9") scale length.
- .2 Liquid filled or Solar powered
- .3 Aluminum case

.4 Remote Reading Dial Thermometers
- .1 100 mm (4 1/2") vapor activated dial type, accuracy within one scale division brass movement, stainless steel capillary, stainless steel spiral armor, stainless steel bulb and cast aluminum case for wall mounting.

.5 Thermometer Wells
- .1 Copper pipe: use copper or bronze. For steel pipe use stainless steel.
- .2 Steel Pipe:
  - .1 Open systems use stainless steel.
  - .2 Closed systems use brass.

.6 Pressure Gauges
- .1 100 mm (4 1/2") dial type: liquid filled having 1% accuracy unless otherwise specified.
- .2 Provide gauge cock. Ball valve in accordance with Section 23 05 23 Valves

.7 Acceptable Material

	Direct Reading Thermometers	Remote Reading Dial Thermometers	Pressure Gauges
Trerice	BX 9140 or SX9140305	V80342	700 LFB
Weiss	A9VS9	VTR-45BL38	NF4S-1
Winters	9IT with Aluminum case	R33452	FPQ-4
Weksler	EG5H-9 with Aluminum Case	-	EA14

3 Execution

3.1 GENERAL

.1 Provide thermometers and gauges so they can be easily read from floor or platform. If this cannot be accomplished, install remote reading thermometers and gauges.

.2 Provide between equipment and first fitting or valve.

.3 Increase pipe size at well to minimum NPS 2 to accommodate well.

.4 Well to extend 6 mm to 12 mm into the pipe.

3.2 DIRECT READING THERMOMETERS

.1 Provide in wells on all piping. Provide heat conductive material inside well.

.2 Provide in the following locations:
- .1 Water boiler headers.
- .2 DHW tank outlets.
- .3 DHW recirculation line.
- .4 Programmed water control valves outlet.
- .5 In other locations as indicated.

.3 Use extensions where thermometers are installed through insulation.

3.3 PRESSURE GAUGES

.1 Provide in following locations:
- .1 Suction and discharge of pumps and circulators over 373 kW (1/2 hp).
- .2 In other locations as indicated.

.2 Use extensions where pressure gauges are installed through insulation.

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 GAS VALVES NPS 2 AND UNDER

.1 Ball Valves NPS 2 and under, screwed.
- .1 Application.
  - .1 Section 23 11 23 Facility Gas Piping
- .2 ULC or CGA approved for Natural Gas and Propane.
- .3 Quarter-turn: bronze.

.2 Acceptable material:

NPS 2 and under	**Ball Gas**
Crane Canada Inc.	9302 CGA
Jenkins Valves 92 Inc.	901CJ
Kitz	58
Red-White/Toyo	5044A CGA
Newman Hattersley	1969F
Nibco	T-FP-600

2.2 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 Section 23 21 13 Hydronic Systems
  - .3 Section 23 11 13 Oil Piping and Storage Tank.
- .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 Section 23 21 13 Hydronic Systems
.2 1380 kPa (200 psi) W.O.G., bronze body, bronze swing disc, screw in cap, regrindable seat.

.3 Swing Check Valves NPS 2 and under, screwed:
  .1 Application
    .1 Section 23 11 13 Oil Piping and Storage Tank.
    .2 Condensate
  .2 1380 kPa (200 psi) W.O.G., bronze body, bronze swing disc, screw in cap, regrindable seat.

.4 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
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

2.3 VALVES NPS 2 AND OVER FOR HYDRONIC

.1 Gate Valves NPS 2 1/2 and over, flanged
  .1 Application
    .1 Section 23 21 13 Hydronic Systems
  .2 Rising stem: class 125, 1380 kPa (200 psi) W.O.G., FF flange, cast-iron body, OS&Y bronze trim.

.2 Check Valves NPS 2-1/2 and up, flanged:
  .1 Application
    .1 Section 23 21 13 Hydronic Systems
    .2 Condensate
  .2 Class 125, 1380 kPa (200psi) W.O.G., cast iron body, FF flange, renewable seat, bronze disc, bolted cap.

.3 NPS 2-1/2 to 10, lug wafer butterfly:
  .1 Application: Section 23 21 13 Hydronic Systems
  .2 200 CWP @ 93° C, cast iron body with uncoated bronze disc and 316 stainless steel stem, replaceable EPDM seat, locking handle, gear operators NPS 6 and over.

.4 Acceptable material:

NPS 2-1/2 and up Flanged	Cast Iron Gate	Check	Lug Wafer

			Butterfly
Crane Canada Inc.	465 1/2	373	44-BSZ-L/G
Jenkins Valves 92 Inc.	454J	587J	2231-ELJ/GJ
Kitz	72	78	6122EL/G
Red-White/Toyo	421 A	435A	
Milwaukee	F-2885-M	F2974M	CL2/3-24E L/G
Newman Hattersley	T504	T651	Series 45-313321/2
Nibco	FE-617-0	FE918B	LC2008-3/5
Bray	-	-	34-01/04
Keystone	-	-	F1020 CBE2

2.4 GROOVED END VALVES NPS 2 AND OVER FOR HYDRONIC

.1 Check Valves NPS 2 ½ to 4 for grooved end pipe:
- .1 Class 125, 860 kPa (125 psi), ductile iron body, stainless steel discs, stainless steel spring, stainless steel shaft, EPDM seat.

.2 Butterfly Valves NPS 2-1/2 and over grooved end body:
- .1 Housing: Ductile iron conforming to ASTM A-536, grade 65-45-12 or ASTM A-395, grade 65-45-15
- .2 Body: Carbon steel, electroplated
- .3 Seat/Liner: Grade "E" EPDM. Temperature range –34° C to +110° C.
- .4 ANSI/NSF 61 for cold +86°F/+30°C and hot 180°F/+82°C potable water service.
- .5 Stem-Upper/Lower: 416 stainless steel
- .6 Disc: Aluminum bronze
- .7 Locking handle, gear operators NPS 6 and over.

.3 Acceptable material:

NPS 2-1/2 and up Grooved	**Check**	**Butterfly**
Victaulic	Vic 716	Vic 300 MasterSeal
Anvil	7800	Series 7600
Nibco	-	GD-4765-3/5

2.5 ROOM HEATING UNIT VALVE

.1 NPS 1-1/4 and under: Ball Valve with union or Min. 860 kPa (125 psi), bronze body renewable composition disc, screwed straight or angle bonnet, threaded/solder union tail piece.

.2 On supply piping, wheel handle.
- .1 Acceptable Material:
  - .1 Dahl Brothers Canada Ltd. 11042/11041
  - .2 Red-White/Toyo 250/253
  - .3 Kitz 106/107
  - .4 Ball Valve with union

.3 On return piping, memory balancing valve with flow measuring device
- .1 Acceptable Material:
  - .1 Dahl Brothers Canada Ltd. 13012/13013 MV-2

.1 2000 series Venturion for 0.003 to 0.13 l/s (0.4 to 2.0 USgpm)
.2 6000 series Venturion for 0.11 to 0.38 l/s (1.75 to 6.0 USgpm)
.2 Circuit Balancing Valve with union

2.6 DRAIN VALVES AND GAUGE COCKS

.1 Lead Free Drain Valves
- .1 Locate at low points of mains, branches and risers.
- .2 At domestic water branch isolation valves, provide drain unless branch can be drained through a fixture.
- .3 At hydronic branch isolation valves, provide drain unless branch can be drained through a hydronic unit.
- .4 At pumps locate drain between pump and suction diffuser. Don't use suction diffuser drain plug.
- .5 Equipment drain valves line size.
- .6 Minimum NPS 1/2 unless otherwise specified.
- .7 Ball valve with hose end male thread and cap with chain.

.2 Lead Free Gauge Cocks
- .1 NPS 1/4 screwed.
  - .1 Application
    - .1 Pressure Gauge
    - .2 Air vents
    - .3 Where indicated
- .2 Quarter-turn: 1725 kPa (250 psi) W.O.G., bronze.

.3 Acceptable material:

	Drain valves	**Gauge Cocks**
Apollo	77CLF-100-HC/77CLF-200-HC	77CLF-100/77CLF-200
Kitz	868/869 w/cap and chain.	868/869
Nibco	S-685-80-LF-HC /T -685-80-LF-HC	S-685-80-LF /T -685-80-LF
Watts	LFB6080/ LFB6081 w/cap and chain	LFB6080/ LFB6081
Milwaukee	UPBA150/ UPBA100 w/cap and chain	UP1509/UP509

2.7 CIRCUIT BALANCING VALVES

.1 Hydronic Heating:
- .1 Y style globe valve, designed to provide precise flow measurement and control, with valved ports for connected to differential pressure meter.
- .2 Accuracy: Readout to be within plus or minus 2% of actual flow at design flow rate.
- .3 Flow control: At least four (4) full turns of handwheel with digital handwheel and tamperproof concealed mechanical memory.
- .4 Positive shut-off.
- .5 Memory stop.
- .6 Connections:
  - .1 Screwed or soldered: NPS ½ and NPS ¾
  - .2 Screwed: NPS 1 to NPS 2.
  - .3 Flanged or Grooved: NPS 2 1/2 and over.
- .7 Standard of Acceptance Heating:
  - .1 S. A. Armstrong CBV.
    - .1 NPS ½ LF for 0.03 to 0.125 l/s (0.5 to 2.0 USgpm)
    - .2 NPS ¾ LF for 0.03 to 0.19 l/s (0.5 to 3.0 USgpm)

.3 Standard CBV for other flows

.8 Acceptable Material Heating:
- .1 Hattersley 1710 and 737
- .2 Tour and Anderson STA-D/F.
- .3 Anvil Series GBV and MBV
- .4 Oventrop Hydrocontrol 106 Series
- .5 Victaulic 78 TA Series

3 Execution

3.1 GENERAL

.1 Install valves with stems upright or horizontal unless approved otherwise.

.2 Line size.

3.2 CIRCUIT BALANCING VALVES

.1 Maintain Manufacturer's recommended minimum straight pipe diameters.

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 Welded eye rod:
- .1 Wood.
- .2 Zinc plated.
- .3 Application: Piping and ductwork

.3 Coach screw with flatten end with hole for threaded rod:
- .1 For side attachment to Wood.
- .2 Application: Piping and ductwork

.4 Coach screw and machine thread rod:
- .1 Wood.
- .2 Zinc plated.
- .3 Application: Piping and ductwork

.5 Caddy clip for 6 mm (¼") rod Min 90 kg Static Load.
- .1 Steel beam, channel, joist or angle.
- .2 Application: Ductwork.

.6 Steel washer plate with double locking nuts.
- .1 Steel Joist.

.2 Application: Cold and hot, plumbing and hydronic piping, any size and ductwork.

.7 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.

.8 Acceptable material:

	CCTF/Hunt	**E. Myatt & Co**	**Taylor Pipe Supports**	**Anvil**	**Carpenter and Paterson Pipe Hangers Ltd.**
Welded eye rod	95	440		278	
Coach screw with Flattened end		#3 size 2			
Coach screw	58N	461	61	142	
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

.9 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.

.10 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.

.11 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.

.12 Pre-Cast Hollow Core Concrete Planks:
- .1 Inserts anchors.
- .2 Space hangers and inserts so that the load on a plank does not exceed 50 lb. per linear foot per hanger, that is, 90kg (200 lb.) at 1200 mm (4’0”) on centers, 135 kg (300 lb.) at 1800 mm (6’0”) on centers, etc.
- .3 Locate inserts minimum 50 mm (2”) from plank strands.
- .4 Acceptable Material: Hilti HDI-P

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.**
Protecting Shield	102		69H	167	
Protection Saddle	71	210 to 240	70 to 75	160 to 166	351 to 356
Adjustable clevis hanger	32N	124	24Z	260	100
Long adjustable clevis hanger	32U	124L	24L	300	286
Copper plated or epoxy coated clevis hanger	30C/E	151CT or 56	52	CT65	100CT
Adjustable steel yoke pipe roll	3436	258	93	181	140
Clevis hanger for cast iron pipe	33AC	126	27AC	590	
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 ¾	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")
6	20 mm (3/4")	4570 mm (15'0")	3000 mm (9'10")
Over 8	22 mm (7/8")	4570 mm (15'0")	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 Gas piping:

.1 To CAN/CGA B149.1.

.2 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
1/2	10 mm (3/8")	1800 mm (6'0")	1800 mm (6'0")
3/4 and 1	10 mm (3/8")	2400 mm (8'0")	1800 mm (6'0")
1 1/4 to 2 1/2	10 mm (3/8")	3000 mm (10'0")	1800 mm (6'0")
3 and 4	13 mm (1/2")	4570 mm (15'0")	3000 mm (10'0")

.3 Rooftop: Less than NPS 1 support at 1200 mm (4'0")

.4 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 AND HYDRONIC PIPE ATTACHEMENT APPLICATIONS

.1 Upper Attachment as noted above.

.2 Middle attachment as noted above.

.3 Pipe Attachment Application

.1 Uninsulated steel pipe: All sizes.

.1 Adjustable clevis hanger.

.2 Hot insulated steel pipe: NPS 4 and under.

.1 Long adjustable clevis hanger.

.3 Hot insulated steel pipe: over NPS 4.

.1 Adjustable clevis hanger with protection saddle: Over NPS 4 with less than 25 mm (1") horizontal movement and with more than 300 mm (12") middle attachment (rod) length.

.2 Adjustable steel yoke pipe roll with protection saddle: Over NPS 4 with horizontal movement in excess of 25 mm (1") and with middle attachment

rod 300 mm (12") or less.
.3 Insulate between saddle and pipe.
.4 Cold insulated steel pipe: NPS 1 ¼ and under.
.1 Long adjustable clevis hanger.
.5 Cold insulated steel pipe: NPS 1 ½ and over.
.1 Adjustable clevis hanger with protection shield and P-5 insulation (Section 23 07 00) between shield and pipe.
.6 Uninsulated copper pipe: All sizes.
.1 Copper plated or epoxy coated adjustable clevis hanger.
.7 Hot Insulated plumbing copper pipe: All sizes
.1 Copper plated or epoxy coated adjustable clevis hanger.
.8 Cold Insulated plumbing copper pipe: NPS 1 ¼ and under.
.1 Copper plated or epoxy coated adjustable clevis hanger.
.9 Cold insulated plumbing copper pipe: NPS 1 ½ and over.
.1 Adjustable clevis hanger with protection shield and P-5 insulation (Section 23 07 00) between shield and pipe.
.10 PVC: All sizes.
.1 Adjustable clevis hanger.
.11 PEX: All sizes.
.1 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 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

- .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 1.
  - .1 Control Components.

.5 Use Size 3.
- .1 Inline circulators.
- .2 Packaged fans.
- .3 Trap Primers
- .4 Backflow preventers
- .5 Motorized Dampers
- .6 Mixing valves

.6 Use Size 7.
- .1 Base mounted pumps.
- .2 Vertical Inline pumps
- .3 Control panels.
- .4 Junction boxes.
- .5 Relay panels.

.7 Use Size 8.
- .1 Boilers.

.4 Mechanically fasten nameplates.

2.3 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:

Outside Diameter of Pipe or Insulation	**Size of Letters**
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"	

Outside Diameter of Pipe or Insulation	**Size of Letters**
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 Legend	Valve Legend	Tag Primary Color	Secondary Color
Dom. Cold Water	DCW	Green	None
Dom. Hot Water	DHW	Green	None
Dom. Hot Water Tempered	DHWT	Green	None
Dom. Hot Water Recirculation	DHWR	Orange	None
Vent (plumbing)	-	Green	None
Hot Water Heating Supply	HWS	Yellow	Black
Hot Water Heating Return	HWR	Yellow	Black
Trap Seal Primer	TSP	Green	None

.9 Legend and arrows:
- .1 Black or white to contrast with primary color.

.10 Heating: Label zones.

.11 Natural Gas and Propane Piping
- .1 To CAN/CGA B149.1-00, Natural Gas and Propane Installation Code.
- .2 Paint entire piping or tubing system yellow.
- .3 In addition, on interior piping provide yellow labels marked "Gas" at 6 meter (20') intervals. Secure label with color band tape wrapped around pipe with ends overlapping one (1) pipe diameter. Cut band to length, don't tear off.

2.4 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", "Washroom Exhaust", "Kitchen Exhaust", with directional arrow and "Fan System No."

2.5 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.

2.6 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.

2.7 BALANCING DAMPER

.1 Paint the balancing damper handles where concealed.

2.8 ELECTRICAL COMPONENTS SUPPLIED BY DIVISION 20 TO 25

.1 Identify electrically fed equipment supplied by Division 25 as per Section 25 05 03 BAS Identification.

2.9 WARNING SIGNS

.1 Equipment (e.g. motors, starters) under remote automatic control: provide orange colored signs warning of automatic starting under control of BAS.

.2 Sign to read: "Caution: This equipment is under automatic remote control of BAS" or equivalent to Consultant's approval.

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 Adjacent to all changes in direction.

.3 At least once in each small room through which piping passes.

.4 Both sides of visual obstruction or where run is difficult to follow.

.5 On both sides of any separation such as walls, floors and partitions.

.6 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.

.7 At beginning and end points of each run and at each piece of equipment in run.

.8 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.

.9 Legend to be easily and accurately readable from usual operating areas and all readily accessible points.

.10 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.

.11 Stencil over final finish only.

.12 Beside each access door.

3.5 VALVE TAGS

.1 Secure tags to valve handle with non-ferrous chains or closed "S" hooks for valves except at plumbing fixtures and radiation.

.2 Provide one copy of valve schedule mounted in frame with non-glare glass where directed by Consultant. Provide one copy in each operating and maintenance instruction manual.

.3 Consecutively number valves in system.

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 PEX Pressure Tubing
  - .3 Tempered domestic hot water.
  - .4 Hydronic piping
  - .5 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 on branch vertical drops concealed in walls (25 mm (1") on horizontal to the branch vertical drops concealed in walls.)

.2 25 mm (1") on NPS 1/2 to NPS 2.

.3 38 mm (1 1/2") on NPS 2 1/2 and over.

.3 Hydronic: Interior of building

.1 25 mm (1") on NPS ¾ to NPS 2

.2 38 mm (1 ½") on NP NPS 2 1/2 and over.

.5 All pipe insulation shall be by one manufacturer.

.6 Copper tube size for copper pipe.

.2 P-5 Insulation Support System

.1 Application at:

.1 Pipe Hangers.

.2 Thickness: As per adjacent insulation.

.3 Material for steel pipe NPS 6 and smaller:

.1 CAN/CGSB-51.2 Calcium Silicate Insulation.

.2 Buckaroo Insulation with ASJ Support System.

.4 Material for Steel Pipe NPS 8 and larger: Buckaroo Insulation Support System with ASJ.

.5 Material for Copper Pipe: Buckaroo Insulation Support System with ASJ.

.3 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
P-3	All service duct wrap	Alley Wrap FSK	Duct Wrap.	Microlite Fiber Glass Wrap Insulation
P-5	Calcium Silicate	Calmax	Temperlite 1200	Thermo-12/Blue

.4 P-A Formed Mineral Fiber with Vapour Barrier Flexible elastomeric thermal insulation, manufactured without the use of CFC's, HFC's or HCFC's formaldehyde free, low VOCs, fiber free, dust free and resists mold and mildew to 100° C

.1 Application for piping, valves and fittings on:

.1 Domestic water piping

.2 PEX Pressure Tubing.

.3 Hydronic piping except infloor heating system.

.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 0.25 BTU-in/hr.ft^2 °F

.4 Water Vapor Transmission: 0.05 perm-inch

.5 Flame-spread index of less than 25 and a smoke-developed index of less than 50 as tested by ASTM E 84 and CAN/ULC S-102.
.6 Adhesive: Armaflex 520 BLV Adhesive low V.O.C. adhesive
.7 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 and Hot Water Recirculation.
    .1 25 mm (1") on NPS 1/2 to NPS 2.
    .2 13 mm (1/2") on NPS 1/2 pipe on branch vertical drops concealed in walls (25 mm (1") on horizontal to the branch vertical drops concealed in walls.)
    .3 25 mm (1") on NPS 1/2 to NPS 2.
  .3 Hydronic:
    .1 25 mm (1") on NPS 2 and under pipe.
.8 Insulation Support System
  .1 Application at: Pipe Supports.
  .2 Thickness: As per adjacent insulation.
  .3 Acceptable Material: Armaflex IPH pipe hanger by Armacell
.9 Acceptable Material:
  .1 AP Armaflex Pipe Insulation

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 relief air ducting and exhaust ducting to the motorized damper or for minimum of 3 meters (measured on centerline of duct), whichever is greater, from steel roof deck, from underside of wood trusses or exterior wall.
    .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 One layer of duct insulation for outside air for boiler rooms,

.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 Combustion outside air intakes.
    .2 Entire boiler room ventilation duct system.
    .3 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 50 mm (2") layer of duct insulation for outside air duct for boiler rooms, for outside air ducts serving mechanical rooms, for combustion air intakes and outside air ducts serving electrical rooms.
.2 One 25 mm (1") layer of duct insulation for exhaust air from boiler rooms, for exhaust air ducts serving mechanical rooms and for exhaust air ducts serving electrical rooms.

.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 For insulation system underside of roof drain body.
.1 Contact adhesive: quick-setting for seams and joints.
.2 Tape: self-adhesive PVC.

.5 Fire restrictive contact adhesive: quick setting.
.1 Standard of Acceptance:
.1 Monsey Bakor 230-38.

.6 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 Air separator.
  - .3 Exposed insulated ductwork

.2 PVC.
- .1 CGSB 51-GP-53M PVC sheets.
- .2 0.4 mm (0.015") thick minimum.
- .3 Fitting covers, one piece, premoulded to match.
- .4 Application on exposed insulated piping where noted below:
  - .1 Section 22 11 16 Domestic Water Piping for elbows and mechanical couplings only
  - .2 Section 23 21 13 Hydronic Systems for elbows and mechanical couplings only except humidification steam.
- .5 Standard of Acceptance:
  - .1 Proto.
  - .2 The Sure-Fit System.
  - .3 Zeston 2000 PVC.

2.6 REMOVABLE PRE-FABRICATED INSULATION PADS

.1 Application:
- .1 Backflow preventers.
- .2 Circuit Balancing Valves over NPS 1
- .3 Heating and Glycol Suction Diffusers.
- .4 Heating and Glycol triple duty valves.
- .5 3 way control valves.
- .6 Flanged equipment connections
- .7 Valves and strainers over NPS 2.

.2 To permit periodic removal and replacement without damage to adjacent insulation.

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.

.9 On equipment with insulation and vapour barrier, maintain integrity of vapour barrier over full length without interruption at sleeves, fittings and supports.

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 Provide P-5 insulation at pipe shields. Refer to Section 23 05 29 Hangers and Supports.

.7 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.

2 Products

2.1 FILL AND VENT PIPE

.1 Steel: to ASTM A53, Grade B, Schedule 40.

2.2 CARRIER PIPE

.1 Steel: to ASTM A53, Grade B, Schedule 40.

2.3 JOINTING MATERIAL FOR CARRIER PIPE

.1 Socket Weld fittings.

2.4 FITTINGS

.1 Steel
- .1 Socket weld: butt-welding to ANSI/ASME-B16.9.
- .2 Unions: malleable iron, brass to iron, ground seat, screwed, to ASTM A47M.
- .3 Nipples: Schedule 40, to ASTM A53.

2.5 VALVES

.1 As per Section 23 05 23 Valves.

2.6 OIL SOLENOID VALVE

.1 Two way normally closed diaphragm valve.

.2 Aluminum body compatible with fuel oil.

.3 Explosion proof shell and watertight.

.4 NPS 3/4 Flow CV 5.1

.5 Acceptable material
- .1 OPW Fueling Components 821-0075AC

2.7 OIL FILTER

.1 Replaceable cartridge type as recommended by oil burner manufacturer.

.2 Furnish spare filter cartridge.

2.8 STEEL TANKS

.1 Existing 10,000L Steel tank by owner

2.9 VACUUM MONITORING SYSTEM

.1 Tank mounted vacuum switch monitoring interstitial leaks

.2 Alarm condition to be indicated by visual indicator light audible alarm and operation of isolated relay to allow interface with other equipment.

.3 Supply voltage: 120 VAC.

.4 Alarm lamp, test switch and reset switch.

.5 Acceptable Manufacturer:
.1 CTI
.2 Veeder-Root

3 Execution

3.1 TANK INSTALLATION

.1 Tank installation and recertification by certified tank installer registered as per Department of the Environment Petroleum Storage Tank Regulations.

.2 Install tanks in accordance with CAN/CSA-B139, National Fire Code of Canada and manufacturer's recommendation.

.3 Position tanks using lifting lugs and hooks, and where necessary use spreader bars. Do not use chains in contact with tank walls.

.4 Install tanks using Class I certified installers.

.5 All work to be in accordance with authorities having jurisdiction and manufacturer's recommendations. In case of conflicting requirements, the more stringent shall apply.

.6 Don't weld, grind or drill near tank without protecting paint surface.

.7 Clean surface and all equipment of the tank of all grease, dirt, etc., prior to final inspection.

3.2 FIELD QUALITY CONTROL

.1 Test tanks and piping for leaks to requirements of authority having jurisdiction.

3.3 TOUCH-UP

.1 Where tank coating is damaged, touch-up with original coating material.

3.4 LEVEL GAUGE SYSTEM

.1 Provide leak and vapor proof caulking at connections.

.2 Shield capillary and tubing connections in heavy duty 50 mm polyethylene pipe

.3 Calibrate system.

3.5 PIPING

.1 Install oil piping system in accordance with CAN/CSA-B139 and CAN/CSA-B140.0

.2 Assemble piping using fittings manufactured to ANSI standards.

.3 Slope piping down in direction of storage tank unless otherwise indicated.

.4 Use eccentric reducers at pipe size change installed to provide positive drainage.

.5 Provide clearance for access and maintenance of equipment, valves and fittings.

.6 Ream pipes, clean scale and dirt, inside and out.

.7 Suction piping inside building:
- .1 Steel except at burner.
- .2 Install filter, fusible link valve, union, and gate valve on the suction and check valve and union on the return at each burner.
- .3 Where suction line enters building, install union, isolation valve, anti-siphon device and cap (for priming purposes).

.8 Fill, vent, suction and return outside building:
- .1 Steel piping welded throughout except at tank connections.
  - .1 Use electric isolating type fittings to isolate piping from tanks.
- .2 Grading: slope all piping at 1% minimum back to tanks.

.9 Piping at tanks:
- .1 Suction: terminate 150 mm (6") from bottom of tank with foot valve and strainer.
- .2 Return: Terminate above grade and cap. Run only from each end of the underground containment, and cap for future use.
- .3 Vent: extend into tank and terminate less than 150 mm (6") from top. Terminate open end with vent alarm and removable 10 mesh copper screen.
- .4 Fill: terminate as indicated with locking cap, chain and padlock.
- .5 Dipstick: extend tube to within 150 mm (6") from bottom of tank. Terminate at grade with cap and chain and watertight cover.

3.6 PAINTING

.1 Prime and paint all exterior piping with corrosion resistant coatings.

3.7 OIL FILTERS

.1 At time of acceptance, replace filter cartridge with new.

3.8 FIELD QUALITY CONTROL

.1 Test system in accordance with CAN/CSA-B139 and CAN/CSA-B140.0 and authorities having jurisdiction.

.2 Isolate tanks from piping pressure tests.

3.9 FLUSHING AND CLEANING

.1 Flush after pressure test with number 1 or number 2 fuel oil for a minimum of 2 h. Clean strainers and filters.

.2 Dispose of fuel oil used for flushing out in accordance with requirements of authority having jurisdiction.

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 PERMIT

.1 Mechanical Contractor to arrange and pay for the required permits and approvals by the Office of the Provincial Fire Marshal.

.2 Mechanical Contractor to make all necessary arrangements with the propane supplier for the supply and installation of storage tank(s), vaporizer, etc.

.3 Mechanical Contractor to obtain from the propane supplier the tank information required for the gas permit.

.4 Mechanical Contractor to engage a licensed gas installer for gas pipe work including but not limited to the following:

- .1 Above grade piping at the tank systems including but not limited to piping and fittings connecting the propane tanks and vaporizer to the underground 5 psig piping including pressure regulators, heavy ends trap, piping and fittings, etc. as required for a complete system.
- .2 Underground piping from tank system to building
- .3 Above grade piping at and in building

.5 Mechanical Contractor to apply for the gas permit in accordance with fuel safety act and including but not limited to the following:

- .1 Business name, building name and civic address.
- .2 Propane tank/cylinder size, clearances to buildings, building openings and property lines where applicable. Engineered drawing for bases of horizontal tanks.
- .3 Use of areas adjacent to propane supply containers (lawn, parking, etc.).
- .4 Vehicle impact protection barrier type and clearances.
- .5 Regulator and line pressure relief locations and pressure settings.
- .6 Where piping or tubing is located below grade, indicate size, material used, type of fittings, length of run, depth below grade and protection method.
- .7 Arrangement of building piping/tubing, material used, size, type of fittings, length of runs, supports and identification method.
- .8 Location of all shut-off valves and the make and model number of valve to be used.
- .9 Flexible connectors make and model number.
- .10 Appliance arrangement along with the individual make, model and BTU/hr. input of each appliance.
- .11 Venting arrangement of vented appliances including material used, size and length of vent, method of insulating and vent termination.
- .12 Combustion air method.

2 Products

2.1 PIPE

.1 Minimum NPS ¾

.2 Steel pipe: to ASTM A53, Grade B Schedule 40 as follows:
- .1 NPS 3/4 to 2, socket welded joints
- .2 NPS 3/4 to 2, screwed.
- .3 NPS 2 1/2 and over, plan end.
- .4 Exterior: Galvanized piping with joints coated with cold galvanized paint.

.3 Copper Tube: to ASTM B75M.

.4 Underground Pipe
- .1 Medium density polyethylene pipe and fittings
- .2 HDB ratings of 1250 psi at 73°F and 1000 psi at 140°F.
- .3 Pipe and fittings materials: opaque yellow in color.
- .4 Stabilized against ultraviolet deterioration

2.2 FITTINGS AT TANK(S)

.1 Propane vaporizer
- .1 Electric
- .2 Building Owners' propane supplier.
- .3 Installation is by this mechanical contractor.

.2 Heavy ends trap provided by the mechanical contractor.
- .1 Acceptable Manufacturer: Algas SDI – Filtaire F Series.

2.3 FITTINGS

.1 Steel pipe fittings, screwed, flanged or welded:
- .1 Malleable iron: screwed, banded, Class 150.
- .2 Steel pipe flanges and flanged fittings: to ANSI/ASME B16.5.
- .3 Welding: butt-welding fittings.
- .4 Unions: malleable iron, brass to iron, ground seat, to ASTM A47M.
- .5 Bolts and nuts: to ANSI B18.2.1.
- .6 Nipples: schedule 40, to ASTM A53.

.2 Copper pipe fittings, screwed, flanged or soldered:
- .1 Cast copper fittings: to ANSI B16.18.
- .2 Wrought copper fittings: to ANSI/ASME B16.22.

2.4 JOINTING MATERIAL

.1 Steel pipe:
- .1 Welded fittings: to CSA W47.1
- .2 Flange gaskets: to nonmetallic flat.
- .3 Screwed fittings: pulverized lead paste.

.2 Copper Tube:
- .1 Soldered: to ASTM B32, (tin antimony 515).

.3 Underground Pipe
- .1 Heat Fusion Joining: Butt, socket and saddle fusion joints in polyethylene gas piping
- .2 Joining by polyethylene gas pipe to other materials by transition fittings, fully restrained mechanical couplings, or electrofusion.

2.5 VALVES

.1 Refer to Section 23 05 23 Valves.

2.6 VALVE BOX

.1 Fully recessed stainless steel front with hinged Plexiglas door.

2.7 IDENTIFICATION

.1 As per Section 23 05 53 Mechanical Identification.

3 Execution

3.1 PIPING

.1 Install in accordance with applicable Provincial/Codes by licensed installer.

.2 Assemble piping using fittings manufactured to ANSI standards.

.3 Slope piping down in direction of flow to low points.

.4 Install drip points:
- .1 At low points in piping system.
- .2 At each connection to equipment.

.5 Use eccentric reducers at pipe size change installed to provide positive drainage.

.6 Provide clearance for access and for maintenance.

.7 Ream pipes, clean scale and dirt, inside and out.

.8 Install piping to minimize pipe dismantling for equipment removal.

.9 Buried tubing:
- .1 Soft copper where installed in sleeves. Bend tubing without crimping or constriction. Minimize use of fittings.
- .2 Sleeves to be PVC drainage pipe with two 45° elbows for bends.

3.2 IDENTIFICATION

.1 Refer to Section 23 05 53 Mechanical Identification.

.2 Paint entire pipe system yellow.

3.3 HEATING EQUIPMENT

.1 Make final gas connections to equipment.

.2 Pipe relief vents as per CAN/CSA B149.1 Natural Gas and Propane Installation Code.

.3 Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.

3.4 PURGING

.1 Purge after pressure test.

3.5 VALVES

.1 Install valve with stems upright or horizontal unless approved otherwise.

.2 Install valves at all branch take-offs to isolate each piece of equipment, and as indicated.

.3 Install shut-off valves in recessed valve box approved for propane gas by Office of the Fire Marshal. Affix to each such recessed valve box a sign with an inscription identifying the shut-off valve in compliance with the Office of the Fire Marshal.

3.6 TESTING

.1 Test gas system in accordance with CAN/CGA B149.1, Natural Gas and Propane Installation Code and the Office of the Provincial Fire Marshal.

.1 At minimum, test to the requirements of a system operation over 14kPA (2 psig), but not more than 230kPa (33 psig) with greater than 60 M (200 feet) of piping.

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 PIPE, FITTINGS, COUPLINGS AND JOINTS

.1 ASME/ANSI B16 series

.2 Welded pipe and fitting connections where noted on drawing

.3 Steel Pipe to ASTM A-53/A-135 Grade B.
- .1 Application: Hydronic
- .2 NPS 2 and Smaller Pipe Joints:
  - .1 Schedule 40: Screwed or Roll Grooved Couplings.
- .3 NPS 2½ up to NPS 8 Pipe Joints:
  - .1 Schedule 40: Welded, Flanged, Roll Grooved Couplings.
- .4 NPS 8 and Larger Pipe Joints:
  - .1 Schedule 30/40: Welded, Flanged, Roll Grooved Couplings.
- .5 Screwed fittings with Teflon tape.
- .6 Flanges: plain or raised face.
- .7 Pipe fittings
  - .1 Screwed, flanged or welded: to ASME/ANSI B16 series
  - .2 Cast iron pipe flanges: Class 125.
  - .3 Malleable iron screwed fittings: Class 150.
  - .4 Steel pipe flanges and flanged fittings, Steel butt-welding fittings
  - .5 Unions, malleable iron
  - .6 Bolts and nuts: to ASME/ANSI B18.2.1 and ASME/ANSI B18.2.2.
  - .7 Cold Press Mechanical Joint Fitting:
    - .1 EPDM sealing elements for press fittings.
    - .2 Factory installed sealing elements.
    - .3 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.
    - .4 Acceptable Material: Viega MegaPress fittings with the Smart Connect feature

.4 Copper Tube: Type L hard drawn to ASTM B88M.
- .1 Pipe fittings
  - .1 Solder/brazing: lead free to ASTM B32.
  - .2 Brazed with Sil-Fos BCuP5: to ANSI/AWS A5.8.
  - .3 Cast bronze threaded fittings.
  - .4 Wrought copper and copper alloy solder joint pressure fittings.
  - .5 Cast copper alloy solder joint pressure fittings.
  - .6 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.

2.2 ROLL GROOVED COUPLINGS AND FITTINGS

.1 Where rolled grooved couplings and fittings are used, they shall be of the same manufacturer.

.2 Grooved products to have current CRN Numbers.

.3 Ductile iron to ASTM A-536 or malleable iron to ASTM A-47 coupling housings painted with alkyd enamel.

.4 Rigid Grooved type Couplings: Housings cast with offsetting angle-pattern bolt pads to provide rigidity and system support and hanging in accordance with ANSI B31.1 and B31.9.

.5 Gaskets: Molded EPDM Compound to ASTM D-2000, -34° C to +120° C temperature range. Suitable all hydronic piping including hot water heating, glycol and chilled water supply and return piping.

.6 Ductile iron to ASTM A-536 or malleable iron to ASTM A-47 fittings painted with alkyd enamel.

.7 Coupling Bolts/Nuts: Heat treated carbon steel, track head to ASTM A-183 minimum tensile 110,000 psi.

.8 Standard of Acceptance:
- .1 Victaulic Co. of Canada Style 07 Zeroflex couplings with Grade “EHP” EPDM gaskets and grooved-end fittings.
- .2 Victaulic Co. of Canada Style 107 Quick-Vic Installation ready rigid coupling, with grade “EHP” EPDM gaskets for direct stab installation without field disassembly.

.9 Acceptable Manufacturers: Anvil Gruvlo

2.3 VALVES

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

2.4 RELIEF VALVE PIPING AND DRAINS

.1 All sizes: Steel Pipe as noted above.

2.5 HANGERS SUPPORTS

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

2.6 INSULATION

.1 As per Section 23 07 00 Mechanical Thermal Insulation

3 Execution

3.1 INSTALLATION

.1 Cut piping square, ream, ensure free of cuttings and foreign material.

.2 Install pipes close to building structure to minimize furring, conserve headroom and space. Run piping parallel to walls. Group piping wherever possible.

.3 Slope piping in direction of flow wherever possible. Slope for positive drainage and venting.

.4 Use eccentric reducers for pipe size changes at wall fin connections to provide positive drainage or positive venting

.5 Where pipe sizes differ from connection sizes of equipment, install reducing fittings close to the equipment. Reducing bushings are not acceptable.

.6 Provide clearance for installation of insulation and access for maintenance of equipment, valves and fittings. Install piping, unions and flanges so that any fixed piping does not interfere with removal of coils, tubes or tube bundles.

.7 Assemble piping using fittings manufactured to ANSI standards.

.8 Saddle type branch fittings may be used on mains if branch line is half size or smaller than main. Hole saw or drill and ream main to maintain full inside diameter of branch line prior to welding saddle or installing mechanical T.

.9 Minimum size NPS 3/4.

.10 Forced water supply and return piping to be taken off main at 45° angle vertically from each main or branch. All runout made from main using four joint swing connection to permit expansion and avoid strain on equipment.

.11 Ensure that proper clearance around equipment permits performance of service maintenance, that height clearance for piping is adequate. Check final location with Consultant if different from that shown prior to installation. Allow removal space for removal of all coils. Install piping, unions and flanges so that any fixed piping does not interfere with removal of coils, tubes or tube bundles.

3.2 RELIEF VALVE PIPING AND DRAINS

.1 Turn down at floor drain.

.2 Cut end of discharge pipe at 45°.

3.3 WELDED PIPE

.1 Welded connections where noted on drawing

3.4 ROLL GROOVED COUPLINGS AND FITTINGS

.1 Roll grooved product manufacturer to supply on site product installation training.

3.5 PRESS CONNECTION INSTALLATION

.1 In accordance with the manufacturer's installation instructions.

.2 The pipe cut and the outside of the pipe end prepared to fitting manufacturer's requirements.

.3 Fully inserted tubing into the fitting and the tubing marked at the shoulder of the fitting.

.4 Check the fitting alignment against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting.

.5 Pressed the joints using the tool(s) approved by the manufacturer.

3.6 FLUSHING AND CLEANING

.1 Refer to Section 23 25 00 HVAC Water Treatment Systems.

3.7 TESTING

.1 Test system in accordance with Section 20 05 01 Mechanical General Requirements

.2 Repair any leaking joints, fittings or valves and retest.

3.8 CONTROLS

.1 Install sensor wells and control valves supplied by Controls.

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 AUTOMATIC AIR VENT

.1 Standard float vent with brass body and NPS 1/8 connection and rated at 690 kPa (100 psig) working pressure.
  .1 Provide separate gauge cock. Refer to section 23 05 23 Valves

.2 Industrial high-capacity float vent with cast iron body and NPS 3/4 connection and rated at 690 kPa (100 psig) working pressure. Provide ball valve on inlet.

.3 Float: solid material suitable for 115° C working temperature.

.4 Standard of Acceptance
  .1 Standard Vent: Amtrol 701.
  .2 High-Capacity Vent: Amtrol 720.

.5 Acceptable Manufacturer:
  .1 Bell & Gossett
  .2 Taco Canada Ltd.

2.2 HYDRO SEPARATOR

.1 Hydronic separator: To keep connected hydronic circuits totally independent from each other.

.2 Dirt remover: To permit the separation and collection of any impurities present in the circuits. Provided with a valved connection with discharge piping.

.3 Automatic air vent valve: For automatic venting of any air contained in the circuits. Provided with a valved connection for maintenance purposes.

.4 Working pressure: 860 kPa (125 psig).

.5 Size based on maximum primary flow.

.6 Acceptable Material:
  .1 Caleffi Series 548 Hydro Separator
  .2 Viessmann Low Loss Header.
  .3 Taco 5900 FlexBalance Series Separators

3 Execution

3.1 GENERAL

.1 Install according to piping layout. Pipe drains and blow off connections to nearest drain.

.2 Maintain proper clearance around equipment to permit performance of service maintenance. Check final location with Consultant if different from that indicated prior to installation.

.3 Should deviations beyond allowable clearances arise, request and follow Consultant's directive.

.4 Check that all openings for appurtenances and equipment operating weight conform to shop drawings.

.5 If accessories, ancillaries, are received knocked down, check assembly with Consultant.

3.2 AIR VENTS

.1 Install at high points of systems and where indicated.

.2 Provide high-capacity air vents at air separators. Pipe to floor drain.

3.3 AIR SEPARATORS

.1 Pipe blowdown to floor drain.

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 Non overloading design.

.2 Capacity: As per schedule on drawing.

.3 Motors: In accordance with Section 20 05 01 Common Work Results for Mechanical - General

2.2 IN-LINE CIRCULATING PUMPS

.1 Bronze fitted pump complete with motor.

.2 Volute: cast iron radically split, with screwed or flanged design suction and discharge connections.

.3 Impeller: cast bronze.

.4 Shaft: alloy steel with bronze sleeve bearing, integral thrust collar.

.5 Seal assembly: mechanical for service to 107° C.

.6 Coupler: flexible self-aligning.

.7 Motor: Resilient mounted, drip proof, sleeve bearing.

.8 Standard of Acceptance:
- .1 Bell & Gossett as per drawings.

.9 Acceptable Manufacturers:
- .1 Grundfos
- .2 Taco
- .3 S. A. Armstrong Ltd.

2.3 WET ROTOR TYPE

.1 Maintenance-free, in-line, single stage, wet rotor type with the motor mounted directly to the pump volute.

.2 Capable of operating continuously at temperatures from -10° C to 110° C for closed systems

.3 Maximum working pressure shall be 1000 kPa.

.4 Volute constructed of close-grained cast iron for closed systems

.5 Impeller, impeller seal ring, rotor can, bearing plate, motor shaft, and rotor cladding constructed of stainless steel.

.6 Impeller secured directly to the motor shaft by means of a stainless steel tapered split cone and locking nut.

.7 Motor shaft with tungsten carbide bearing journals and supported by two aluminium oxide ceramic radial bearings.

.8 Motor shaft with a stainless steel mounted carbon thrust bearing.

.9 Motor:
- .1 Capability to operate on each of three speeds selected using a built-in, three-speed switch
- .2 Cooled and lubricated by the pumped fluid and require no scheduled maintenance.

.10 Standard of Acceptance:
- .1 Bell & Gossett as per drawings.

.11 Acceptable Manufacturers:
- .1 Grundfos
- .2 Taco
- .3 S. A. Armstrong Ltd.

2.4 ECM TYPE

.1 Canned-rotor type: The pump and motor form an integral unit without shaft seal and with only two gaskets for sealing.

.2 Bearings lubricated by the pumped liquid.

.3 Pump features
- .1 Controller integrated in the terminal box
- .2 Control panel on the terminal box
- .3 Terminal box prepared for optional modules
- .4 Differential-pressure and temperature detection
- .5 Cast-iron or stainless-steel pump housing

.6 Motor and electronic controller
  .1 Single-phase motor
  .2 4- or 8-pole, synchronous, permanent-magnet motor (PM motor).
  .3 Pump speed controlled by an integrated frequency converter. P

.4 Capable of operating continuously at temperatures from -10° C to 110° C for closed systems

.5 Maximum working pressure shall be 1000 kPa.

.6 Volute constructed of close-grained cast iron for closed systems

.7 Acceptable Material:
  .1 Grundfos Magna as per drawings.
  .2 Bell and Gossett Eco-Circ

2.5 SINGLE SUCTION CENTRIFUGAL PUMP

.1 Bronze fitted pump complete with motor.

.2 Fabricated steel base.

.3 Carbon steel shaft with two point support, sleeve bearings.

.4 Impeller: bronze type, keyed drive with locking nut or screw.

.5 Volute: cast iron radically split, end suction, flanged suction and discharge, with drain plug and vent cock, suction and discharge pressure tappings, mechanical seal, grease lubricated.

.6 Coupling: flexible self-aligning.

.7 Seal for service to 107° C.

.8 Split coupled where indicated.

.9 Standard of Acceptance:
  .1 Bell & Gossett as per drawings.

.10 Acceptable Manufacturers:
  .1 Grundfos
  .2 Taco
  .3 S. A. Armstrong Ltd.

2.6 VERTICAL IN-LINE CIRCULATING PUMPS

.1 Volute: cast iron radically split, 125 lb. equal flanged design suction and discharge connections.

.2 Suction and discharge pressure tappings.

.3 Impeller: cast bronze.

.4 Shaft: alloy.

.5 Seal assembly: internally flushed mechanical.

.6 Supply in the flush line to the mechanical seal, a 50 micron cartridge filter (alternatively, a cyclone separator when pump differential pressure exceeds 200 kPa (30 psig)) and floating ball type sight flow indicator suitable for the working pressure encountered.

.7 Seal for service to 107° C

.8 Motor: Vertical solid shaft, squirrel cage induction type with ODP enclosure.

.9 Split coupled pumps where indicated.

.10 Standard of Acceptance:
- .1 Bell & Gossett as per drawings.

.11 Acceptable Manufacturers:
- .1 Grundfos
- .2 Taco
- .3 S. A. Armstrong Ltd.
- .4 Wilo

2.7 VARIABLE SPEED PUMP

.1 Each pump Consist of a pump and a Variable Frequency Drive

.2 Variable Frequency Drive
- .1 Construction
  - .1 Enclosure rated for IP 20 and NEMA Type 1 with included conduit kit.
- .2 Application Data
  - .1 Sized to operate a variable torque load.
  - .2 Speed range from a minimum speed of 1 Hz to a maximum speed of 200 Hz.
- .3 Environmental Ratings
  - .1 Meet IEC / EN61800-3, UL 1995 type 1 plenum rated and RoHS
  - .2 Designed to operate in an ambient temperature from -10 to 40° C (+14 to 104° F) without derating the drive, -10 to 50° C (+14 to 122° F) with derating the drive.
  - .3 Maximum 95%RH, non-condensing or dripping water. Compliant with IEC600068-2-3
  - .4 IP54 environmental rating shall be available on certain models upon request. (See IP54 ratings) The top of the drive controller shall be IP21 and IP41.
  - .5 Pollution rating 1 HP to 25 HP at 200V: Pollution degree 2 per IEC / EN61800-5-1, 30 HP to 20 HP @ 200V: Pollution degree 3 per IEC / EN61800-5-1
  - .6 Vibration Resistance 1.5mm to peak from 3 to 13 Hz, 1gn from 13 to 150 Hz, conforming to IEC/EN 60068-2-6.
  - .7 Shock resistance 15 gn for 11 ms conforming to IEC/EN 60068-2-27.

.4 Ratings
- .1 Designed to operate at 208 VAC ± 10% or 575 VAC -10% to + 10% as noted.
- .2 Operate from an input frequency range of 60 Hz ± 5%.
- .3 Displacement power factor be less than 0.96 lagging under any speed or load condition.
- .4 95% or greater AC Drive efficiency at 100% speed and load
- .5 The variable-torque rated AC Drive nominal full load current limit shall be not less than 110% for 60 seconds.

.5 AC Drive power converter Protection
- .1 Upon power-up, automatically test for valid operation of memory, valid operation of precharge circuit, loss of communication, DC-to-DC power supply, and control
- .2 Protected against short circuits between output phases and also phase-to-ground.
- .3 Upon loss of the analog process follower reference signal, programmable to display a detected fault condition signal.
- .4 The output frequency software enabled to fold back when the motor is in an overcurrent condition.
- .5 The output switching frequency selectable from 6 to 16 kHz. Derating of the AC Drive power converter may be required if the factory setting is modified.
- .6 Provide an auto reset feature which can provide up to 10 programmable reset attempts after a detected fault has occurred.
- .7 Lead Length to be 50 meters max out to the motor without a choke.

.6 AC Drive power converter Adjustments and Configurations
- .1 Factory programmed to operate all specified optional devices.
- .2 Acceleration and deceleration ramp times adjustable from 0.1 to 3200 seconds.
- .3 Configuration provisions for an Energy Savings motor type.
- .4 Memory capability to retain and record drive operation and detected fault type for the past four faults.

.7 Keypad Display Interface
- .1 An operator interface offer the modification of AC Drive power converter adjustments through a keypad. All electrical values, configuration parameters, I/O assignments, application and activity function access, detected fault condition signals, local control, adjustment storage, and diagnostics shall be accessible.
- .2 Software revision, output current, motor frequency and motor voltage readable through the drive display.

.8 Operator Controls
- .1 24 Vdc control power for the digital inputs and outputs.
- .2 Terminal block for all logic and analog signal connections to the power converter
- .3 Analog inputs: 3
- .4 Analog outputs: 1
- .5 Logic inputs: 6
- .6 Relay outputs: 2

.9 Serial Communications capability for the BACnet® protocols.

.10 Provide circuitry to limit the total harmonic distortion (THD) on the line side of the VFD to 3%.

.3 Variable Frequency Drive factory mounted to pump or field mounted adjacent to the pump on unistruct frame.

.4 Pump motors used with Variable Frequency Drive: Definite Purpose Inverter Fed Motors in accordance with NEMA MG1.1993 Rev 3 Part 31.

.5 For factory wired VFD's, provide rated VFD Cable wire from the VFD to the motor.

.6 For field wired VFD's, provide rated VFD Cable wire from the VFD to the motor.

.7 Standard of Acceptance:
- .1 Bell & Gossett

.8 Acceptable Material:
- .1 S. A. Armstrong Ltd. to the above requirements
- .2 Grundfos, to the above requirements
- .3 Taco Canada Ltd. to the above requirements
- .4 Wilo to the above requirements

2.8 TRIPLE DUTY VALVE

.1 Combination check valve, isolation valve and balancing valve.

.2 Standard of Acceptance
- .1 S.A. Armstrong Flo-Trex Valve as per schedule on drawings.

.3 Acceptable Material:
- .1 Bell & Gossett Triple Duty Valve
- .2 Taco–Plus Two Multi-Purpose Valve
- .3 Check valve and a circuit balancing valve in accordance with Section 23 05 23 Valves.
- .4 Wilo

2.9 SUCTION DIFFUSER

.1 Cast iron with flanged or screwed connection to suit pump.

.2 Built-in disposable fine mesh strainer with low pressure drop.

.3 Full length straightening vanes.

.4 Pressure gauge tappings.

.5 Adjustable support leg.

.6 Acceptable Material:
- .1 Bell & Gossett Suction Diffuser
- .2 S.A. Armstrong Suction Diffuser
- .3 Taco Canada Ltd. Suction Diffuser
- .4 Victaulic Style 731.
- .5 Wilo

3 Execution

3.1 INSTALLATION

.1 Base mounted type: supply templates for anchor bolt placement. Furnish anchor bolts with sleeves. Place level, shim unit and grout to top of channel frame. Align coupling in accordance with manufacturer's recommended tolerance. Check oil level and lubricate.

.2 In line circulators: Install with flow vertically up or down and as indicated by flow arrows. Support at flanges or near unions on outlets of unit. Install with bearing lubrication points accessible. Check rotation.

.3 Ensure that pump body does not support piping or equipment. Provide stanchions or hangers for this purpose. Refer to manufacturer's installation instructions for details.

.4 Install volute venting pet cock in accessible location.

.5 Change the flush line filters after the system has been flushed and on a regular basis until the pumps are turned over to the owner.

3.2 SUCTION DIFFUSER

.1 Install on inlet to pumps.

.2 Ensure clearance for removal of strainer basket.

.3 Provide short length of pipe between pump and suction diffuser for drain valve.

.4 Remove startup strainer after flushing and prior to balancing.

3.3 TRIPLE DUTY VALVE

.1 Install in accordance with Manufacturer’s 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.

2 Products

2.1 MANUFACTURER

.1 Equipment, chemicals and service by one manufacturer.

.2 Acceptable Manufacturers:
- .1 Dearborn
- .2 Drew Chemicals
- .3 Chem-Aqua

2.2 POT FEEDER

.1 Malleable cast iron or bronze: to ASME S-15. Pressure rating: 1035 kPa (150 psig). Temperature rating 107° C.

.2 Welded steel: Pressure rating: 1035 kPa (150 psig). Temperature rating 107° C.

2.3 FILTERS

.1 304 SS head with 304 SS sump.

.2 Suitable for double open-ended cartridges with knife edge seals.

.3 Operating Characteristics: 300 psig @ 200°F

2.4 CHEMICAL FEED PIPING

.1 Schedule 80, black steel.

2.5 CLOSED HYDRONIC SYSTEMS

.1 Pot feeder as specified elsewhere in this section.

.2 Fittings: Schedule 80 forged steel.

2.6 SUPPLY OF CHEMICALS

.1 Provide supply of chemical for warranty period. Chemicals to be compatible with each type of system specified.

2.7 TEST EQUIPMENT

.1 Provide for each type of system specified herein, one set of basic test equipment complete with carrying case and reagents for chemicals supplied. Include required specialized or supplementary equipment.

3 Execution

3.1 INSTALLATION

.1 Install HVAC water treatment systems in accordance with ASME Boiler Code Section VII, and requirements and standards of authorities having jurisdiction.

.2 Ensure adequate clearances to permit performance of servicing and maintenance of equipment.

3.2 POT FEEDERS

.1 Provide for each hydronic system.

3.3 CHEMICAL FEED PIPING

.1 Install crosses at all changes in direction. Install plugs in all unused connections.

3.4 FLUSHING OF MECHANICAL SYSTEM

.1 Flush after pressure test for a minimum of 24 hours.

.2 During initial flushing, equipment, such as, unit/cabinet heaters, DHW tanks, plate heat exchangers, reheat coils, coils in air handling units and coils other than wall radiation to be disconnected from the heating mains and the supply pipes and return pipes looped at the equipment. Final flushing to be through entire system. Provide temporary hose connectors to facilitate flushing.

.3 Do not use system pumps. Provide a temporary flushing pump with a minimum capacity of 3 l/s (50 USgpm). Remove temporary flushing pump from site at end of project.

3.5 CLEANING OF MECHANICAL SYSTEM

.1 Provide copy of recommended cleaning procedures and chemicals for review by Consultant.

.2 Thoroughly flush all mechanical systems and equipment with cleaning chemicals designed to remove deposition from construction such as pipe dope, oils, loose mill scale and other extraneous materials. Chemicals to inhibit corrosion of various systems materials and be safe to handle and use.

.3 During circulation of cleaning solution, periodically examine and clean filters and screens and monitor changes in pressure drop across equipment.

.4 Drain and flush systems until alkalinity of rinse water is equal to make-up water. Refill with clean water treated to prevent scale and corrosion during system operation.

.5 Disposal of cleaning solutions to be approved by authority having jurisdiction.

.6 Following final filling of system, provide written recommendation for ongoing water treatment.

3.6 WATER TREATMENT SERVICES

.1 Provide water treatment monitoring and consulting services for project warranty period. Service to include:

- .1 Initial water analysis and treatment recommendations.
- .2 System start-up assistance.
- .3 Operating staff training.
- .4 Visit plant every 2 months during period of operation and as required until system stabilizes and advice on treatment system performance.
- .5 Provide necessary recording charts and log sheets for operation during warranty period.
- .6 Provide necessary laboratory and technical assistance.
- .7 Instructions and advice to operating staff to be clear, concise and in writing.

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 BREECHING

ALL FUELS POSITIVE PRESSURE CHIMNEY, BREECHING

.1 ULC labeled, 760° C rated, all fuels.

.2 Suitable for positive venting applications with maximum 15 kPa (60” water column) internal static pressure at 525° C.

.3 Sectional, prefabricated, double wall with 50 mm (2") mineral wool insulation with mated fittings and couplings.

.4 Material
- .1 Liner: type 316 stainless steel.
- .2 Shell: type 316 stainless steel.
- .3 Insulation

.5 Joints
- .1 Flange to flange inner pipe joints
- .2 Inner flange band
- .3 Outer closure band.

.6 Exterior wall has combustible insulation. Manufacturer to provide fitting listed for combustible wall at wall penetration.

.7 Acceptable Material:
- .1 Metal Fab. Inc. IPIC.
- .2 Selkirk Metalbestos IPS.
- .3 Van Packer DWs
- .4 Cleaver Brook CBIL II
- .5 Security

2.2 CONDENSING GAS POSITIVE PRESSURE CHIMNEY, BREECHING

.1 ULC labeled, 248° C rated, Condensing gas.

.2 Application: condensing appliances with pressurized venting systems serving Category I, II, III and IV appliances.

.3 Suitable for positive venting applications with maximum 1.5 kPa (6" water column) internal static pressure.

.4 Sectional, prefabricated, double wall with mated fittings and couplings.

.5 Material
- .1 Liner for Condensing Boilers: Stainless Steel AL 29 4C
- .2 Shell: type 304 stainless steel.
- .3 Minimum of 1" Insulation.

.6 Joints
- .1 Slip fit with Viton O-Ring seals with mechanical locking clips.

.7 Exterior roof construction has combustible insulation. Manufacturer to provide fitting listed for combustible penetration.

.8 Acceptable Material:
- .1 Metal Fab Inc. Corr/Guard II
- .2 Selkirk Metalbestos Saf-T Vent CI Plus
- .3 Security Chimney SSID
- .4 ICC VIC

2.3 ACCESSORIES

.1 Cleanouts: bolted, gasketted type, full size of breeching.

.2 Barometric dampers: single acting, 70% of full size of breeching area.

.3 Hangers and supports: in accordance with recommendations of SMACNA.

.4 Discharge cone

.5 Base cap with drain.

.6 Drain Pipe: Threaded 316 Stainless Steel

.7 Expansion sleeves with heat resistant caulking, held in place as indicated.

.8 Bellows sections with cover.

.9 Flip top cap for diesel generator exhaust.

.10 Ventilate wall thimble with full angle ring and storm collar.

3 Execution

3.1 GENERAL

.1 Install in accordance with manufacturer's and SMACNA recommendations for shop fabricated components.

.2 Support breeching at minimum 1500 mm (5') centers and at each joint.

.3 Support breeching to ensure weight of breeching does not rest upon the boiler smoke stack connection.

.4 90^0 Elbows to be 5 Gore radius (inside and outside)

.5 Connections from vertical to horizontal to be 45^0 elbow and 45^0 connection.

.6 Support chimneys at bottom and guide as indicated on drawings.

.7 Provide thimbles where penetrating roof, floor, ceiling and where breeching enters masonry chimney. Pack annular space with rope.

.8 Provide flashing on chimneys penetrating roofs.

.9 Provide cleanouts as required to access the entire breeching.

.10 Trap and pipe drain to floor drain.

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 WARRANTY

.1 For boilers, the non-prorated warranty period is extended to ten (10) years. Signed by authorized representative of the original manufacturer.

.2 For burner, controls and other included equipment, the non-prorated warranty period is extended to two (2) years. Signed by authorized representative of the original manufacturer.

.3 If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer. This warranty does not include labor.

2 Products

2.1 GENERAL

.1 Boiler(s) complete with burner, necessary accessories, boiler controls and chimney(s).

.2 Training: As per Section 20 05 03 Mechanical Contract Closeout

.3 Trial usage:
- .1 Consultant may use boilers for test purposes prior to acceptance and commencement of warranty period.
- .2 Supply labor, materials and instruments required for tests.

2.2 CHIMNEYS

.1 Supplied by this section.

.2 Refer to Section 23 51 00 Breeching, Chimney and Stacks for materials.

.3 Refer to drawings for chimney height.

.4 Boiler Manufacturers listed are required to carry all costs for the chimneys as required for proper operation of their boilers.

.5 Boiler manufacturer to confirm in writing that the chimney size shown on the shop drawings is the recommended size for this project.

2.3 BOILER GENERAL

.1 Factory Tested High-efficiency gas-fired condensing boiler

.2 ULC and / or CSA approved Boiler/Burner package including any field installed devices.

.3 Designed and constructed to ANSI/ASME Boiler and Pressure vessel Code Section IV and bear the "H" stamp.

.4 CRN (Canadian Registration Number) to CSA B51 for the Province of Nova Scotia.

.5 Complete with boiler fittings and automatic controls.

.6 Factory package, with all piping and wiring.

.7 Low flow resistance.

.8 Provide auxiliaries for each boiler and to meet ANSI/ASME requirements

.9 Burner turndown ratio: minimum of 5:1.

.10 O2 levels: maximum of 3% at high fire and 4.5% at low fire.

.11 CO: Less than 20 ppm at all rates.

2.4 BOILER TRIM AND ACCESSORIES

.1 ASME Section IV approved Safety valve(s) side outlet type mounted on the boiler air vent outlet. Sized in accordance with code requirements and set to open at 210 kPa to release entire boiler capacity.

.2 Pressure gauge: 100 mm diameter complete with gauge cock.

.3 Thermometer: 100 mm diameter range 10° C to 150° C.

.4 Float Type Low water cut-off with manual reset and Test-N-Check Valves

.5 Manual Reset High Limit Temperature sensor; range not to exceed 210 ^{0} F and an integral device of the Boiler Burner Control and UL recognized as a limit control.

.6 Outlet water supply temperature sensing probe for operating water limit setpoint.

.7 Return water temperature sensing probe for operating water limit setpoint.

.8 Condensate neutralizing box complete with limestone chips shipped loose for field installation by Mechanical Contractor.

.9 Stack thermometer 65° to 400° C.

.10 Threaded air vent connection for field piping.
.1 Automatic brass air vent complete with gauge cock chain by Mechanical

Contractor.

.11 Threaded boiler drain connection for field piping.
.1 Boiler drain valve, manual full size ball type complete with cap and chain by Mechanical Contractor. Refer to Section 23 05 23 Valves

.12 One 1 set of cleaning tools.

2.5 GAS TRAIN

.1 In accordance with the requirements of CSA/UL and ASME CSD-1 and include:
.1 Low Gas Pressure Interlock, manual reset.
.2 High Gas Pressure Interlock, manual reset.
.3 Upstream and downstream manual test cocks.
.4 Ball Type manual shutoff valve upstream of the main gas valve.
.5 Unibody double safety gas valve assembly.
.6 Gas Pressure Regulator
.7 Union connection to permit burner servicing.

2.6 DOWN-FIRED FIRETUBE TYPE

.1 Noise Sound Levels: Based on ABMA test code for packaged boilers measured at 1400 mm (4 ½ feet) vertically above the bottom of the base and 900mm (3’0”) horizontally in front of the end of the burner or front surface of control cabinet. Sound levels dBA on the scale in reference to 0.0002 microbars.

.2 Compact, single-pass, vertical down-fired Firetube type, with Duplex stainless steel tubes, tube sheets and combustion chamber. The boiler pressure vessel completely insulated with a minimum of 2” of insulation and encased in an 18 gauge metal cabinet with powder coated finish. To prevent installation damage, the casing shall be packaged

.3 Duplex Stainless Steel tubes and fitted with Aluminum Alloy internal heat transfer fins creating no less than 10 square feet of fireside heating surface per boiler horsepower.

.4 Vessel mounted on a structural steel stand with exhaust gasses collected in a polymer drain collection box complete with drain fitting for draining condensation from the products of combustion.

.5 Top tubesheet fully accessible without burner disassembly or removal from the boiler. Burner assembly complete with lifting hinges and pneumatic lifters. Built in hinged platform allowing the operator to access the tubesheet, burner, ignition assembly and flame rod without the use of a ladder.

.6 The vessel fully insulated with a minimum of 50 mm (2”) of insulation, guaranteeing external convection and radiation heat losses to the boiler room from the boiler less than 0.5% of the rated input.

.7 Condensing capability allowing the boiler to be operated without the use of a 3-way valve for the boiler supply water temperature reset. No minimum boiler return water temperature or secondary pump or minimum flow rate shall be required to protect the

boiler against thermal shock or for minimum temperature water.

.8 Top rear water flanged outlet and bottom rear water flanged inlet. The water inlet (return) equipped with internal baffling.

.9 Second water return connection that will permit low temperature returns to be utilized for condensing, regardless of the primary return temperature water above condensing conditions.

.10 Suitable for operation with a water condition of 8.0 - 9.5 pH range.

.11 Burner Design
- .1 Forced draft burner mounted in and integral with the boiler hinged top door so when the door is opened the burner head, furnace, tubesheet and tubes are exposed.
- .2 Burner door utilizing easy removable threaded handles
- .3 Burner swings upward on hydraulic piston arms, one on each side to provide open support of the burner assembly.
- .4 Drop down hinged service platform furnished to provide service personnel an easy means of accessing the burner and controls for service and maintenance. When out of use, this platform folds up beneath the front service boiler panel.
- .5 Unitized Venturi, Gas Valve, Blower and burner head design.
- .6 Pre-mix design utilizes a variable speed fan connected to a venturi to simultaneously modulate fuel and air for a minimum a 5:1 turndown ratio.
- .7 Venturi design acts as a method for compensating for changes in barometric pressure, temperature and humidity so the excess air levels are not adversely affected by changes in atmospheric conditions.
- .8 Burner head constructed of a Fecralloy-metal fiber for solid body radiation of the burner flame.
- .9 Combustion takes place on the surface of the burner mantle, which shall be constructed of a woven Fecralloy material creating a 360 degree low temperature radiant flame.
- .10 Emissions: Limit NOx emissions to 20 PPM or less, as certified by an independent testing lab. NOx emission levels shall not be exceeded at full operating conditions and at designed turndown of the burner.
- .11 Combustion Air Proving Switch to ensure sufficient combustion airflow is present for burner ignition firing.
- .12 High Air Pressure Switch sensing the outlet pressure connection relative to stack back draft.

2.7 INOX-CROSSALL HEAT EXCHANGER TYPE

.1 Combustion chamber and Heat Exchanger
- .1 Fabricated of high-grade stainless steel (SA240-316Ti).

.2 Utilizing the heating surface for maximum heat transfer and condensation for optimum energy savings.
.3 Smooth, non-fin heat exchanger surfaces providing a self-cleaning effect while promoting clean combustion through low heat exchanger loading and a straight-through design.
.4 Heat exchanger of a compact design for ease of handling, and incorporate a full-swing door, left- or right-hinge, to allow for easy inspection and cleaning.
.5 Combustion chamber, heat exchanger and condensate collector constructed of high-alloy stainless steel and titanium.

.2 R-value of the insulation equivalent to 4" (100 mm) mineral wool with nylon backing.

.3 Flue gas and condensate collector made of single mould polypropylene (PPs) material.

.4 Insulation R-value equivalent to 100 mm (4”) mineral wool with nylon backing.

.5 Flue gasses pass by the return water in a counter-flow direction only, for maximum heat transfer effectiveness.

.6 Burner
.1 Modulating compact pre-mix cylindrical stainless steel gas burner with a high-alloy stainless steel surface capable of operating with consistently high efficiency
.2 Equipped with a variable speed combustion fan for quiet and economical operation.
.3 Burner constructed from high-grade stainless steel for universal use with natural gas or propane gas.
.4 Direct spark ignition system.
.5 Capable of operating at natural gas pressures from 1.75 kPa to 3.5 kPa (4 up to 14" W.C)
.6 Incorporate the electronic high limit, and the manual reset fixed high limit.

2.8 ELECTRICAL

.1 Electrical power supply 120 volts, 60 cycle single phase for the fan and 120 volts for control circuit requirements.

2.9 BOILER CONTROLS

.1 On/Off switch.

.2 Operating status indication light.

.3 Fault Indicator light.

.4 Operating condition scans.

.5 Integrated, solid state digital micro-processing modulating device computerized Boiler Burner control, complete with sequence indication, fault reset, mode selection, and parameter set-point.
.6 Mounted at the front of the boiler panel for easy access and viewing.
.7 Provide for both flame safeguard and boiler control through separate power

supplied CPU's (to meet NFPA)
.8 EPROM memory is maintained without main power.
.9 Control algorithms are PID-based.
.10 Quick connect plug & play system for low voltage controls.
.11 LON ready with gateway for BACnet

.6 Touch screen Keyboard display module for set up, trouble shooting, and operational display.
.1 Capable of displaying temperatures as °C or °F.
.2 Able to display all system temperatures and set points.
.3 Displays unique fault message during an alarm.
.4 A program selection mode.
.5 Information indicator with confirmation.
.6 Boiler operating hours display.
.7 Number of burner starts display.
.8 Operating status check.
.9 Emission/service test switch (TUV).
.10 Adjust the display contrast.
.11 Temporary occupied mode function.
.12 Slope and shift adjustment for heating curve.

.7 Performs the following functions:
.1 Burner sequencing with safe start check, pre-purge, Electronic direct spark ignition or pilot ignition and post purge. Flame rod or UV scanner to prove combustion.
.2 Flame Supervision. Pre-purge and post-purge and maintain a running history of operating hours, number of cycles, and the most recent six faults.
.3 Safety Shutdown with display of error.
.4 Modulating control of the variable speed fan for fuel/air input relative to load requirements.
.5 Gas pressure supervision, high and low.
.6 Combustion Air Proving Supervision.
.7 High Air Pressure [back draft too high] Supervision.
.8 Supply temperature and set-point temperature displayed at all times on the touch screen display.
.9 All parameter input control set-points factory downloaded with jobsite conditions programmed at the time of initial jobsite operation.

.8 Accept a 0-10V signal from a Building Automation System (BAS) for the purpose of allowing remote control of the boiler supply water temperature set point.

.9 Fault Management
.1 If a fault occurs on a boiler, indicate the fault code in the display window and flash red fault lamp.
.2 Close compiled failure alarm contact in order to signal the alarm condition to a Building Automation System (BAS).
.3 Save error history to memory.

.10 All controls panel mounted and located on the boiler as to provide ease of servicing the boiler without disturbing the controls and also located to prevent possible damage by water according to CSA requirements.

2.10 TEMPERATURE SENSORS

.1 All water sensors to be immersion sensors.

.2 External water sensors to be suitable for conduit connection.

2.11 ACCEPTABLE MATERIAL FOR DOWN-FIRED FIRETUBE TYPE

.1 Cleaver Brooks ClearFire-C series

2.12 ACCEPTABLE MATERIAL FOR INOX-CROSSALL HEAT EXCHANGER TYPE

.1 Viessmann Vitocrossal 200 series

3 Execution

3.1 INSTALLATION

.1 Install in accordance with ANSI/ASME Boiler and Pressure Vessels Code Section IV, regulations of Province having jurisdiction, except where specified otherwise, and manufacturer's recommendations.

.2 Make all required piping connections to all inlets and outlets recommended by boiler manufacturer.

.3 Maintain clearances as indicated or if not indicated, as recommended by manufacturer for operation, servicing and maintenance without disruption of operation of any other equipment/system.

.4 Mount unit level.

.5 Propane Gas fired installations - in accordance with CAN/CGA B149.1, Natural Gas and Propane Installation code.

3.2 WIRING

.1 Make all required connections recommended by boiler manufacturer including control connections from boiler to supplied accessories.

.2 Refer to Electrical Contract for Materials and Methods

.3 Wiring to sensors, etc. to be in an approved raceway or in conduit, no exposed wiring.

.4 Provide all necessary adaptors for conduit connections to devices.

3.3 RELIEF VALVES

.1 Pipe hot water relief valves full size to nearest drain.

.2 Cut end of discharge pipe at 45°.

.3 Provide unions on discharge piping of relief valves.

3.4 START UP

.1 Boiler supplier's factory authorized service organization to:
- .1 Perform inspections, start up and testing of the package boiler and accessory equipment and materials furnished under this Section.
- .2 Perform a detailed written record of the start-up performance, including burner setting data over the entire load range
- .3 All labor, equipment and test apparatus furnished by the authorized service organization.
- .4 Provide jobsite assistance to inspect boilers and other equipment upon arrival, verifying completeness of equipment supplied and potential damages.
- .5 Pre start-up walk through: Visit jobsite reviewing installation with mechanical contractor prior to startup.
- .6 Start-up conducted by experienced and factory authorized licensed burner technician (who also is to sign the report) in the regular employment of the authorized service organization including but not limited to the following:
  - .1 Demonstrate that boiler, burner, controls and accessories comply with requirements of this Section
  - .2 Pre-test all items prior to scheduling the final testing that will be witnessed by the Consultant.
  - .3 Take readings at different firing rates (20, 50, 75 and 100%) of load for the modulating burner. Provide to the Consultant a written report of the tests Include readings for each firing rate tested and include stack temperatures, O_2, CO, NOx, and overall boiler efficiency.
  - .4 Auxiliary Equipment and Accessories: Observe and check all valves, draft fans, electric motors and other accessories and appurtenant equipment during the operational and capacity tests for leakage, malfunctioning, defects, and non-compliance with referenced standards or overloading as applicable.
  - .5 Verification Requirements:
    - .1 Fireside inspection
    - .2 Set up fuel train and combustion air system
    - .3 Set up operating set points
    - .4 Check all safeties, including Flame safeguard, LWCO, Airflow, Fuel pressures, High limits.
    - .5 Set up and verify efficiencies at 20%, 50%, 75%, and 100%
    - .6 Set up and verify burner turndown.
- .7 Demonstrate operation and maintenance.

.2 Provide Consultant at least 24 h notice prior to inspections, tests and demonstrations.

.3 Submit written report of inspections and test results.

.4 Provide copies of the actual analyzer test printouts to be provided. Report shall also include boiler and burner manufacturer's literature with acceptable ranges for the parameters tested.

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 Capacity: As per schedule on drawing.

.2 Motor In accordance with Section 20 05 01 Common Work Results for Mechanical General.

2.2 HORIZONTAL UNIT HEATERS

.1 Casing: minimum 1.3 mm (18 Ga.) thick cold rolled steel with threaded connections for hanger rods. Finish with factory applied primer coat.

.2 Coils: seamless copper tubing, silver brazed to steel headers and with evenly spaced aluminum fins mechanically bonded to tubing. Leak test pressure to 1 MPa hydrostatically.

.3 Fan: direct drive propeller type, factory balanced, with anti-corrosive finish and fan guard.

.4 Motor: speed as indicated continuous duty, built-in overload protection, and resilient motor supports.

.5 Air outlet: four-way adjustable louvers.

.6 Standard of Acceptance:
- .1 Engineered Air as per Schedule on Drawings.

.7 Acceptable Manufacturers:
- .1 Rosemex
- .2 Rittling
- .3 Trane
- .4 Sigma Corporation

3 Execution

3.1 INSTALLATION

.1 Install according to piping layout. Provide for pipe movement during normal operation.

.2 Maintain proper clearance around equipment to permit performance of service maintenance. Check final location with Consultant if different from that indicated prior to installation.

.3 Should deviations beyond allowable clearances arise, request and follow Consultant's directive.

.4 Check that all openings for appurtenances and operating weight conform to shop drawings.

.5 If accessories, ancillaries, are received knocked down, check assembly with Consultant.

.6 Venting: Install screwdriver vent on convector, terminating inside access door.

.7 Clean all finned tubes and comb straight.

3.2 CABINET AND UNIT HEATER INSTALLATION

.1 Install according to piping layout. Provide for pipe movement during normal operation.

.2 Maintain proper clearance around equipment to permit performance of service maintenance. Check final location with Consultant if different from that indicated prior to installation.

.3 Should deviations beyond allowable clearances arise, request and follow Consultant's directive.

.4 Refer to manufacturer's installation drawings. Verify electrical service work with characteristics stamped on unit.

.5 Check that all openings for appurtenances and operating weight conform to shop drawings.

.6 Vents: on liquid type unit heaters, install standard air vent with cock.

.7 Clean all finned tubes and comb straight.

.8 Install unit heaters at heights indicated. Where not indicated, follow Consultant's instruction. Set discharge pattern required.

.9 Provide supplementary suspension steel as required.

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 Liquid systems:
    - .1 Flushed, filled, vented.
    - .2 Correct pump rotation.
    - .3 Strainers in place, baskets clean.
    - .4 Isolating and balancing valves installed, open.
    - .5 Calibrated balancing valves installed, at factory settings.
    - .6 Chemical treatment systems complete, operational.

1.11 APPLICATION TOLERANCES

.1 Do TAB to following tolerances of design values:
- .1 Hydronic systems: plus or minus 10%.

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 HYDRONIC SYSTEMS

.1 Definitions: for purposes of this section, to include low pressure hot water heating systems.

.2 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls:
- .1 Flow
- .2 RPM
- .3 Electrical Power:
  - .1 Voltage.
  - .2 Current draw.

.3 Locations of equipment measurement: To include, but not be limited to, following as appropriate:
- .1 Inlet and outlet of each:
  - .1 Boiler
  - .2 Pump
  - .3 Other auxiliary equipment.

.4 Locations of systems measurements to include, but not be limited to, following as appropriate:
- .1 Heating water
- .2 Hydronic at circuit balancing valves (Not required at flow measuring venturi)

1.19 DOMESTIC HWC SYSTEMS

.1 Meet all requirements as specified for hydronic systems.

.2 Locations of equipment measurements: To include, but not be limited to, following as appropriate: Inlet and outlet of each heater, tank, pump, circulator, at each controller, controlled device.

.3 Locations of systems measurements to include, but not be limited to, following as appropriate: main, main branch, branch, sub-branch.

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.

.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 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.

.3 Mitered elbows, rectangular:
- .1 To and including 400 mm: Single thickness turning vanes.
- .2 Over 400 mm: Double thickness turning vanes.

.4 Transitions:
- .1 Diverging: 20° maximum included angle.
- .2 Converging: 30° maximum included angle.

.5 Offsets: square elbows and/or full radiused elbows as indicated.

.6 Obstruction deflectors: maintain full cross-sectional area. Maximum included angles as for transitions.

2.5 FIRESTOPPING

.1 Retaining angles all around duct, on both sides of fire separation.

.2 Firestopping material and installation must not distort duct.

2.6 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

2.7 TAPE

.1 Poly-vinyl treated, open weave fiberglass tape.

.2 50 mm (2") wide.

.3 Standard of Acceptance.
- .1 Duro Dyne FT-2.

2.8 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'
31 to 36"	1 1/2" x 1 1/2" x 1/8"	1/4"	8'
37 to 60"	1 1/2" x 1 1/2" x 1/8"	3/8"	8'
61 to 84"	2" x 2" x 1/8"	3/8"	5'
85 to 96"	2" x 2" x 1/4"	3/8"	5'

Duct Size	Angle Size	Rod Size	Spacing
up to 750 mm	25 x 25 x 3mm	6 mm	2400 mm
751 to 900 mm	38 x 38 x 3 mm	6 mm	2400 mm
901 to 1500 mm	38 x 38 x 3 mm	10 mm	2400 mm
1501 to 2100 mm	50 x 50 x 3 mm	10 mm	1500 mm
2101 and over	50 x 50 x 6 mm	10 mm	1500 mm

.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

Duct Size	Band Size	Rod Size	Spacing
901 to 1270 mm	25 x1.3 mm	2 @ 10 mm	2400 mm
1271 to 2130 mm	25 x 1.6 mm	2 @ 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.

3.2 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 WATERTIGHT DUCT

.1 Provide water tight duct for:
  .1 Outside air intake plenums.
  .2 Exhaust air plenums.
  .3 As indicated.

.2 Form bottom of horizontal duct without longitudinal seams. Weld joints of bottom and 150 mm (6") up side sheets. Seal all other joints with duct sealer and tape.

.3 Slope bottom of duct/plenum to drain.

.4 Duct connections to plenum to be minimum 50 mm (2") above bottom of plenum.

.5 Provide NPS 1 1/4 drain with deep seal trap from outside air intake plenums and louvered exhaust air plenums to floor drain. Provide 150 mm deep trap for drains.

3.5 PROTECTION AND CLEANING

.1 Seal and protect open ends of ductwork continuously during construction.

3.6 CONTROL DAMPERS

.1 Install control dampers supplied by Section 24 33 15 Dampers - Operating and supplied with fans.

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 ACCESS DOORS IN DUCTS

.1 Non-insulated ducts:
- .1 Sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 26 Ga. thick complete with sheet metal angle frame.
  - .1 Gasketed, Frameless or Framed.

.2 Insulated ducts:
- .1 Sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 26 Ga. thick complete with sheet metal angle frame and insulation thickness as per adjacent duct.

.3 Hardware for framed:
- .1 Up to 300 x 300 mm (12" x 12") 2 sash locks
- .2 325 mm to 450 mm (13" to 18") 4 sash locks
- .3 Safety chain except for hinged.
- .4 Lift out handle for access doors 450 x 450 mm (18" x 18") and over.
- .5 Access doors into intake and exhaust plenums.
  - .1 Gasketted
  - .2 Hinged
  - .3 Flanged mounted.
  - .4 Insulation stop

.4 For round ducts up to 16”, provide sheet metal rolled to duct size with gasket, hinge and latches (file of sharp edges of duct opening). For round ducts over 16”, provide square duct adapter and access doors.

2.2 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/m 2.

2.3 TURNING VANES

.1 Factory or shop fabricated single thickness without trailing edge, to recommendation of SMACNA.

2.4 BOND CONECTIONS

.1 6 mm x 40 mm long grounding bolts

.2 Hex nuts and star washers.

.3 #12 AWG bonding conductor with Green jacket or round tinned Copper Braid with crimped lugs of equivalent AWG.

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 Bond connections
- .1 Bond across each flexible duct connection.
- .2 Bonding bolts: drill hole, install bolt with star washers both sides and secure with nut.
- .3 Length of bond connection determined by contractor.
- .4 Locate bond connection so they are visible from the floor level.

.4 Access doors:
- .1 Size:
  - .1 600 x 600 mm (24" x 24") for person size entry and plenums.
  - .2 300 x 300 mm (12" x 12") for service entry.
- .2 Location:
  - .1 At fire dampers.
    - .1 Minimum 300 x 300 mm (12" x 12") for ducts where both dimensions are under 450 mm (18").
    - .2 Minimum 450 x 450 mm (18" x 18") for ducts where both dimensions are 450 mm (18") and over.
    - .3 Locate as close as possible to fire damper.
    - .4 If requested, Demonstrate that fire damper links can be replaced.
  - .2 At control dampers, person size for view the operation of the damper blades and access to linkage.
  - .3 At plenums, intake and exhaust.
  - .4 At devices requiring maintenance.
  - .5 At locations required by code.

.5 Access panels
- .1 Size: Minimum 450 x 450 mm (18" x 18")
- .2 Location:
  - .1 At 9000 mm (30 ft.) centers in horizontal duct mains, at each change in direction, both sides of turning vanes and both sides of duct silencers.
  - .2 Access doors as per above or an access panel constructed of 500 x 500 mm (20” x 20”) 18 gauge sheet metal with gasket and fastened at 75 mm (3”) centers around perimeter.

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 AEL: ratio between total test period less any system downtime accumulated within that period and test period.

.2 Downtime: results whenever BAS is unable to fulfill all required functions due to malfunction of equipment defined under the responsibility of BAS contractor. Downtime is measured by duration, in time, between the time that the Contractor is notified of failure and the time system is restored to proper operating condition. Downtime not to include following:

- .1 Outage of main power supply in excess of back-up power sources, provided that:
  - .1 Automatic initiation of back-up was accomplished.
  - .2 Automatic shut-down and re-start of components was as specified.
- .2 Failure of communications link, provided that:
  - .1 Controller automatically and correctly operated in stand-alone mode.
  - .2 Failure was not due to failure of any specified BAS equipment.
  - .3 Functional failure resulting from individual sensor inputs or output devices, provided that:
    - .1 System recorded said fault.
    - .2 Equipment defaulted to fail-safe mode.
    - .3 AEL of total of all input sensors and output devices is at least 99 % during test period.

1.4 SYSTEM DESCRIPTION

.1 Work includes:

- .1 Start-up testing and verification of all systems supplied under this section.
- .2 Check out demonstration of proper operation of all components.
- .3 On-site operational tests.

.2 Following submission of report by contractor Consultant will review testing and verification as required.

.3 Provide test equipment including two-way radios.

.4 Independent testing laboratory to certify test equipment as accurate to within approved tolerances no later than 2 months prior to tests.

.5 Inform and obtain approval from Consultant in writing at least 14 days prior to each test.

Indicate:
- .1 Location and part of system to be tested.
- .2 Testing procedures, anticipated results.
- .3 Names of testing personnel.

.6 Co-ordinate with other trades.

.7 Correct deficiencies; re-test in presence of Consultant until satisfactory performance is obtained.

.8 Acceptance of tests will not relieve Contractor from responsibility for ensuring that complete systems meet every requirement of Contract.

.9 Load system with project software.

1.4 QUALITY ASSURANCE

.1 Test after installation of each part of system and after completion of mechanical and electrical hook-ups, to verify correct installation and functioning.
- .1 Test and calibrate field hardware including stand-alone capability of each controller.
- .2 Verify each A-to-D convertor.
- .3 Test and calibrate each AI using calibrated Binary instruments.
- .4 Test each BI to ensure proper settings and switching contacts.
- .5 Test each BO to ensure proper operation and lag time.
- .6 Test each AO to ensure proper operation of controlled devices. Verify tight closure and signals.
- .7 Test operating software.
- .8 Test application software. Provide samples of logs and commands.
- .9 Debug software.

.2 Final Startup Testing
- .1 Upon satisfactory completion of tests, perform point-by-point test of entire system under direction of Consultant.
- .2 Provide:
  - .1 Two technical personnel capable of re-calibrating field hardware and modifying software.
  - .2 Detailed daily schedule showing items to be tested and personnel available.
  - .3 Key document for recording procedures to be listing of system database, including key name, English description, point type and address, engineering units, low and high limits. Include space on listing for remarks and signatures of commissioning technician

.3 Final Operational Testing
- .1 Purpose: to demonstrate that BAS functions in accordance with contract

requirements.

.1 Prior to the commencement of 30 day test Contractor must demonstrate that operating parameters (setpoints, alarm limits and CDL's) have been implemented so as to ensure proper operation and operator notification in event of off-normal operation. Repetitive alarm conditions to be resolved so as to minimize reporting of nuisance conditions.

.2 Test to last at least 30 consecutive 24 hour days.

.3 Tests to include:

.1 Demonstration of correct operation of monitored and controlled points.

.2 Operation and capabilities of sequences, reports, special control algorithms, diagnostics, software.

.4 System will be accepted when:

.1 BAS equipment operates to meet overall performance requirements. Downtime must not exceed allowable time calculated for this site.

.2 Requirements of Contract have been met.

.5 In event of failure to attain specified AEL during test period, extend test period on day-to-day basis until specified AEL is attained for test period.

.6 Correct defects when they occur and before resuming tests.

1.5 VERIFICATION

.1 After installation of the system and completion of mechanical and electrical hook-up, perform point by point verification to confirm correct installation and functioning of equipment.

.2 Submit a point by point Equipment Inspection and Verification Report with each point results initialed by BAS Technician to the consultant.

.3 Following submission of the above point by point Equipment Inspection and Verification Report, notify the consultant in writing at least seven days prior to the Owner/Consultant point by point verification:

.1 Provide all necessary testing equipment, communication equipment and personnel.

.2 Perform Owner/Consultant verification in the presence of the Owner/Consultant.

.3 Demonstrate the proper operation of each component.

.4 Verify all Binary input alarm points by physically simulating an alarm condition.

.5 Calibrate all temperature, humidity, and pressure sensors using accurate electronic testing, equipment as a reference.

.6 Verify all control loops and programmed sequences of operation by simulating conditions for each mode of operation.

.4 Correct any deficiencies and re-test in the presence of the consultant, until designated part of the system performs satisfactorily.

2 Products Not Applicable

3 Execution

3.1 GENERAL

.1 Install in accordance with manufacturer's instructions.

.2 Cooperate with other sections of Mechanical Contract and Electrical Contract to start-up equipment and provide documentation included but not limited to the following:
- .1 Boilers
- .2 Humidifier.
- .3 Testing, Adjusting & Balancing.

3.2 FIELD SERVICES

.1 Prepare and start logic control system under provisions of this section.

.2 Start-up, Check-out and Verification of systems: Allow sufficient time for start-up and verification prior to placing control systems in permanent operation. Provide the capability for off-site monitoring at control contractor's local or main office. At a minimum, off-site facility shall be capable of system diagnostics and software download.

.3 Provide Owner's Representative with spare parts list. Identify equipment critical to maintaining the integrity of the operating system.

3.3 BAS BUILDING CONTROLLER VERIFICATION

.1 The following checkout and start-up procedure must be performed on each BAS panel prior to software installation and prior to commencement of point to point check-out.

.2 BAS Panel Checkout:
- .1 Verify that the enclosure is not mounted to a vibrating surface.
- .2 Verify that line voltage wiring enters the enclosure separate from all low voltage wiring. Line and low voltage wiring is required to be separated within field panels.
- .3 Verify that wiring is not routed from the bottom of the enclosure up through the center.
- .4 Check all point and trunk wiring for shorts, grounds, and induced/stray voltages. Also, verify all terminations are neat and dressed.
- .5 Verify that all points are properly terminated according to as-built drawings.
- .6 Verify that the correct point modules have been inserted to the proper termination blocks and the address keys have been placed in proper slots. Install corresponding module labels.
- .7 Verify that required LAN trunk wires have been terminated correctly.
- .8 Verify that the BAS panel has been powered with the proper voltage.
- .9 Using either the terminal workstation or the system technicians laptop personal computer load the BAS panel database.

3.4 VERIFICATION OVERVIEW

.1 Verification and field start-up to be performed by Factory Trained Authorized Manufacturer Service Technician.

.2 Include the following services:
- .1 Provide the initial system software, programming, customizing and data entry.
- .2 Factory Trained Authorized Manufacturer Service Technician must visit the site to test and commission the equipment. Provide written verification report detailing this phase of the work.
- .3 Provide Demonstration, Operating and Maintenance Instructions.

.3 Verification
- .1 Start-up testing and verification of all parts of the systems supplied under this section.
- .2 Verification performed by Factory Trained Authorized Manufacturer Service Technician(s) on site capable of re-calibrating field hardware and modifying software on site.
- .3 On-site operational tests.
- .4 Verify the wiring to all equipment is complete.
- .5 After installation of the system and completion of mechanical, control and electrical hook-up, perform point by point verification to confirm correct installation and functioning of equipment.
- .6 Cooperate with other sections of Mechanical Contract to start-up equipment and provide documentation included but not limited to the following: Testing, Adjusting & Balancing.
- .7 Check out demonstration of proper operation of all components.
- .8 After installation of the system and completion of mechanical, control and electrical hook-up, perform point by point verification to confirm correct installation and functioning of equipment.
- .9 Provide a copy of inspecting technician's report to user. Identify each device by location and certify the test results.

.4 The following checkout procedures must be performed on all input/output points defined in any field panel or LAN Device. These procedures represent the minimum requirements for verification of inputs. More in-depth verification may be necessary.

.5 Verify the correct wiring terminations per the design documentation package, at the field panel. Verify that all wiring and terminations are neat and dressed.

.6 Analog Input Checkout
- .1 Verify the point address by checking that the analog input instrument is wired to the correct piece of field equipment. Do this by altering the environment at the sensing element or by disconnecting one of the wires at the sensor, and verifying that the reading at the field panel has reacted to this change.
- .2 Verify the point database to be correct, (i.e. alarm ability, alarm limits, slope/intercept, engineering units, etc.). Verify that the correct change of value (COV) limit has been defined.
- .3 Verify the sensor has the correct range and input signal. (i.e. 10-60° C, 4 - 20 mA). Verify that the device is mounted in the correct location and is wired and installed correctly per the design documentation package.
- .4 Set-up and/or calibrate any associated equipment (i.e. panel LCD meters, loop isolators, etc.). Verify that these auxiliary devices are mounted in the correct location and are wired and installed correctly per the design documentation package.

.7 Binary Input Checkout

.1 Verify the point address by verifying that the Binary input is correctly terminated at the controlled piece of equipment.

.2 Verify the point database is correct (i.e. point name, address, alarm ability, etc.).

.3 Set-up and/or calibrate the associated equipment, i.e. high/low temp detector, flow switch, end switch, current relay, pressure switch, etc. is mounted in the correct location, and is wired and installed correctly per the control system installation drawings.

.4 With the controlled equipment running or energized as described in the Binary output checkout procedures, verify the correct operation of the Binary input point and associated equipment by putting the Binary input monitored equipment into its two states. Verify that the proof or status point indicates the correct value at the operator's terminal and that the status led is giving the proper indication in each mode of operation (on/off).

.8 Analog Output Checkout

.1 Insure that the correct output device(s) are installed per the Control System Installation Drawings. (i.e. # modules, transformers, power supply, etc.). Verify that these devices are installed, wired and piped correctly. Verify that any configuration jumpers for PXP type devices are in the proper settings for the required application. Verify related transformers are fused in accordance with installation drawings.

.2 Verify the point database to be correct (i.e., slope/intercept, engineering units, etc.). Verify that the correct COV limit has been defined. Refer to Manufacturer's Instructions for establishing correct COV values.

.3 Verify the point address by checking that the analog output is wired and/or piped to the correct output transducer and/or equipment.

.4 Verify that the controlled device is calibrated (i.e. 4-20 mA variable frequency drive, etc.) and is in the correct location, and is wired or piped and installed correctly per the design documentation package. If the controlled device is not calibrated, then a three point (high, low and mid-point) calibration procedure must take place. Verify proper operation of the end device. When calibration has been verified, ensure that installation drawings and point database have been updated.

.5 Set-up and or calibrate any associated equipment, (i.e. panel LCD meters, loop isolators, pneumatic gauges, etc.). Also verify that these auxiliary devices are mounted in the correct location and are wired or piped and installed correctly per the design documentation package.

.6 After verifying the set-up and operation of any associated equipment check for the correct operation of the logical point and associated equipment by commanding the analog output to the top and bottom of its range. Verify that the control device(s) responded appropriately as indicated by the design documentation package. Check to insure that all network terminals, etc. can also command these outputs.

.9 Binary Output Verification

.1 Verify that the correct voltage is utilized in the circuit.

.2 Verify the point database to be correct (i.e. point name, address, etc.).

.3 Check and verify that the end device responds appropriately to the Binary output(s).

.4 After verifying the set-up and operation of any associated Binary input/proof points, check and verify correct operation of the logical point and associated equipment by commanding the point to all possible states (i.e. off, on, fast, slow, auto, etc.). Verify that the defined proof delay is adequate for all modes of operation.

.5 If any interlocked equipment exists that has independent hand-off-auto or auxiliary control wiring, verify correct operation of same. Also check that any interlocked equipment such as end switches for damper operation or exhaust and return fans are wired correctly and operate correctly.

.6 Verify that the controlled piece or pieces of equipment cannot be caused to change state via the Binary output if an associated hand-off-auto switch is in the hand /on or hand/off mode of operation, unless specified as a fireman's override point etc.

3.5 SEQUENCE OF OPERATION TEST

.1 The following are sample sequence of operations tests. The intent of these procedures is to provide a plan of action to verify system operations via block checks of the project specific sequence of operations. It also provides a basis for determining the number of tests and the time required to conduct them for a given project. The procedures may be used in this format, or one procedure to a page should more detail be required. Additional tests can and should be added to form a test library. The procedures outlined below should be verified for accuracy, and may be modified to meet your specific requirements.

.2 DESCRIPTION OF TEST: Room Control Checkout. Verify operation of heating valve (Winter Mode of Operation).
INPUT TO TRIGGER TEST: Change room air setpoint from current value to a lower value (setpoint - 5° C). Observe valve operation. After 10 minutes, change room air temperature setpoint from current value to a higher value (setpoint + 10° C). Observe valve operation.
EXPECTED OUTCOME: In both cases, the heating valve will open and close to achieve and maintain setpoint.

PASS:	FAIL:	DATE:	INITIALS:

.3 DESCRIPTION OF TEST: AH Alarm Checkout. Verify AH-1 discharge air temperature alarming is operational and is received at the designated terminal.
INPUT TO TRIGGER TEST: Change discharge temperature high alarm limit through software to a value below the current discharge temperature (discharge temperature - 5° C).
EXPECTED OUTCOME: A high temperature alarm will be received per the Alarm Definition Report at its designated terminal.

PASS:	FAIL:	DATE:	INITIALS:

.4 DESCRIPTION OF TEST: AH Temperature and Humidity Control Checkout. Verify modulation of heating valve (Winter Mode of Operation) AH-1 / VHC-1G.
INPUT TO TRIGGER TEST: Place the summer/winter trigger point in the winter mode. Change discharge air setpoint from current value to a lower value (setpoint - 5° C). Observe valve operation. After 10 minutes, change discharge air temperature setpoint from current value to a higher value (setpoint + 10° C). Observe valve operation.
EXPECTED OUTCOME: In both cases, the heating valve will modulate to achieve and maintain setpoint.

PASS:	FAIL:	DATE:	INITIALS:

.4 DESCRIPTION OF TEST: AH Temperature and Humidity Control Checkout. Verify modulation of humidity valve with supply humidity as high limit.
INPUT TO TRIGGER TEST: Change return air humidity setpoint to a lower setpoint value (setpoint - 20 % RH). Observe valve operation. Supply humidity high limit control loop should have an observable upper limit (i.e. virtual point). Change supply humidity high limit setpoint to a lower value (setpoint - 20% RH). Observe supply humidity high limit control loop upper limit value.
EXPECTED OUTCOME: After changing return air humidity setpoint, humidifier will modulate to achieve and maintain the new setpoint. After changing the supply humidity high limit setpoint, the virtual point storing the humidity value upper operating limit should decrease, preventing the humidifier from opening to achieve the new high limit setpoint.

PASS:	FAIL:	DATE:	INITIALS:

.5 DESCRIPTION OF TEST: AHU Safety Checkout. Verify Low Temperature Detector Operation.
INPUT TO TRIGGER TEST: Manually depress low temperature detector to simulate a freeze or low temperature condition.
EXPECTED OUTCOME: Supply and return fans will shut down. Heating valve will return (to its fail safe position), humidifier will shut down , mixing dampers will close to the full return air position.

PASS:	FAIL:	DATE:	INITIALS:

.6 DESCRIPTION OF TEST: AH Temperature and Humidity Control Checkout. Verify modulation of mixing dampers (OA/RA/EA).
INPUT TO TRIGGER TEST: Change mixed air temperature setpoint to a lower setpoint value, (setpoint - 5° C). Observe damper operation.
After a time period of 10 minutes, change mixed air temperature setpoint from the original setpoint to a higher setpoint value (setpoint +10° C). Observe damper operation.
EXPECTED OUTCOME: In both cases, the mixed air dampers will modulate to achieve and maintain setpoint.

PASS:	FAIL:	DATE:	INITIALS:

3.6 EQUIPMENT INSPECTION AND VERIFICATION REPORT - APPENDIX A

.1 Installation: Initialing this column verifies the proper location and mounting per the Manufacturer's installation instructions and control drawings.

.2 Point To Point Complete: This column indicates that the point checkout procedure is successfully completed.

.3 Procedure # Used: This column indicates the Procedure # used to check out the points and equipment.

.4 Date: This column is dated when the point checkout procedure is successfully completed.

.5 Contractor's Initials: This column is initialized by a Contractor's representative, verifying the completion of the checkout procedure.

.6 Comment Number: This column indicates a number referencing a comment on the Point Verification Comment Sheet. The comments are used to indicate any additional information or problems.

.7 Displayed Value: The displayed value column is the value displayed on the i.e. PC, Laptop, Terminal.

.8 Actual Value: This column is for recording the measured value at the sensor, i.e. with an approved test instrument.

APPENDIX 'A'
EQUIPMENT INSPECTION AND VERIFICATION REPORT
Note: Points added by change order to be included.
BAS Technician: _____

Point Information									
	Name								
	Number								
	Type								
	Address								
	Fail Mode								
Start-Up	Installation								
	Point to Point								
	Procedure #								

	Date								
	BAS Technician								
	Comment #								
	Display Value								
	Actual Value								
	Calibration Needed								
	Notes								

APPENDIX 'B' PROJECT PUNCH LIST
BAS Technician: _____

Item	Description of Problem	Date	Int.	Action Taken	Date	Int.

APPENDIX 'C' POINT VERIFICATION COMMENT SHEET
BAS Technician: _____

The purpose of this form is to document such things as devices which have been mounted in a manner which deviates from the contract documents. Such deviations may occur due to customer requests or architectural requirements or constraints.
Entering such deviations on this form provides a permanent record for reference by the customer and/or service personnel at a later date.

Date:_____ BAS#: or LAN Device #_____

Comment #	Comment from Point Verification Sheet for Bas # or Lan Device

APPENDIX 'D' SYSTEM PERFORMANCE TEST FORM

PPCL Program Number_____ PPCL Revision Number_____
Date of Test_____ Equipment_____
Test Number_____

BAS Technician: _____

DESCRIPTION OF TEST: INPUT TO TRIGGER TEST: EXPECTED OUTCOME:

RESULT	PASS/FAIL	DATE	INITIAL

IF TEST FAILS SEE RETEST NUMBER_____

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 RELATED SECTIONS

.1 Section 25 30 02 BAS: Field Control Devices.

.2 Section 25 30 03 BAS Field Installation

.3 Refer to Division 26 Electrical and Division 27 Communications for acceptable wiring materials and wiring methods.

1.4 BAS IDENTIFICATION

.1 Conform to requirements of Section 23 05 53 Mechanical Identification and Section 26 05 03 Electrical Identification supplemented and modified by requirements specified in this section.

1.5 WORK INCLUDED

.1 Except as otherwise indicated the system supplier shall secure and pay for all permits, inspections and certifications required for his work and arrange for necessary approvals by the governing authorities.

.2 Work covered by sections referred to above consists of fully operational BAS, including, but not limited to, following:

- .1 Expansion of existing AEM BACnet® based Building Automation System.
- .2 Design and provide all new networking equipment, building controllers, field control devices, cabling and any other accessories or devices required to make new controls function as designed.
- .3 Modify existing BAS programming and graphics to suit new sensors and controlled devices. New graphics to the standard of the existing BAS Graphic User Interface.
- .4 Provide all necessary power required for BAS from local 120V/208V branch circuit panelboards including low voltage transformers.

1.6 COORDINATION

.1 Coordinate location of exposed control sensors with plans and room details before installation.

.2 Coordinate controlled/monitored equipment from other divisions to achieve compatibility with BAS.

.3 Coordinate with the Owner's IT department for Ethernet communication cabling and TCP/IP address.

1.7 WARRANTY

.1 Control system failures during warranty period shall be adjusted, repaired, or replaced at no additional cost or reduction in service to Owner. Respond during normal business hours within 24 hours of Owner's warranty service request 24 hours Monday through Friday and 48 hours on Saturday and Sunday.

.2 Provide updates to operator workstation or web server software, project-specific software, graphic software, database software, and firmware that resolve Contractor-identified software deficiencies at no charge during warranty period. Coordinate updates or upgrades with Owner's representative.

.3 Provide for 16 hours of customized programming after verification by the original programmer

1.8 OWNERSHIP OF PROPRIETARY MATERIAL

.1 Project-specific software and documentation shall become Owner's property. This includes, but is not limited to:
- .1 Graphics
- .2 As Built drawings
- .3 Database
- .4 Application programming code
- .5 Documentation

1.9 PERMITS, FEES AND INSPECTIONS

.1 Line and low voltage Control Wiring permit.
- .1 Wiring shall be installed by an Electrician
- .2 Submit to Electrical Inspection Department and Supply Authority necessary quantity of Control Drawings and Control Specifications for examination and approval prior to commencement of work
- .3 Pay associated fees.
- .4 Furnish Certificates of Acceptance from Inspection Department and authorities having jurisdiction on completion of work.

1.10 MAINTENANCE CONTRACT DURING WARRANTY PERIOD

.1 Provide services, materials and equipment to maintain BAS for the building warranty period.

.2 Perform as minimum (4) equally distributed visits including during warranty period. Notify Consultant and Owner 24 hours in advance of each visit and Provide written report.

.3 Check, setup and calibrate a minimum of 33% of all devices and all dampers during each visit.

.4 Perform inspections during regular working hours

.5 Records and logs: maintain records and logs of each maintenance task

.6 System modifications: provide in writing. No system modification, including operating parameters and control settings, to be made without prior written approval of Consultant.

.7 Rectify deficiencies revealed by maintenance inspections and environmental checks.

1.11 SUBMITTALS

.1 In accordance with Section 20 05 02 Mechanical Submittals.
- .1 Submit control diagrams
  - .1 Sequences of operation for each system,
  - .2 All input/output object listings and an alarm point summary listing.
  - .3 Complete bill of materials
  - .4 Provide BACnet® Conformance
  - .5 Provide complete description and documentation of any proprietary (non-BACnet®) services and/or objects used in the system.
  - .6 Specification sheets for each item to include manufacturer's descriptive literature, specification, drawings, diagrams, performance and characteristic curves, catalogue cuts, manufacturer's name, trade name, catalogue or model number, nameplate data, size, layout, dimensions, capacity, other data to establish compliance.
  - .7 Sketch of site-specific system architecture.
  - .8 Specification sheets for each item including memory provided, programming language, speed, type of data transmission.
  - .9 Controller locations.
  - .10 Sensing element type and location.

.2 As Built Drawings
- .1 Conform to requirements of Division 1 and Section 20 05 01 Common Work Results for Mechanical - General, supplemented and modified by requirements specified in this section.
- .2 Final Control Diagrams
- .3 Changes to contract documents as well as addenda and contract extras.
- .4 Changes to interface wiring.
- .5 Major routing of conduit and control air lines.
- .6 Signal levels, setpoints, reset curves, schedules.

2 Products

2.1 GENERAL

.1 Control system installed to be "fail-safe".

.2 Provide all required adapters between "metric" and "Imperial" components.

2.2 PRODUCT

.1 Use new products the manufacturer is currently manufacturing and selling for use in new installations. Do not use this installation as a product test site unless explicitly approved in writing by Owner. Spare parts shall be available for at least seven years after completion of this contract.

.2 Each major component of equipment shall have the manufacturer's name and address and the model and serial number on a nameplate.

.3 Maintainability: Maintenance of any satellite panel or any peripheral device shall not affect the remainder of the system.

2.3 BUILDING CONTROLLERS

.1 Listed as a certified B-BC in the BACnet® Testing Laboratories (BTL) Product Listing.

.2 Fully programmable BACnet® Building Controllers that communicate on BACnet® Local Area Network (LAN) and BACnet® MS/TP Network (MS/TP)

.3 Controllers equal to or better than most recent expanded building controllers. Compatible with existing BACnet® BAS

.4 Provide UPS for each Building Controller

.5 Provide quantity as required to create a functional system.

2.4 LOCKABLE CONTROL ENCLOSURES

.1 Enclosures to bear the appropriate CSA designation i.e. CSA Enclosure 1 - General Purpose, CSA Enclosure 3 - Weatherproof.

.2 To have hinged doors equipped with standard keyed-alike cabinet locks, keyed to same key.

.3 Either free-standing or wall mounted enameled steel cabinets with hinged and key-locked front door.

.4 Modular multiple panels as required to handle requirements with additional space to accommodate future capacity without adding additional cabinets.

.5 Cabinets: 12 gauge furniture steel (12 gauge) with baked enamel finish on exterior and rust inhibitive paint on interior, for surface mounting, with hinged door, latch lock, 2 keys, complete with perforated metal mounting backboard.

.6 Factory installed bonding and neutral termination strips.

.7 Provide for conduit entrance from top, bottom or sides of panel.

.8 Cabinets to provide protection from water dripping from above, while allowing sufficient airflow to prevent internal overheating.

2.5 ACCEPTABLE MATERIAL AND INSTALLER

.1 Native BACnet® Building Automation System (BAS) throughout project. Building Controllers (B-BC) to be currently listed by BACnet® Testing Laboratories (BTL)

.2 Acceptable Installer and Material:
.1 Advanced Energy Management with Alerton, Inc. BTL Listed BACnet® Building Controllers (B-BC)

3 Execution

3.1 ELECTRICAL ENCLOSURES

.1 House all electrical equipment associated with the control system in separate dedicated enclosures provided by this section.

.2 House all controllers associated with the control system in lockable enclosures provided by this section.

.3 Top of lockable enclosure to be 1980 mm AFF.

3.2 BAS OBJECT TYPE SUMMARY

.1 Displays: System displays shall show all analog and binary object types within the system. They shall be logically laid out for easy use by the owner. Provide outside air temperature indication on all system displays associated

.2 Run Time Totalization: At a minimum, run time totalization shall be incorporated for each monitored piece of equipment (i.e. Fans, Pumps, Boilers but not including valves, dampers etc.). Warning limits for each point shall be entered for alarm and or maintenance purposes.

.3 Trend log: All binary and analog object types (including zones) shall have the capability to be automatically trended.

.4 Alarm: All analog inputs (High/Low Limits) and selected binary input alarm points shall be routed (locally or remotely) with alarm message per owner's requirements.

.5 Database Save: Provide back-up database for all stand-alone application controllers on disk.

3.3 BAS POINT DESCRIPTORS & NOMENCLATURE

.1 Conform to existing naming conventions for buildings, zones, controllers and devices in use at building.

.2 Typical control device identification tag:

Point: XYZ _AH1_SAT Address: 1000300.AI2 Description: Supply Air Temperature Part No. XXX – XXXX	Point: XYZ _HX1_VLV Address: 1000100.AO9 Description: Heating Water Exchanger: Steam Valve Part No. XXX – XXXX
Point: XYZ _AH2_FSS Address: 1000500.BO1 Description: Fan Start/Stop Relay Part No. XXX – XXXX	Point: XYZ _ DHWR_PST Address: 1000200.BI4 Description: Domestic Hot Water Return: Pump Current Sensor Part No XXX - XXXX

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 RELATED SECTIONS

.1 Section 23 05 53 Mechanical Identification
  .1 Coordinate identification with Mechanical Contractor

2 Products

2.1 IDENTIFICATION NAMEPLATES

.1 In accordance with 26 05 03 Electrical Identification

2.2 COLOUR CODING OF ELECTRICAL BOXES

.1 In accordance with 26 05 03 Electrical Identification

2.3 WIRING IDENTIFICATION

.1 In accordance with 26 05 03 Electrical Identification

2.4 NAMEPLATES FOR BAS FIELD DEVICES

.1 As a minimum, control device identification shall correspond to descriptors provided in the reviewed shop drawings with respect to panel designation or BAS point name.

.2 Identify intermediate and end control devices including sensors, controllers, monitoring devices etc. as follows:
  .1 Laminated plastic plates nameplates attached by chain or heavy duty plastic tie wraps.
  .2 Plastic encased cards
    .1 Sizes: 50 x 100 mm minimum.
    .2 Lettering: 6 mm minimum high produced from laser printer in black.
    .3 Data to include: point name, schematic designation number, model, capillary length, size, range, set point, other pertinent data, function, fail-safe position.
    .4 Attached by chain or heavy duty plastic tie wraps.
  .3 Field Device Tagging:
    .1 90 x 24 x 4 mm white styrene plastic with 5mm diameter hole for chain or tie wrap mounting.

.2 Lettering:
.1 20 pt bold for point name
.2 12 pt reg for point descriptor
.3 10 pt reg for point address
.4 Miscellaneous text 8 pt regular

.4 Full stick-on labels attached to plastic backing. Labels generated by Excel spreadsheet of point database then imported to any common label making machine (i.e. Brother P-touch). Labels and text can be any color.

.5 90 x 24 x 4 mm clear plastic with 5mm diameter hole for chain or tie wrap mounting.

2.5 WARNING SIGNS

.1 Equipment (e.g. motors, starters) under remote automatic control: provide orange colored signs warning of automatic starting under control of BAS.

.2 Sign to read: "Caution: This equipment is under automatic remote control of BAS" or equivalent to Consultant's approval.

3 Execution

3.1 EQUIPMENT IDENTIFICATION

.1 Submit description of proposed equipment identification plates for Consultant Review.

.2 Do not manufacture Lamecoid plates prior to receiving review comments from the Consultant.

.3 In accordance with 26 05 03 Electrical Identification

3.2 IDENTIFICATION OF JUNCTION BOXES, PULL BOXES, SPLITTER TROUGHS AND OUTLET BOXES

.1 In accordance with 26 05 03 Electrical Identification

3.3 IDENTIFICATION OF SYSTEM CONTROL PANELS

.1 Provide Size 6 Lamecoid plate fastened to equipment enclosure indicating:
.1 System name.
.2 Example: “Building Automation System Control Panel”.

3.4 IDENTIFICATION OF WIRING

.1 In accordance with 26 05 03 Electrical Identification

3.5 BAS IDENTIFICATION

.1 Provide engraved Lamecoid nameplates clearly indicating the service and designation for the following devices:
  .1 Duct and pipe mounted sensors.
  .2 Control panels.
  .3 Manual switches.
  .4 Control valves.
  .5 Damper operators.

.2 Provide point I/O summary inside each control panel, specific for that control panel.

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 External trim materials to be corrosion resistant. Internal parts to be assembled in vibration-proof, assembly.

.2 Terminations: use standard conduit box with slot screwdriver compression connector block unless otherwise specified.

.3 Transmitters to be unaffected by external transmitters (e.g. walkie talkies).

.4 Account for hysteresis, relaxation time, maximum and minimum limits in applications of sensors and controls.

.5 Devices to be installed in user occupied space must not exceed Noise Criteria (NC) of 35. Noise generated by any device must not be detectable above space ambient conditions.

2.2 ETHERNET SWITCHES

.1 Conform to IEEE Standard 802.3 and UL508 Listed, Industrial Control Equipment.

.2 RoHS Compliant

.3 Data rate: 10/100Mbps using RJ-45 Connectors.

2.3 TEMPERATURE SENSORS

.1 General: except for Terminal unit box control to be resistance or thermocouple type to following requirements:

- .1 Thermocouples: to be limited to temperature range of 200° C and over. RTD's: 100 ohm at 0° C (plus or minus 0.2 ohms) platinum element with strain minimizing construction, 3 integral anchored leadwires. Coefficient of resistivity: 0.00385 ohms/ohm ° C.
- .2 Sensing element: hermetically sealed.
- .3 Stem and tip construction: copper or type 304 stainless steel. Time constant response: less than 3 seconds to temperature change of 10° C.

.2 Thermistor:
- .1 Monitoring Range.
  - .1 -40° C to 55° C where exposed to outside air.
  - .2 -5° C to 55° C elsewhere.
- .2 Factory Calibration Point 25° C with accuracy of Calibration Point +/- 0.3° C.
- .3 Stainless steel probe.

.3 Resistance Temperature Detectors (RTD's):
- .1 Monitoring Range.
  - .1 -1° C to 49° C for ducts.
  - .2 21° C to 104° C for hot water and glycol systems.
- .2 Factory Calibration Point 21° C.
- .3 Accuracy Calibration Point.
  - .1 For -7° C to 49° C type +/- 0.7° C.
  - .2 For 21° C to 104° C type +/- 1.1° C.
  - .3 Platinum or Nickel Wire Sensor.

.4 Immersion wells: NPS 3/4, stainless-steel spring-loaded construction, with heat transfer compound compatible with sensor. Insertion length 100 mm or as indicated.

.5 Outside air type: complete with probe length 100 mm (4") long, non-corroding shield to minimize solar and wind effects, threaded fitting for mating to 13 mm (1/2") conduit, weatherproof construction in EEMAC 12 enclosure

.6 Room Temperature Sensors-Type T-RM
- .1 Common Areas / Corridors: wall mounting flush mounted with stainless steel blank cover and vandal resistant screws.
  - .1 Standard of Acceptance:
    - .1 Greystone TE200 AS7 10,000 Ohm Thermistor

.7 Room Temperature Sensors-Type TRM
- .1 Room type: wall mounting Intelligent room sensor with a LCD display and 4 push buttons for user control.
  - .1 Built-in 10k½ thermistor
  - .2 Programmable 3-value, 96 segment, LCD display
  - .3 4 stylized momentary push buttons
  - .4 Service port
  - .5 8-bit processor with internal A/D, Flash, and RAM
  - .6 Device Address Set via DIP switches
- .2 Standard of Acceptance:
  - .1 Delta DNS-24 or equivalent

2.4 TEMPERATURE TRANSMITTERS

.1 Input circuit: to accept 3-lead, 100 ohm at 0° C, platinum resistance detectors type sensors.

.2 Power supply: 575 ohms at 24 V DC into load of 575 ohms. Power supply effect less than 0.01° C per volt change.

.3 Output signal: 4 - 20 mA into 500 ohm maximum load.

.4 Input and output short circuit and open circuit protection.

.5 Output variation: less than 0.2 % of full scale for supply voltage variation of plus or minus 10 %.

.6 Combined non-linearity, repeatability, hysteresis effects: not to exceed plus or minus 0.5 % of full scale output.

.7 Maximum current to 100 ohm RTD sensor: not to exceed 25 mA.

.8 Integral zero and span adjustments.

.9 Temperature effects: not to exceed plus or minus 1.0 % of full scale/ 50° C.

.10 Long term output drift: not to exceed 0.25 % of full scale/ 6 months.

.11 Transmitter ranges: Select narrowest range to suit application from following:
- .1 - 50° C to +50° C, plus or minus 0.5° C.
- .2 0 to 100° C, plus or minus 0.5° C.
- .3 0 to 5° C, plus or minus 0.25° C.
- .4 0 to 25° C, plus or minus 0.1° C.
- .5 10 to 35° C, plus or minus 0.25° C.

2.5 ELECTRICAL RELAYS

.1 Double voltage, DPDT, plug-in type with termination base

.2 Coils: rated for 120 VAC or 12 V DC. Other voltage: provide transformer

.3 Contacts: rated at 6 amps at 120 VAC

.4 Relay to have visual status indication

.5 Acceptable material: Eaton Model # XRR2D12 and plug-in base.

2.6 ANALOG CURRENT SENSORS

.1 Purpose: measure line current and produce proportional signal in one of following ranges:
- .1 4-20 mA DC
- .2 0-5 volt DC
- .3 2-10 volts DC

.2 Solid core AC current sensors.

.3 Frequency insensitive from 10 - 80 Hz.

.4 Accuracy to 0.5% full scale

.5 Zero and span adjustments. Field adjustable range to suit motor applications.

.6 Adjustable mounting bracket.

.7 Acceptable material: Greystone Model CS-450-1.

2.7 ELECTRONIC CONTROL DAMPER OPERATORS

.1 Spring return for "fail-safe" in Normally Open or Normally Closed position as indicated.

.2 Refer to Section 24 33 15 Dampers - Operating for damper size limits. Provide separate actuators per section for multiple section dampers.

.3 Operator: size so as to control dampers against maximum pressure or dynamic closing pressure (whichever is greater).

.4 Power requirements: 5 VA maximum at 24 VAC.

.5 Operating range: 0 - 20 VDC

.6 Provide adjustable external stops to limit stroke in either direction.

.7 For electric damper operators, use only 75% of the manufacturer's rated motor torque in calculating damper operator requirements.

.8 Provide multiple operators wired to operate in unison where required.

2.8 DAMPER END SWITCHES

.1 Activated by damper blade movement and mounted securely on damper frame.

.2 Rotary action steel slotted lever with plastic roller.

.3 Two electrically isolated SPST changeover micro switches. One circuit to fan interlock and other circuit to BAS system.

.4 Contact rating of 10 amperes at 120 V AC.

.5 CSA approved and bear a ULC label.

2.9 CONTROL VALVES

.1 NPS 2 and under.
- .1 Class 250.
- .2 Bronze body and trim.
- .3 Screwed ends.

.2 NPS 2 1/2 and over.
- .1 Class 125.
- .2 Cast iron body.
- .3 Bronze trim.
- .4 Flanged or roll grooved ends.

.3 Two-Way Potable Water Control Valves:
- .1 Spring return for "fail safe" in normally open position unless otherwise noted.
- .2 Line size
- .3 Lead Free
- .4 NPS ½ to NPS 3.
- .5 Acceptable Material
  - .1 Belimo B2 + LF Two way Lead Free ball valves

.4 Two-Way Radiator Control Valves:
- .1 Spring return for "fail safe" in normally open position unless otherwise noted.
- .2 Line size
- .3 NPS ½ to NPS 3.
- .4 Acceptable Material
  - .1 Belimo B2 + LF Two way ball valves

.5 Three-Way Mixing Control Globe Valve:
- .1 Spring return for "fail safe" in normally open position.
- .2 Cv rating port A to AB to equal port B to AB
- .3 Leakage: A port 0%. B port 0%
- .4 Linear characteristics.
- .5 Maximum pressure drop across any control valve shall not exceed (4 psi) unless otherwise specified.
- .6 NPS ½ to NPS 2.
  - .1 Acceptable Material
    - .1 Belimo G3 + LF/AF Three way globe valves.
- .7 NPS 2 ½ to NPS 6.
  - .1 Acceptable Material
    - .1 Belimo G7 + LF/AF Three way globe valves.

2.10 ELECTRONIC/ELECTRIC VALVE ACTUATORS

.1 Construction: steel, cast iron, aluminum.
- .1 Control voltage: 0-20V DC or 24V AC.
- .2 Positioning time: to suit application. 90 sec maximum
- .3 Spring return to normal position as indicated

.2 Size operators to ensure tight shut off when subjected to maximum system differential pressure

.3 Minimum close off rating shall be 200 kPa (30 psi).

3 Execution

3.1 GENERAL

.1 Temperature transmitters, humidity transmitters, controllers, relays: install in NEMA I enclosure or as required for specific applications. Provide for electrolytic isolation in all cases when dissimilar metals make contact.

.2 Support field-mounted transmitters, sensors on pipe stands or channel brackets.

.3 Wall mounted devices: Install on plywood panel properly attached to wall.

3.2 PUMP STATUS

.1 Pump status: determined via AI points connected to current operated sensors.

.3 Auxiliary contacts on motor starters will not be acceptable for this function.

3.3 BAS CONTROL COMPONENTS AND MOTOR STARTERS

.1 AC Current sensors
- .1 For motor control centers and for individual magnetic starters, AC Current sensors are supplied and installed by Electrical Contractor. Refer to Section 26 29 10 Motor Starters to 600 V and Section 26 24 19 Motor Control Devices. Provide necessary adapters to utilize these devices.
- .2 For thermal overload switches, AC Current sensors are supplied and installed by Section 25 30 02 BAS Field Control Devices.

.2 Relays and Relay Bases
- .1 For motor control centers and for individual magnetic starters, relays and relay bases are supplied and installed by Electrical Contractor. Refer to Section 26 29 10 Motor Starters to 600 V and Section 26 24 19 Motor Control Devices. Provide necessary adapters to utilize these devices.
- .2 For thermal overload switches, relays and relay bases are supplied and installed by Section 25 30 02 BAS Field Control Devices.

.3 The AC Current sensors, Relays and Relay Bases that are provided by Electrical Contractor are for use by the BAS. Provide necessary hardware, adapters and devices as required for the BAS to utilize this equipment. Should modifications be required to the supplied devices to facilitate interfacing with the BAS, all necessary modifications, equipment, programming, etc. shall be carried out by the BAS contractor, at no additional cost to the Owner. Further, if the BAS Contractor modifies the control components located in the starter enclosures, the services of CSA will be required to visit the site and perform a field certification of each modified starter. Include all costs for the field certification in the BAS Contract.

3.4 TEMPERATURE SENSORS

.1 Mount room temperature sensors on electrical box as per detail on the drawings.

.2 Stabilized to such a level as to permit on-the-job installations that will require minimum field adjustments or calibration.

.3 Assemblies readily accessible and adaptable to each type of application in such a manner as to allow for quick, easy replacement and servicing without special tools or skills.

.4 Install wells in the piping at elbows where piping is smaller than the length of the well to affect proper flow across the entire area of the well. Well shall not restrict flow area to less than 70 percent of line-size-pipe normal flow area.

3.5 FIELD MOUNTED TRANSMITTERS AND SENSORS

.1 Support properly on pipe stands or channel brackets.

.2 Install wall mounted devices on plywood panel attached properly to wall.

END OF SECTION

1 General

1.1 GENERAL

.1 NOTE: 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 RELATED DIVISIONS

.1 Divisions 26 Electrical

.2 Divisions 27 Communications

1.4 WIRING

.1 If departures from the contract drawings are deemed necessary, details of such departures, including changes in related portions of the project and the reasons therefore, shall be submitted to the Consultant with drawings for approval.

.2 Incorporate surge transient protection in the design of the system to protect all electrical components in all control equipment.

1.5 SYSTEM DESCRIPTION

.1 Electrical: Hard wiring between field control devices and BAS field panels.

.2 Terminal Units: Air flow probe for Terminal Units are provided by Section 24 37 13 Air Terminal. Air flow dp sensor, actuator and associated controls are provided by BAS contractor. Tubing from air probe to dp sensor as well as installation and adjustment of air flow sensors and actuators to be the responsibility of BAS contractor. Coordinate air flow adjustments with balancing trade.

2 Products

2.1 CONTROL SYSTEM WIRE AND CABLE

.1 Cable jacket:
- .1 FT6 jacket rated and bear the following labels: CSA 300 volts and FT6.
- .2 FT4 jacket rated and bear the following labels: CSA 600 volts and FT4.
- .3 Labeled with the following information, as a minimum:
  - .1 Cable type.
  - .2 FT rating.
  - .3 Temperature rating.
  - .4 CSA number.
  - .5 Rated voltage.
  - .6 Gauge and number of conductors.

.4 Application:
- .1 Control wiring to 600 volt starters to be FT4 in conduit.
- .2 All control wiring in conduit may be FT4.
- .3 All other control wiring to be FT6.
- .4 Colored as follows:

System Description	Jacket Colour
BAS	Yellow

.2 Below 50V control wiring:
- .1 Minimum No. 14 stranded.
- .2 Minimum two conductor No. 18 AWG solid copper or No. 20 AWG, stranded twisted pair for field wiring of each digital device.
- .3 Minimum No. 22 AWG solid copper for multi-conductor wiring having four or more conductors.
- .4 Minimum two conductor No. 18 AWG, solid copper, or No. 20 AWG, stranded twisted pair, shielded for field wiring of each analog input.

2.2 BAS CONTROL WIRING MATERIALS AND INSTALLATION METHODS

.1 In accordance with the following Sections:
- .1 Section 26 05 20 Wire and Box Connectors - 0 - 1000 V
- .2 Section 26 05 28 Grounding- Secondary
- .3 Section 26 05 31 Splitter, Junction, Pull Boxes and Cabinets
- .4 Section 26 05 32 Outlet Boxes, Conduit Boxes and Fittings
- .5 Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- .6 Section 27 10 05 Structured Cabling for Communications Systems

.2 Exception, where wiring is permitted to be run in free air, it shall be run as high as possible.
- .1 Refer to Section 27 05 28 Pathways for Communication System Wiring.

3 Execution

3.1 GENERAL

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

.2 In accordance with Section 27 05 28 Pathways for Communication System Wiring

.3 Install in a neat and ordered manner.

.4 Colour Coding: Refer to 25 05 03 BAS Identification and Section 26 05 03 Electrical Identification.

.5 Fully enclose or properly guard electrical wiring, terminal blocks, high voltage above 70 V contacts and mark to prevent accidental injury.

.6 Check factory connections and joints. Tighten where necessary to ensure continuity.

.7 Holes through exterior wall and roofs: flash and make weatherproof.

.8 Where equipment, ducts or pipes are insulated, install control wiring on stand-offs.

.9 Do not cover with mechanical insulation.

.10 Secure approval for damper motor locations and supports.

.11 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.

.12 Run conduits in flanged portion of structural steel, where possible.

.13 Group conduits wherever possible.

.14 Do not pass conduits through structural members except as indicated.

.15 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.

.16 Support electrical systems raceway independent of any type of suspended ceiling support rods, wires, etc. Toggle bolts shall not be used in Gypsum board construction.

.17 Do not install horizontal conduits runs in masonry walls.

.18 Do not install conduits in terrazzo or concrete toppings.

END OF SECTION

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 post award, 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 betaken 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) _____

_____

March 22, 2024

HRCE – Halifax Regional Centre for Education
33 Spectacle Lake Drive
Dartmouth, Nova Scotia B3B 1X7

Re: Hazardous Building Materials Assessment (Management)
Tantallon Senior Elementary, 3 French Village Station Road, Upper Tantallon, Nova Scotia
Pinchin File: 336128.006

HRCE – Halifax Regional Centre for Education (Client) retained Pinchin Ltd. (Pinchin) to conduct a hazardous building materials assessment of Tantallon Senior Elementary School located at 3 French Village Station Road, Upper Tantallon, Nova Scotia.

Pinchin performed the assessment between February 6 and February 8, 2024. The assessor was unaccompanied during the assessment. The assessment was complete outside of regular school hours when teachers and students were not present. The assessed area was only occupied by maintenance staff at the time of the assessment.

The objective of the assessment was to document the locations of specified hazardous building materials, evaluate their condition and develop corrective action plans as required. This assessment is only to be used for the purposes of long-term management and routine maintenance. The results of this assessment are not to be used for construction, renovation, demolition or project tendering purposes.

The **assessed area** consisted of all interior and exterior areas of the building accessible with a 6-foot step ladder, excluding the roof.

The assessment was performed to establish the type of specified hazardous building materials, locations and approximate quantities incorporated in the structure(s) and its finishes.

For the purpose of the assessment and this report, hazardous building materials are defined as follows:

- Asbestos
- Lead
- Silica
- Mercury
- Polychlorinated Biphenyls (PCBs)
- Mould and Water Damage

1.0 RECOMMENDATIONS

1.1 On-going Management and Maintenance

The following recommendations regard on-going management and maintenance work involving the ACM identified.

1.1.1 Asbestos

Inspect all accessible confirmed and presumed ACM at reasonable intervals and update the written documentation annually, as required by provincial guidelines.

Update the asbestos inventory report for all new information obtained (i.e., new materials, change of condition, abatement performed).

Remove ACM before alteration or maintenance work if ACM may be disturbed. Follow appropriate asbestos precautions for the classification of work as per applicable regulations and guidelines.

Asbestos-containing materials must be disposed of at a landfill approved to accept asbestos waste.

1.1.2 Lead

For lead-containing or lead-based paints (i.e., greater than the EACC guideline of 0.1% (1,000 mg/kg) for lead-containing paints, and 0.5% (5,000 mg/kg) for lead-based), construction disturbance may result in over-exposure to lead dust or fumes. The need for work procedures, engineering controls and personal protective equipment should be assessed on a site-specific basis to comply with Ministry of Labour, Training and Skills Development regulations, and guidelines.

For paints identified as having low levels of lead (i.e., equal to or above 0.009% (90 mg/kg) but less than or equal to the EACC guideline of 0.1% (1,000 mg/kg) for lead-containing paints special precautions are not recommended unless aggressive disturbance (grinding, blasting, torching) is planned.

Exposure from construction disturbance of paints containing lead less than 0.009% (90 mg/kg) is assumed to be insignificant.

Items painted with paints containing elevated levels of lead may be a hazardous waste. Test lead-painted materials for leachable lead and other metals prior to disposal. Metallic components coated with lead paint do not require leachate testing and can be disposed of as non-hazardous construction and demolition (C&D) waste.

Lead-containing items should be recycled when taken out of service.

1.1.3 Silica

Disturbance of silica-containing products during maintenance activities may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding, drilling or demolition of

materials containing silica should be completed only with proper respiratory protection and other worker safety precautions that comply with per applicable regulations and guidelines.

1.1.4 Mercury

Do not break lamps or separate liquid mercury from components. Recycle and reclaim mercury from fluorescent lamps when taken out of service. Mercury is classified as a hazardous waste and must be disposed of in accordance with applicable regulations.

1.2 Construction and Demolition

This assessment report does not provide sufficient detail to support renovation and demolition work. Therefore, perform a detailed intrusive assessment before building renovation or demolition operations. The assessment should include destructive testing (e.g., coring, removal of building finishes and components), and sampling of any other materials not tested (e.g., roofing materials, caulking, mastics).

2.0 BACKGROUND INFORMATION

2.1 Assessed Area Description Summary

Description Item	Details
Building Use	School
Floors Above Grade	2
Floors Below Grade	0
Total Area (square feet)	50,464
Year of Construction	1972
Structure	Structural steel, poured concrete
Exterior Cladding	Brick, metal cladding, Transite panels
HVAC	Boiler with radiators, mechanical room air handling units
Roof	(Unknown) Not assessed
Flooring	Vinyl floor tiles, terrazzo
Wall and Ceiling Finishes	Drywall, masonry, exposed structure, lay-in ceiling tiles

2.2 Existing Reports

2.2.1 Review of Previous Reports

A report provided by HRCE pre-dated 2000 and was not utilized, based on regulatory changes which have significantly changed since the report publications, and the likelihood that site conditions, including renovations, have resulted in significant changes for the reported information.

3.0 FINDINGS

Any quantities listed in this report or data tables are estimated based on visual approximations only and are subject to variation.

3.1 Asbestos

The following table summarizes the materials evaluated for asbestos in the assessed area. For details on approximate quantities, condition, friability, accessibility, and locations of hazardous building materials; refer to the Hazardous Material Summary / Sample Log and Confirmed and Presumed Report in Appendices V and VI.

Any quantities listed in this report or data tables are estimated based on visual approximations only and are subject to variation.

Sample Number	Material Description	Type of Asbestos	Confirmed Hazard	Total Quantity Present	Material Specific Notes
S0001 ABC	Piping | Heating Water Supply | Parging Cement	Chrysotile	Yes	15 EA	
S0002 ABC	Piping | Domestic Water (Hot and Cold) | Parging Cement	Chrysotile	Yes	71 EA	
S0003 ABC	Duct | Boiler Exhaust | Parging Cement	Chrysotile	Yes	50 SF	
S0004 ABC	Piping | Heating Water Return | Parging Cement	Chrysotile	Yes	5 EA	
S0005 ABC	Wall | Paint | White	None Detected	No	6,050 SF	
S0006 ABC	Wall | Expansion Joint | Caulking	None Detected	No	150 LF	
S0007 ABCDEFG	Ceiling, Wall | Drywall and joint compound	Chrysotile	Yes	20,682 SF	
S0008 ABC	Floor | Vinyl Floor Tile and Mastic | 12" brown and beige streaked	Chrysotile	Yes	6,400 SF	1
S0009 ABC	Floor | Vinyl Floor Tile and Mastic | 12" cream with beige flecks	Chrysotile	Yes	7,416 SF	2
S0010 ABC	Other | Window Caulking | Grey	Chrysotile	Yes	761 LF	
S0011 ABC	Floor | Vinyl Floor Tile and Mastic | 12" grey with white and beige flecks	None Detected	No	65 SF	

Sample Number	Material Description	Type of Asbestos	Confirmed Hazard	Total Quantity Present	Material Specific Notes
S0012 ABC	Floor | Vinyl Floor Tile and Mastic |12" white with grey flecks	Chrysotile	Yes	3,728 SF	1
S0013 ABC	Floor | Vinyl Floor Tile and Mastic |12" beige with brown flecks	Chrysotile	Yes	4,263 SF	2
S0014 ABC	Wall | Firestopping (mastic) | Red	None Detected	No	2 SF	
S0015 ABC	Floor | Vinyl Floor Tile and Mastic | 12" teal with flecks	None Detected	No	676 SF	
S0016 ABC	Floor | Vinyl Floor Tile and Mastic | 12" light brown with flecks	None Detected	No	670 SF	
S0017 ABC	Floor | Vinyl Floor Tile and Mastic | 12" brown and light brown flecks	None Detected	No	2,709 SF	
S0018	Other | Sink Mastic, Gold	Chrysotile	Yes	2 EA	
S0019 ABC	Floor | Vinyl Floor Tile and Mastic | 12" light grey with flecks	None Detected	No	852 SF	
S0020 ABC	Floor | Vinyl Floor Tile and Mastic | 12" brown with white streaks	None Detected	No	183 SF	
S0021 ABC	Other | Door Caulking | Grey	Chrysotile	Yes	32 LF	
S0022 ABC	Floor | Vinyl Floor Tile and Mastic | 12" aqua green with flecks	None Detected	No	48 SF	
S0023 ABC	Floor | Vinyl Floor Tile and Mastic | 12" yellow with flecks	Chrysotile	Yes	1,895 SF	2
S0024 ABC	Floor | Vinyl Floor Tile and Mastic | 12" light brown with brown streaks	Chrysotile	Yes	3,354 SF	1
S0025 ABC	Floor | Vinyl Floor Tile and Mastic | 12" green with light green streaks	Chrysotile	Yes	1,343 SF	3
S0026 ABC	Floor | Vinyl Floor Tile and Mastic | 12" white with tan flecks	None Detected	No	1,150 SF	

Sample Number	Material Description	Type of Asbestos	Confirmed Hazard	Total Quantity Present	Material Specific Notes
S0027	Other | Sink Mastic, White	None Detected	No	2 EA	
S0028 ABC	Floor | Vinyl Floor Tile and Mastic | Grey with flecks	None Detected	No	1,440 SF	
S0029 ABC	Floor | Vinyl Floor Tile and Mastic | 12" light blue with blue flecks	None Detected	No	420 SF	
S0030 ABC	Other | Door Caulking | Grey	Chrysotile	Yes	420 LF	
S0031 ABC	Wall | Cement Product | Transite	Chrysotile	Yes	100 SF	
V9000	Floor | Vinyl Floor Tile and Mastic | 12" blue with flecks	Confirmed Asbestos	Yes	432 SF	4
V9500	Ceiling | Ceiling Tiles (lay-in) | 24”x24” pinhole	Presumed Asbestos	Yes	600 SF	5
V9500	Floor | Terrazzo	Presumed Asbestos	Yes	3,347 SF	
V9500	Piping | Drain | Parging Cement	Presumed Asbestos	Yes	12 LF	5
V0000	Ceiling | Ceiling Tiles (lay-in) |	Non-Asbestos	No		
V0000	Floor | Vinyl Floor Tile and Mastic	Non-Asbestos	No		
V0000	Other | Caulking | Silicone	Non-Asbestos	No		

Material Specific Notes:

1. Vinyl floor tile and mastic both determined to be asbestos-containing.
2. Mastic is asbestos-containing, and vinyl floor tiles are non-asbestos; however, due to the contamination of the vinyl tiles from the mastic, the tiles would be considered asbestos-containing for removal purposes.
3. Vinyl floor tile determined to be asbestos-containing. Mastic was not present in samples collected. Mastic is presumed asbestos-containing.
4. Accent vinyl floor tiles were not sampled. Considered asbestos-containing based on homogenous installation with main floor.
5. Unable to sample due to height.

General Notes:

Materials identified as Sample Number V9500 were either observed to be present or based on the construction of the building/equipment are likely present in concealed locations. These materials have not been sampled and are presumed to contain asbestos based on historical known use of asbestos. Sampling of these materials may be completed prior to disturbance.

Materials identified as Sample Number V9000 were observed to be present and were determined to contain asbestos based on previous analytical results, or labelling (e.g., Transite clearly labelled by the manufacturer).

Materials identified as Sample Number V0000 were determined to be non-asbestos based on the manufacture date and known end of use of asbestos in these products.

3.1.1 Excluded Asbestos Materials

The following is a list of materials which may contain asbestos and were excluded from the assessment. These materials are presumed to contain asbestos until otherwise proven to be non-asbestos by sampling and analysis:

- Roofing felts and tar, mastics
- Floor levelling compound
- Electrical components
- Refractory materials and insulations in boilers
- Insulation under metal clad boilers and vessels
- Mechanical packing, ropes, and gaskets
- Vermiculite
- Soffit and fascia boards
- Fire resistant doors
- Ropes and gaskets in cast-iron bell and spigot joints
- Sealants on pipe threads

3.2 Lead

Refer to the Hazardous Material Summary / Sample Log and Confirmed and Presumed Report in Appendices V and VI for details on locations, condition and approximate quantities on paints sampled and their locations.

Sample Number	Material Description	Concentration	Confirmed Hazard	Total Quantity Present	Notes
L0001	Wall | Masonry | White	2,600 mg/kg	Yes	6,050 SF	
L0002	Wall | Drywall and joint compound | White	<81 mg/kg	No	4,860 SF	
L0003	Wall | Drywall and joint compound | Purple	<80 mg/kg	No	5,830 SF	
L0004	Wall | Masonry | Off-white	170 mg/kg	Yes	120,730 SF	
L0005	Ceiling | Drywall and joint compound | White	<81 mg/kg	No	3,899 SF	
L0006	Floor | Wood | Grey	<80 mg/kg	No	1,066 SF	
L0007	Other | Wood | Door | Red	2,100 mg/kg	Yes	85 EA	
L0008	Floor | Concrete (poured) | Green	14,000 mg/kg	Yes	700 SF	

General Notes:

Results above 0.1% (1,000 mg/kg) are considered lead-containing, and over 0.5% (5,000 mg/kg) are considered lead-based.

Results less than or equal to 0.1% (1,000 mg/kg), but equal to or greater than 0.009% (90 mg/kg), are considered low-level lead paints or surface coatings in accordance with the EACC guideline.

Paints containing lead less than 0.009% (90 mg/kg) is assumed to be insignificant.

3.2.1 Lead Products and Applications

Refer to the Hazardous Material Summary / Sample Log and Confirmed and Presumed Report for details on lead-products including their locations and quantities.

Sample Number	Material Description	Confirmed Hazard	Total Quantity Present	Notes
V9000	Bell And Spigot Fittings	Yes	8 EA	
V9500	Batteries In Emer. Lights	Yes	37 EA	

General Notes:

Items identified as Sample Number V9500 were observed to be present but could not be definitively determined to contain lead (e.g., inaccessible batteries).

Items identified as Sample Number V9000 were observed to be present and were determined to contain lead based on visual observation (e.g., bell and spigot joints, lead shielding and flashing).

3.2.2 Excluded Lead Materials

Lead may be present in a number of materials which were not assessed and/or sampled. The following materials, where found, should be considered to contain lead.

- Electrical components, including wiring connectors, grounding conductors, and solder
- Solder on pipe connections

3.3 Silica

Crystalline silica is a presumed component of the following materials:

- Concrete
- Masonry and mortar
- Refractory or ceramic materials
- Terrazzo

3.4 Mercury

Refer to the Hazardous Material Summary / Sample Log and Confirmed and Presumed Report in Appendices V and VI for details on mercury-containing products including their locations and quantities.

Sample Number	Material Description	Confirmed Hazard	Total Quantity Present	Notes
V9000	Light Fixture	Yes	46 EA	
V9500	Boiler Control	Yes	1 EA	
V9500	Light Fixture	Yes	856 EA	
V0000	Thermostat	No		

General Notes:

Items identified as Sample Number V9500 were observed to be present but could not be definitively determined to contain mercury (e.g., inaccessible lamps and thermostats).

Items identified as Sample Number V9000 were observed to be present and were determined to contain mercury based on visual observation (e.g., labelled lamps and ampules in thermostats).

Items identified as Sample Number V0000 are items that historically may have contained mercury; however, have been visually identified as non-mercury types (e.g., LED lamps, digital or electric thermostats).

3.5 Polychlorinated Biphenyls

Refer to the Hazardous Material Summary / Sample Log and Confirmed and Presumed Report in Appendices V and VI for details on PCB-products including their locations and quantities.

Sample Number	Material Description	Concentration	Confirmed Hazard	Total Quantity Present	Material Specific Notes
P0001	Caulking | Expansion Joint | Grey	<0.5 mg/kg	No	182 LF	
V0000	Light Ballasts		No		T8 fixtures

General Notes:

Materials identified as Sample Number V0000 were determined to be non-PCB based on previous analytical results, the manufacture date and regulated restrictions of PCBs. It can also include items that historically may have contained PCBs; however, have been visually identified as non-PCB types (e.g., LED light fixtures).

3.5.1 Excluded PCB Materials

PCBs are known to be present in several materials and equipment which were not assessed or sampled. The following materials, where found, should be presumed to contain PCBs until sampling proves otherwise.

- Capacitors within or associated with electrical equipment
- Caulking and sealants (except where sampled)
- Paints

4.0 METHODOLOGY

Pinchin conducted a room-by-room assessment (rooms, corridors, service areas, exterior, etc.) to identify the hazardous building materials as defined in the scope.

The assessment was limited to non-intrusive testing. Concealed spaces such as those above solid ceilings and within shafts and pipe chases were accessed via existing access panels only. Destructive testing of flooring was not conducted (under carpets or multiple layers of flooring). Demolition of walls, solid ceilings, structural items, interior finishes or exterior building finishes, to determine the presence of concealed materials was not conducted. Sampling of roofing materials was not conducted.

For further details on the methodology including test methods and evaluation criteria, refer to Appendix III.

5.0 REFERENCES

The following legislation and documents were referenced in completing the assessment and this report:

1. Nova Scotia Occupational Safety General Regulation (N.S. Reg. 53/2013).
2. A Guide to Removal of Friable Asbestos-Containing Material.
3. A Guide to Assessment and Management of Asbestos in the Workplace.
4. Asbestos Waste Management Regulations, N.S. Reg. 53/95.
5. Lead in the Workplace: A Guide to Working with Lead, revised January 18, 2019.
6. The Environmental Abatement Council of Canada (EACC) Lead Guideline for Construction, Renovation, Maintenance or Repair.
7. Guidelines for Disposal of Contaminated Solids in Landfills.
8. Nova Scotia Environment Act, 1994-95.
9. Mercury Diversion Standard, N.S. Reg. 161/2018.
10. PCB Management Regulations, N.S. Reg. 163/97.
11. PCB Regulations, SOR/2008-273, Canadian Environmental Protection Act.
12. Surface Coating Materials Regulations, SOR/2016-193, Canada Consumer Product Safety Act.
13. Consolidated Transportation of Dangerous Goods Regulations, including Amendment SOR/2019-101, Transportation of Dangerous Goods Act.
14. Mould Guidelines for the Canadian Construction Industry, Standard Construction Document CCA 82 – 2004 (Revised 2018), Canadian Construction Association.

6.0 LIMITATIONS

This work was performed subject to the Terms and Limitations presented or referenced in the proposal for this project.

Information provided by Pinchin is intended for Client use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.

7.0 CLOSURE

Contact the undersigned should you have any questions.

Sincerely,

Pinchin Ltd.

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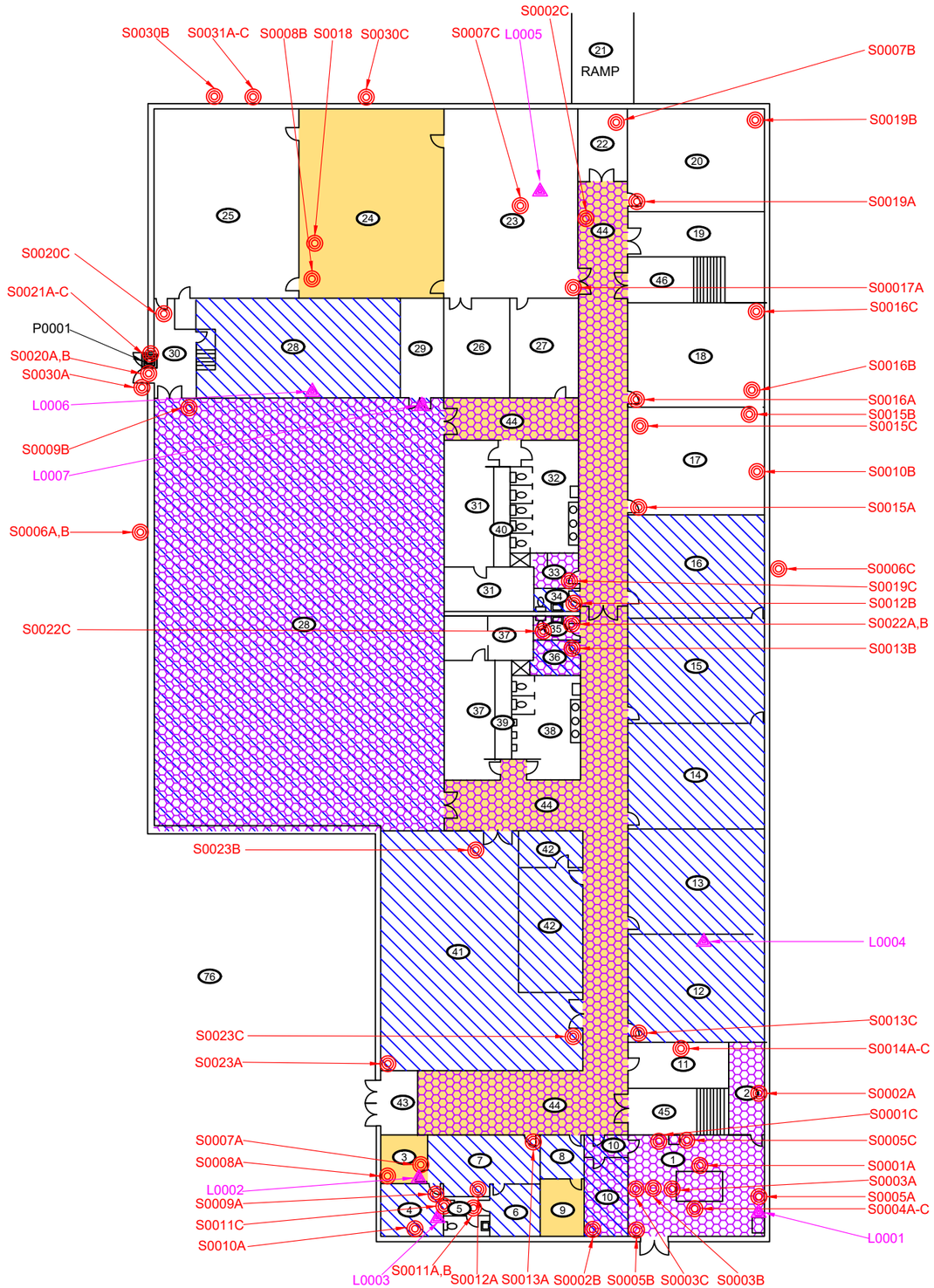
APPENDIX I	Drawings
APPENDIX II-A	Asbestos Analytical Certificates
APPENDIX II-B	Lead Analytical Certificates
APPENDIX II-C	PCB Analytical Certificates
APPENDIX III	Methodology
APPENDIX IV	Location Summary Report
APPENDIX V	Hazardous Materials Summary Report / Sample Log
APPENDIX VI	Confirmed and Presumed Report
APPENDIX VII	Photographs

APPENDIX I
Drawings



N

LEGEND

- PINCHIN LOCATION NUMBER
- ASBESTOS BULK SAMPLE
- LEAD BULK SAMPLE
- PCB BULK SAMPLE

ASBESTOS-CONTAINING MATERIALS:

- THERMAL SYSTEM INSULATION
- FLOOR MASTIC
- VINYL FLOOR TILE AND MASTIC

FOR CLARITY, THE FOLLOWING ASBESTOS-CONTAINING MATERIALS, ARE PRESENT IN THE ASSESSED AREA, BUT HAVE NOT BEEN HATCHED ON THE DRAWING:

- DRYWALL JOINT COMPOUND
- SINK MASTIC
- CAULKING
- TRANSITE PANELS

NOT ALL KNOWN OR SUSPECTED HAZARDOUS BUILDING MATERIALS MAY BE DEPICTED ON THE DRAWING. REFER TO THE HAZARDOUS BUILDING MATERIALS ASSESSMENT REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

PINCHIN

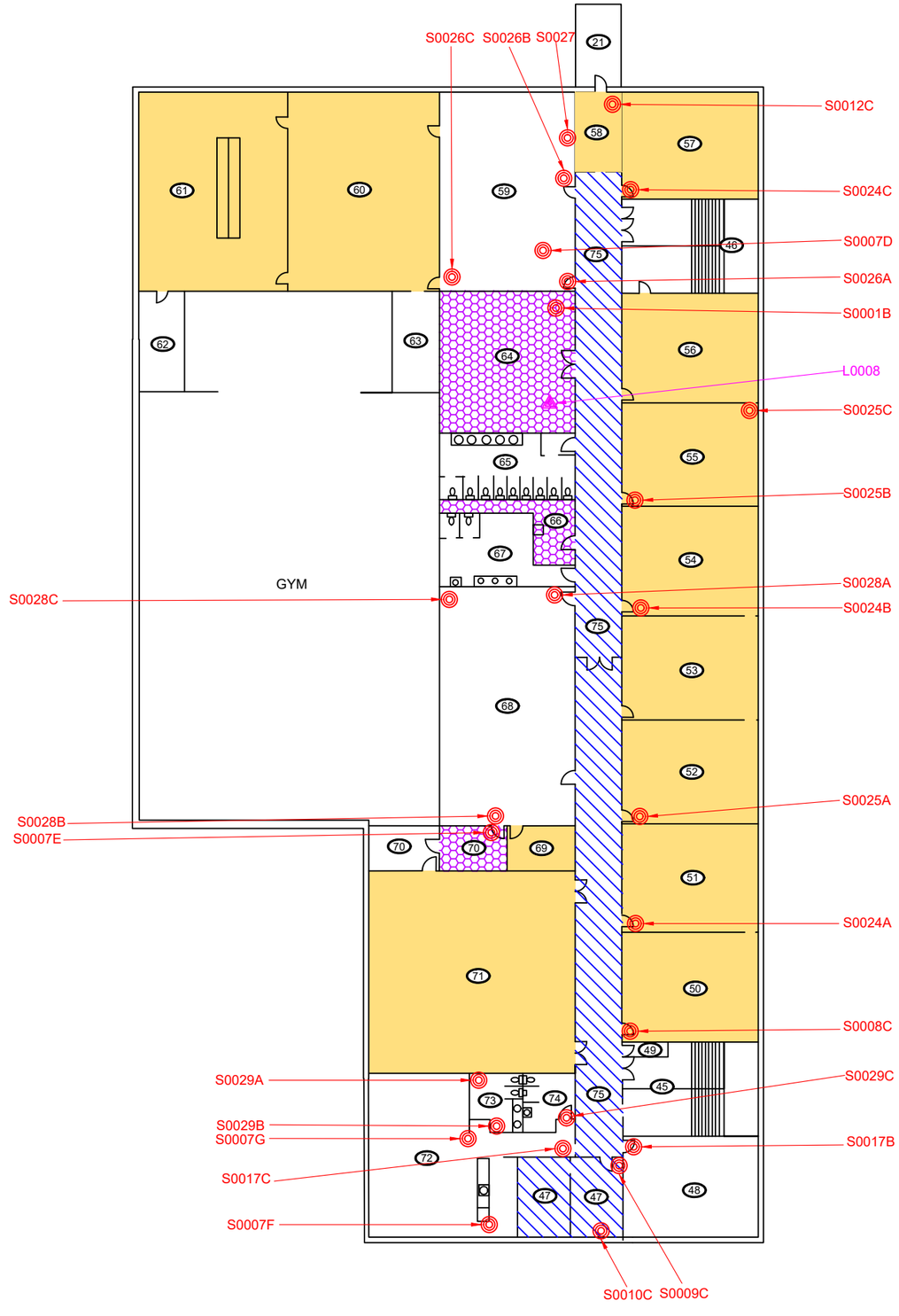
PROJECT NAME:
HAZARDOUS BUILDING MATERIALS ASSESSMENT

CLIENT NAME:
HALIFAX REGIONAL CENTRE FOR EDUCATION

PROJECT LOCATION:
TANTALLON SENIOR ELEMENTARY
3 FRENCH VILLAGE STATION ROAD,
UPPER TANTALLON, NOVA SCOTIA

FIGURE NAME:
GROUND FLOOR PLAN

PROJECT NUMBER:	SCALE:
336128.006	NOT TO SCALE
DRAWN BY: NJ	REVIEWED BY: AP
DATE: MARCH 2024	FIGURE NUMBER: 1 OF 2



N

LEGEND

- (X) PINCHIN LOCATION NUMBER
- ASBESTOS BULK SAMPLE
- LEAD BULK SAMPLE

ASBESTOS-CONTAINING MATERIALS:

- THERMAL SYSTEM INSULATION
- FLOOR MASTIC
- VINYL FLOOR TILE AND MASTIC

FOR CLARITY, THE FOLLOWING ASBESTOS-CONTAINING MATERIALS, ARE PRESENT IN THE ASSESSED AREA, BUT HAVE NOT BEEN HATCHED ON THE DRAWING:

-
- DRYWALL JOINT COMPOUND
- SINK MASTIC
- CAULKING
- TRANSITE PANELS

NOT ALL KNOWN OR SUSPECTED HAZARDOUS BUILDING MATERIALS MAY BE DEPICTED ON THE DRAWING. REFER TO THE HAZARDOUS BUILDING MATERIALS ASSESSMENT REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

PINCHIN

PROJECT NAME:
HAZARDOUS BUILDING MATERIALS ASSESSMENT

CLIENT NAME:
HALIFAX REGIONAL CENTRE FOR EDUCATION

PROJECT LOCATION:
TANTALLON SENIOR ELEMENTARY
3 FRENCH VILLAGE STATION ROAD,
UPPER TANTALLON, NOVA SCOTIA

FIGURE NAME:
SECOND FLOOR PLAN

PROJECT NUMBER:	SCALE:
336128.006	NOT TO SCALE
DRAWN BY: NJ	REVIEWED BY: AP
DATE: MARCH 2024	FIGURE NUMBER: 2 OF 2

APPENDIX II-A
Asbestos Analytical Certificates

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name:	**HRCE, TSE, NS**		
Project No.:	**0336128.006**		
Prepared For:	**A. Penney / A. Thebeau**		
Lab Reference No.:	**b308416 Revision 1**		
Analyst(s):	**R. Janssen**		
Date Received:	**February 12, 2024**	**Samples Submitted:**	**46**
Date Analyzed:	**February 16, 2024**	**Phases Analyzed:**	**43**

The Pinchin Ltd. Dartmouth asbestos laboratory is accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 201032-0) for the 'EPA – 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples,' and the 'EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials'; and meets all requirements of ISO/IEC 17025:2017. The Pinchin asbestos laboratory uses the aforementioned methods of analysis.

Bulk samples are checked visually and scanned under a stereomicroscope. Slides are prepared and observed under a Polarized Light Microscope (PLM) at magnifications of 40X, 100X or 400X as appropriate. Asbestos fibres are identified by a combination of morphology, colour, refractive index, extinction, sign of elongation, birefringence and dispersion staining colours. A visual estimate is made of the percentage of asbestos present. A reported concentration of less than (<) the regulatory threshold indicates the presence of confirmed asbestos in trace quantities, limited to only a few fibres or fibre bundles in an entire sample. This method complies with provincial regulatory requirements where applicable. Multiple phases within a sample are analyzed and reported separately.

All bulk samples submitted to this laboratory for asbestos analysis are retained for a minimum of three months. Samples may be retrieved, upon request, for re-examination at any time during that period.

This report relates only to the items tested.

Revision History:

Revision 1 (2024-03-19)	Changed sample description (S0002A-B, S0003A-C, S0007E-F).

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308416 Revision 1
Date Analyzed: February 16, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0001A Piping, Heating Water Supply, Parging Cement, Loc:1, Boiler Room	Homogeneous, light grey, soft, parging cement.	Chrysotile 50-75%	Non-Fibrous Material 25-50%
Comments:	Cotton fabric reinforcement is present on the surface of this sample.		
S0001B Piping, Heating Water Supply, Parging Cement, Loc:64, Mechanical Room			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0001C Piping, Heating Water Supply, Parging Cement, Loc:1, Boiler Room			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0002A Piping, Domestic Water (hot And Cold), Parging Cement, Loc:2, Boiler Room	Homogeneous, grey, soft, parging cement.	Chrysotile 50-75%	Non-Fibrous Material 25-50%
Comments:	Cotton fabric reinforcement is present on the surface of this sample.		
S0002B Piping, Domestic Water (Hot and Cold), Parging Cement, Loc:10, Caretaker Office			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0002C Piping, Domestic Water (hot And Cold), Parging Cement, Loc:44, First Floor Corridor			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308416 Revision 1
Date Analyzed: February 16, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0003A Duct, Boiler, Exhaust, Parging Cement, Loc:1, Boiler Room	2 Phases: a) Homogeneous, white, chalky material with fibres. b) Homogeneous, light grey, soft, parging cement.	Chrysotile 25-50% Chrysotile 50-75%	Non-Fibrous Material 50-75% Non-Fibrous Material 25-50%
Comments:	Cotton fabric reinforcement is present on the surface of this sample.		
S0003B Duct, Boiler, Exhaust, Parging Cement, Loc:1, Boiler Room			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0003C Duct, Boiler, Exhaust, Parging Cement, Loc:1, Boiler Room			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0004A Piping, Heating Water Return, Parging Cement, Loc:1, Boiler Room	Homogeneous, light grey, soft, parging cement.	Chrysotile 50-75%	Non-Fibrous Material 25-50%
S0004B Piping, Heating Water Return, Parging Cement, Loc:1, Boiler Room			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0004C Piping, Heating Water Return, Parging Cement, Loc:1, Boiler Room			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0005A Wall, All, Paint, White, Loc:1, Boiler Room	Non-homogeneous, multicoloured, coating material.	None Detected	Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308416 Revision 1
Date Analyzed: February 16, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0005B Wall, All, Paint, White, Loc:1, Boiler Room	Non-homogeneous, multicoloured, coating material.	None Detected	Non-Fibrous Material > 75%
S0005C Wall, All, Paint, White, Loc:1, Boiler Room	Non-homogeneous, multicoloured, coating material.	None Detected	Non-Fibrous Material > 75%
S0006A Wall, Expansion Joint, Caulking, Brown, Loc:76, Exterior	Homogeneous, dark brown, caulking material.	None Detected	Non-Fibrous Material > 75%
S0006B Wall, Expansion Joint, Caulking, Brown, Loc:76, Exterior	Homogeneous, dark brown, caulking material.	None Detected	Non-Fibrous Material > 75%
S0006C Wall, Expansion Joint, Caulking, Brown, Loc:76, Exterior	Homogeneous, dark brown, caulking material.	None Detected	Non-Fibrous Material > 75%
S0007A Wall, Interior, Drywall And Joint Compound, Loc:3, Copier Room	Homogeneous, off-white, drywall joint compound.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%
S0007B Wall, Exterior, Drywall And Joint Compound, Loc:22, Back Vestibule	Homogeneous, pale beige, drywall joint compound.	None Detected	Non-Fibrous Material > 75%
S0007C Ceiling, All, Drywall And Joint Compound, Loc:23, Classroom	Homogeneous, white, drywall joint compound.	None Detected	Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308416 Revision 1
Date Analyzed: February 16, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0007D Wall, Interior, Drywall And Joint Compound, Loc:59, Classroom	Homogeneous, pale beige, drywall joint compound.	None Detected	Non-Fibrous Material > 75%
S0007E Wall, Interior, Drywall And Joint Compound, Loc:70, Storage And Server Room	Homogeneous, off-white, drywall joint compound.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%
S0007F Wall, Interior, Drywall And Joint Compound, Loc:72, Staff Room	Homogeneous, off-white, drywall joint compound.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%
S0007G Wall, Interior, Drywall And Joint Compound, Loc:72, Staff Room	Homogeneous, off-white, drywall joint compound.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%
S0008A Floor, All, Vinyl Floor Tile And Mastic, 12" Brown And Beige Streaked, Loc:3, Copier Room	2 Phases: a) Homogeneous, brown, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	Chrysotile 0.5-5% Chrysotile 0.5-5%	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
S0008B Floor, All, Vinyl Floor Tile And Mastic, 12" Brown And Beige Streaked, Loc:24, Classroom			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308416 Revision 1
Date Analyzed: February 16, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0008C Floor, All, Vinyl Floor Tile And Mastic, 12" Brown And Beige Streaked, Loc:50, Classroom			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0009A Floor, All, Vinyl Floor Tile And Mastic, 12" Cream With Beige Flecks, Loc:4, Principal Office	2 Phases: a) Homogeneous, pale beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	Chrysotile 0.5-5%	Tar and other Non-Fibrous Material > 75%
S0009B Floor, All, Vinyl Floor Tile And Mastic, 12" Cream With Beige Flecks, Loc:28, Gym And Stage	2 Phases: a) Homogeneous, pale beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.		Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
S0009C Floor, All, Vinyl Floor Tile And Mastic, 12" Cream With Beige Flecks, Loc:47, Office	2 Phases: a) Homogeneous, pale beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.		Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
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Lab Reference No.: b308416 Revision 1
Date Analyzed: February 16, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0010A Window, Caulking, Grey, Loc:4, Principal Office	Homogeneous, grey, soft, caulking material.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%
S0010B Window, Caulking, Loc:17, Classroom			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0010C Window, Caulking, Loc:47, Office			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0011A Floor, All, Vinyl Floor Tile And Mastic, 12" Grey With White And Beige Flecks, Loc:5, Washroom And Hallway	2 Phases: a) Homogeneous, light grey, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
Comments:	Another phase is present but there was insufficient material submitted to analyze.		
S0011B Floor, All, Vinyl Floor Tile And Mastic, 12" Grey With White And Beige Flecks, Loc:5, Washroom And Hallway	2 Phases: a) Homogeneous, light grey, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
Comments:	Another phase is present but there was insufficient material submitted to analyze.		

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
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BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0011C Floor, All, Vinyl Floor Tile And Mastic, 12" Grey With White And Beige Flecks, Loc:5, Washroom And Hallway	2 Phases: a) Homogeneous, light grey, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
S0012A Floor, All, Vinyl Floor Tile And Mastic, 12" White With Grey Flecks, Loc:7, Administration Office	2 Phases: a) Homogeneous, light grey, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
S0012B Floor, All, Vinyl Floor Tile And Mastic, 12" White With Grey Flecks, Loc:34, Staff Washroom	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected Chrysotile 0.5-5%	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
Comments:	Another phase is present but there was insufficient material submitted to analyze.		
S0012C Floor, All, Vinyl Floor Tile And Mastic, 12" White With Grey Flecks, Loc:58, Storage Area	2 Phases: a) Homogeneous, off-white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	Chrysotile 0.5-5%	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308416 Revision 1
Date Analyzed: February 16, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0013A Floor, All, Vinyl Floor Tile And Mastic, 12" Beige With Brown Flecks, Loc:7, Administration Office	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected Chrysotile 0.5-5%	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
Comments:	Another phase is present but there was insufficient material submitted to analyze.		
S0013B Floor, All, Vinyl Floor Tile And Mastic, 12" Beige With Brown Flecks, Loc:36, Storage Room	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
S0013C Floor, All, Vinyl Floor Tile And Mastic, 12" Beige With Brown Flecks, Loc:12, Classroom	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
S0014A Wall, Fire Stop, Firestopping (mastic), Red, Loc:11, Electrical Room	Homogeneous, red, caulking material.	None Detected	Man-Made Vitreous Fibres 5-10% Non-Fibrous Material > 75%
S0014B Wall, Fire Stop, Firestopping (mastic), Red, Loc:11, Electrical Room	Homogeneous, red, caulking material.	None Detected	Man-Made Vitreous Fibres 5-10% Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: **HRCE, TSE, NS**
Project No.: **0336128.006**
Prepared For: **A. Penney / A. Thebeau**

Lab Reference No.: **b308416 Revision 1**
Date Analyzed: **February 16, 2024**

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0014C Wall, Fire Stop, Firestopping (mastic), Red, Loc:11, Electrical Room	Homogeneous, red, caulking material.	None Detected	Man-Made Vitreous Fibres 5-10% Non-Fibrous Material > 75%

Reviewed by:

Jason Stapleton
2024.03.19 10:47:07-03'00'

Reporting Analyst:

Pinchin Ltd.
2024.03.19 10:46:34-03'00'
Reid Janssen

Analyzed By: RJ

Reviewed By: JS

Report Sent By: _____

Pinchin Ltd. - Asbestos Laboratory
Internal Asbestos Bulk Sample Chain of Custody

Client Name:	HRCE			**Project Address:**	NS		
Portfolio/Building No:	TSE			**Pinchin File:**	336128.006		
Submitted by:	A Penney			**Email:**	apenney@pinchin.com		
CC Results to:	A Thebeau			**CC Email:**	athebeau@pinchin.com		
Date Submitted:	February	12	2024	**Required by:**	Month	Day	2024
# of Samples:	46			**Priority:**	5 Day Turnaround		
Year of Building Construction (*Mandatory, Years ONLY*):	1972						
Do NOT Stop on Positive (Sample Numbers):	S0007						
Pinchin Group Company (*Mandatory Field*):	Pinchin						
HMIS2 Building Reference #:	130036/2024168013702						
To be Completed by Lab Personnel Only:							
Lab Reference #:	b308416			**Time:**	24 hour clock		
Received by:	Reid Janssen			**Date:**	February	12	2024
Name(s) of Analyst(s):	R. Janssen						

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0001	A	Piping,Heating Water Supply,Parging Cement,Loc:1,Boiler Room CHSO-7S
S	0001	B	Piping,Heating Water Supply,Parging Cement,Loc:64,Mechanical Room (NA)
S	0001	C	Piping,Heating Water Supply,Parging Cement,Loc:1,Boiler Room (NA)
S	0002	A	Piping,Domestic Water (hot And Cold),Parging Cement,Loc:1,Boiler Room CHSO-7S
S	0002	B	Piping,Chilled Water Supply,Parging Cement,Loc:10,Caretaker Office (NA)
S	0002	C	Piping,Domestic Water (hot And Cold),Parging Cement,Loc:44,First Floor Corridor (NA)
S	0003	A	Duct,Boiler Feed Water,Parging Cement,Loc:1,Boiler Room a)CH2S-SO b)CHSO-7S

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Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0003	B	Duct,Boiler Feed Water,Parging Cement,Loc:1,Boiler Room (NA)
S	0003	C	Duct,Boiler Feed Water,Parging Cement,Loc:1,Boiler Room (NA)
S	0004	A	Piping,Heating Water Return,Parging Cement,Loc:1,Boiler Room CH 50-75
S	0004	B	Piping,Heating Water Return,Parging Cement,Loc:1,Boiler Room (NA)
S	0004	C	Piping,Heating Water Return,Parging Cement,Loc:1,Boiler Room (NA)
S	0005	A	Wall,All,Paint,White,Loc:1,Boiler Room ND
S	0005	B	Wall,All,Paint,White,Loc:1,Boiler Room ND
S	0005	C	Wall,All,Paint,White,Loc:1,Boiler Room ND
S	0006	A	Wall,Expansion Joint,Caulking,Brown,Loc:76,Exterior ND
S	0006	B	Wall,Expansion Joint,Caulking,Brown,Loc:76,Exterior ND
S	0006	C	Wall,Expansion Joint,Caulking,Brown,Loc:76,Exterior ND
S	0007	A	Wall,Interior,Drywall And Joint Compound,Loc:3,Copier Room CH0.5-5
S	0007	B	Wall,Exterior,Drywall And Joint Compound,Loc:22,Back Vestibule ND
S	0007	C	Ceiling,All,Drywall And Joint Compound,Loc:23,Classroom ND
S	0007	D	Wall,Interior,Drywall And Joint Compound,Loc:59,Classroom ND

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0007	E	Wall,Interior,Drywall And Joint Compound,Loc:70,Storage And Server Room CHO.S-S
S	0007	F	Wall,Interior,Drywall And Joint Compound,Loc:72,Staff Room CHO.S-S
S	0007	G	Wall,Interior,Drywall And Joint Compound,Loc:72,Staff Room CHO.S-S
S	0008	A	Floor,All,Vinyl Floor Tile And Mastic,12" Brown And Beige Streaked,Loc:3,Copier Room a)CHO.S-S b)CHO.S-S
S	0008	B	Floor,All,Vinyl Floor Tile And Mastic,12" Brown And Beige Streaked,Loc:24,Classroom (NA)
S	0008	C	Floor,All,Vinyl Floor Tile And Mastic,12" Brown And Beige Streaked,Loc:50,Classroom (NA)
S	0009	A	Floor,All,Vinyl Floor Tile And Mastic,12" Cream With Beige Flecks,Loc:4,Principal Office a)ND b)CHO.S-S
S	0009	B	Floor,All,Vinyl Floor Tile And Mastic,12" Cream With Beige Flecks,Loc:28,Gym And Stage a)ND b)(NA)
S	0009	C	Floor,All,Vinyl Floor Tile And Mastic,12" Cream With Beige Flecks,Loc:47,Office a)ND b)(NA)
S	0010	A	Window,Caulking,Grey,Loc:4,Principal Office CHO.S-S
S	0010	B	Window,Caulking,Loc:17,Classroom (NA)
S	0010	C	Window,Caulking,Loc:47,Office (NA)
S	0011	A	Floor,All,Vinyl Floor Tile And Mastic,12" Grey With White And Beige Flecks,Loc:5,Washroom And Hallway a)ND b)ND
S	0011	B	Floor,All,Vinyl Floor Tile And Mastic,12" Grey With White And Beige Flecks,Loc:5,Washroom And Hallway a)ND b)ND
S	0011	C	Floor,All,Vinyl Floor Tile And Mastic,12" Grey With White And Beige Flecks,Loc:5,Washroom And Hallway a)ND b)ND

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Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0012	A	Floor,All,Vinyl Floor Tile And Mastic,12" White With Grey Flecks,Loc:7,Administration Office a)ND b)ND
S	0012	B	Floor,All,Vinyl Floor Tile And Mastic,12" White With Grey Flecks,Loc:34,Staff Washroom a)ND b)CHO.S-S
S	0012	C	Floor,All,Vinyl Floor Tile And Mastic,12" White With Grey Flecks,Loc:58,Storage Area a)CHO.S-S b)(ND)
S	0013	A	Floor,All,Vinyl Floor Tile And Mastic,12" Beige With Brown Flecks,Loc:7,Administration Office a)ND b)CHO.S-S
S	0013	B	Floor,All,Vinyl Floor Tile And Mastic,12" Beige With Brown Flecks,Loc:36,Storage Room a)ND b)(ND)
S	0013	C	Floor,All,Vinyl Floor Tile And Mastic,12" Beige With Brown Flecks,Loc:12,Classroom a)ND b)(ND)
S	0014	A	Wall,Fire Stop,Firestopping (mastic),Red,Loc:11,Electrical Room ND
S	0014	B	Wall,Fire Stop,Firestopping (mastic),Red,Loc:11,Electrical Room ND
S	0014	C	Wall,Fire Stop,Firestopping (mastic),Red,Loc:11,Electrical Room ND

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Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name:	**HRCE, TSE, NS**
Project No.:	**0336128.006**
Prepared For:	**A. Penney / A. Thebeau**
Lab Reference No.:	**b308418**
Analyst(s):	**N. Gerrow**

Date Received:	**February 12, 2024**	**Samples Submitted:**	**47**
Date Analyzed:	**February 20, 2024**	**Phases Analyzed:**	**73**

The Pinchin Ltd. Dartmouth asbestos laboratory is accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 201032-0) for the 'EPA – 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples,' and the 'EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials'; and meets all requirements of ISO/IEC 17025:2017. The Pinchin asbestos laboratory uses the aforementioned methods of analysis.

Bulk samples are checked visually and scanned under a stereomicroscope. Slides are prepared and observed under a Polarized Light Microscope (PLM) at magnifications of 40X, 100X or 400X as appropriate. Asbestos fibres are identified by a combination of morphology, colour, refractive index, extinction, sign of elongation, birefringence and dispersion staining colours. A visual estimate is made of the percentage of asbestos present. A reported concentration of less than (<) the regulatory threshold indicates the presence of confirmed asbestos in trace quantities, limited to only a few fibres or fibre bundles in an entire sample. This method complies with provincial regulatory requirements where applicable. Multiple phases within a sample are analyzed and reported separately.

All bulk samples submitted to this laboratory for asbestos analysis are retained for a minimum of three months. Samples may be retrieved, upon request, for re-examination at any time during that period.

This report relates only to the items tested.

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308418
Date Analyzed: February 20, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0015A Floor, All, Vinyl Floor Tile And Mastic, 12" Teal With Flecks, Loc:17, Classroom	2 Phases: a) Homogeneous, blue, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0015B Floor, All, Vinyl Floor Tile And Mastic, 12" Teal With Flecks, Loc:17, Classroom	2 Phases: a) Homogeneous, blue, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0015C Floor, All, Vinyl Floor Tile And Mastic, 12" Teal With Flecks, Loc:17, Classroom	2 Phases: a) Homogeneous, blue, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0016A Floor, All, Vinyl Floor Tile And Mastic, 12" Light Brown With Flecks, Loc:18, Classroom	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
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Lab Reference No.: b308418
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BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0016B Floor, All, Vinyl Floor Tile And Mastic, 12" Light Brown With Flecks, Loc:18, Classroom	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0016C Floor, All, Vinyl Floor Tile And Mastic, 12" Light Brown With Flecks, Loc:18, Classroom	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0017A Floor, All, Vinyl Floor Tile And Mastic, 12" Brown And Light Brown Flecks, Loc:23, Classroom	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0017B Floor, All, Vinyl Floor Tile And Mastic, 12" Brown And Light Brown Flecks, Loc:48, Classroom	3 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, yellow, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	c) Homogeneous, black, tar material.	None Detected	Tar and other Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: **HRCE, TSE, NS**
Project No.: **0336128.006**
Prepared For: **A. Penney / A. Thebeau**

Lab Reference No.: **b308418**
Date Analyzed: **February 20, 2024**

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0017C Floor, All, Vinyl Floor Tile And Mastic, 12" Brown And Light Brown Flecks, Loc:72, Staff Room	3 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, yellow, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	c) Homogeneous, black, tar material.	None Detected	Tar and other Non-Fibrous Material > 75%
S0018 Sink, Mastic, Gold, Loc:24, Classroom	Homogeneous, black, tar material.	Chrysotile 0.5-5%	Tar and other Non-Fibrous Material > 75%
S0019A Floor, All, Vinyl Floor Tile And Mastic, 12" Light Grey With Flecks, Loc:20, Classroom	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0019B Floor, All, Vinyl Floor Tile And Mastic, 12" Light Grey With Flecks, Loc:20, Classroom	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
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Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308418
Date Analyzed: February 20, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0019C Floor, All, Vinyl Floor Tile And Mastic, 12" Light Grey With Flecks, Loc:33, Office	3 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, yellow, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	c) Homogeneous, black, tar material.	None Detected	Tar and other Non-Fibrous Material > 75%
S0020A Floor, All, Vinyl Floor Tile And Mastic, 12" Brown With White Streaks, Loc:30, Gym Vestibule	2 Phases: a) Homogeneous, brown, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, yellow, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
S0020B Floor, All, Vinyl Floor Tile And Mastic, 12" Brown With White Streaks, Loc:30, Gym Vestibule	3 Phases: a) Homogeneous, brown, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, yellow, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	c) Homogeneous, black, tar material.	None Detected	Tar and other Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
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Project Name: HRCE, TSE, NS
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BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0020C Floor, All, Vinyl Floor Tile And Mastic, 12" Brown With White Streaks, Loc:30, Gym Vestibule	3 Phases: a) Homogeneous, brown, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
	c) Homogeneous, light grey, levelling compound.	None Detected	Non-Fibrous Material > 75%
S0021A Door, Caulking, Grey, Loc:30, Gym Vestibule	Homogeneous, grey, caulking material.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%
Comments:	Rubber baseboard is present on the surface of this sample.		
S0021B Door, Caulking, Grey, Loc:30, Gym Vestibule			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0021C Door, Caulking, Grey, Loc:30, Gym Vestibule			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0022A Floor, All, Vinyl Floor Tile And Mastic, 12" Aqua Green With Flecks, Loc:35, Staff Washroom	2 Phases: a) Homogeneous, blue, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%

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Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308418
Date Analyzed: February 20, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0022B Floor, All, Vinyl Floor Tile And Mastic, 12" Aqua Green With Flecks, Loc:35, Staff Washroom	2 Phases: a) Homogeneous, blue, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0022C Floor, All, Vinyl Floor Tile And Mastic, 12" Aqua Green With Flecks, Loc:35, Staff Washroom	2 Phases: a) Homogeneous, blue, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0023A Floor, All, Vinyl Floor Tile And Mastic, 12" Yellow With Flecks, Loc:41, Cafeteria	2 Phases: a) Homogeneous, yellow, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	Chrysotile 0.5-5%	Tar and other Non-Fibrous Material > 75%
S0023B Floor, All, Vinyl Floor Tile And Mastic, 12" Yellow With Flecks, Loc:41, Cafeteria	2 Phases: a) Homogeneous, yellow, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.		Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308418
Date Analyzed: February 20, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0023C Floor, All, Vinyl Floor Tile And Mastic, 12" Yellow With Flecks, Loc:41, Cafeteria	2 Phases: a) Homogeneous, yellow, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
S0024A Floor, All, Vinyl Floor Tile And Mastic, 12" Light Brown With Brown Streaks, Loc:51, Classroom	2 Phases: a) Homogeneous, light brown, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	Chrysotile 0.5-5% Chrysotile 0.5-5%	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
S0024B Floor, All, Vinyl Floor Tile And Mastic, 12" Light Brown With Brown Streaks, Loc:54, Classroom			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0024C Floor, All, Vinyl Floor Tile And Mastic, 12" Light Brown With Brown Streaks, Loc:57, Classroom			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0025A Floor, All, Vinyl Floor Tile And Mastic, 12" Green With Light Green Streaks, Loc:52, Classroom	Homogeneous, green, consolidated, vinyl floor tile.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308418
Date Analyzed: February 20, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0025B Floor, All, Vinyl Floor Tile And Mastic, 12" Green With Light Green Streaks, Loc:55, Classroom			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0025C Floor, All, Vinyl Floor Tile And Mastic, 12" Green With Light Green Streaks, Loc:55, Classroom			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0026A Floor, All, Vinyl Floor Tile And Mastic, 12" White With Tan Flecks, Loc:59, Classroom	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
S0026B Floor, All, Vinyl Floor Tile And Mastic, 12" White With Tan Flecks, Loc:59, Classroom	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
S0026C Floor, All, Vinyl Floor Tile And Mastic, 12" White With Tan Flecks, Loc:59, Classroom	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308418
Date Analyzed: February 20, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0027 Sink, Mastic, White, Loc:59, Classroom	Homogeneous, grey, mastic material.	None Detected	Cellulose 10-25% Non-Fibrous Material > 75%
S0028A Floor, All, Vinyl Floor Tile And Mastic, Grey With Flecks, Loc:68, Library	2 Phases: a) Homogeneous, grey, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0028B Floor, All, Vinyl Floor Tile And Mastic, Grey With Flecks, Loc:68, Library	2 Phases: a) Homogeneous, grey, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0028C Floor, All, Vinyl Floor Tile And Mastic, Grey With Flecks, Loc:68, Library	2 Phases: a) Homogeneous, grey, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Tar and other Non-Fibrous Material > 75%
S0029A Floor, All, Vinyl Floor Tile And Mastic, 12" Light Blue With Blue Flecks, Loc:73, Women's Staff Washroom	Homogeneous, grey, consolidated, vinyl floor tile.	None Detected	Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308418
Date Analyzed: February 20, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0029B Floor, All, Vinyl Floor Tile And Mastic, 12" Light Blue With Blue Flecks, Loc:73, Women's Staff Washroom	2 Phases: a) Homogeneous, grey, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
S0029C Floor, All, Vinyl Floor Tile And Mastic, 12" Light Blue With Blue Flecks, Loc:74, Mens Staff Washroom	2 Phases: a) Homogeneous, grey, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected	Non-Fibrous Material > 75% Tar and other Non-Fibrous Material > 75%
S0030A Door, Caulking, Grey, Loc:76, Exterior	Homogeneous, grey, caulking material.	Chrysotile 0.5-5%	Cellulose 5-10% Non-Fibrous Material > 75%
S0030B Window, Caulking, Grey, Loc:76, Exterior			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0030C Window, Caulking, Grey, Loc:76, Exterior			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0031A Wall, Exterior, Cement Product, Transite, Loc:76, Exterior	2 Phases: a) Homogeneous, black, tar material. b) Homogeneous, grey, hard, cementitious transite material.	None Detected Chrysotile 10-25%	Tar and other Non-Fibrous Material > 75% Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: HRCE, TSE, NS
Project No.: 0336128.006
Prepared For: A. Penney / A. Thebeau

Lab Reference No.: b308418
Date Analyzed: February 20, 2024

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0031B Wall, Exterior, Cement Product, Transite, Loc:76, Exterior	2 Phases: a) Homogeneous, black, tar material. b) Homogeneous, grey, hard, cementitious transite material.	None Detected	Tar and other Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
S0031C Wall, Exterior, Cement Product, Transite, Loc:76, Exterior	2 Phases: a) Homogeneous, black, tar material. b) Homogeneous, grey, hard, cementitious transite material.	None Detected	Tar and other Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		

Reviewed by:

Jason Stapleton
2024.02.20 16:09:04-04'00'

Reporting Analyst:

Pinchin Ltd.
2024.02.20 15:14:40-04'00'

Analyzed By: NG

Reviewed By: JS

Report Sent By: _____

Pinchin Ltd. - Asbestos Laboratory
Internal Asbestos Bulk Sample Chain of Custody

Client Name:	HRCE			**Project Address:**	NS		
Portfolio/Building No:	TSE			**Pinchin File:**	336128.006		
Submitted by:	A Penney			**Email:**	apenney@pinchin.com		
CC Results to:	A Thebeau			**CC Email:**	athebeau@pinchin.com		
Date Submitted:	February	12	2024	**Required by:**	Month	Day	2024
# of Samples:	47			**Priority:**	5 Day Turnaround		
Year of Building Construction (*Mandatory, Years ONLY*):				1972			
Do NOT Stop on Positive (Sample Numbers):							
Pinchin Group Company (*Mandatory Field*):				Pinchin			
HMIS2 Building Reference #:				130036/2024168013702			
To be Completed by Lab Personnel Only:							
Lab Reference #:	b308418			**Time:**	24 hour clock		
Received by:	Reid Janssen			**Date:**	February	12	2024
Name(s) of Analyst(s):	NGerrow			Feb 20th 2024			

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0015	A	Floor,All,Vinyl Floor Tile And Mastic,12" Teal With Flecks,Loc:17,Classroom a)ND b)ND
S	0015	B	Floor,All,Vinyl Floor Tile And Mastic,12" Teal With Flecks,Loc:17,Classroom a)ND b)ND
S	0015	C	Floor,All,Vinyl Floor Tile And Mastic,12" Teal With Flecks,Loc:17,Classroom a)ND b)ND
S	0016	A	Floor,All,Vinyl Floor Tile And Mastic,12" Light Brown With Flecks,Loc:18,Classroom a)ND b)ND
S	0016	B	Floor,All,Vinyl Floor Tile And Mastic,12" Light Brown With Flecks,Loc:18,Classroom a)ND b)ND
S	0016	C	Floor,All,Vinyl Floor Tile And Mastic,12" Light Brown With Flecks,Loc:18,Classroom a)ND b)ND
S	0017	A	Floor,All,Vinyl Floor Tile And Mastic,12" Brown And Light Brown Flecks,Loc:23,Classroom a)ND b)ND

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0017	B	Floor,All,Vinyl Floor Tile And Mastic,12" Brown And Light Brown Flecks,Loc:48,Classroom a)ND b)ND c)ND
S	0017	C	Floor,All,Vinyl Floor Tile And Mastic,12" Brown And Light Brown Flecks,Loc:72,Staff Room a)ND b)ND c)ND
S	0018		Sink,Mastic, Gold,Loc:24,Classroom CH 0.5-5
S	0019	A	Floor,All,Vinyl Floor Tile And Mastic,12" Light Grey With Flecks,Loc:20,Classroom a)ND b)ND
S	0019	B	Floor,All,Vinyl Floor Tile And Mastic,12" Light Grey With Flecks,Loc:20,Classroom a)ND b)ND
S	0019	C	Floor,All,Vinyl Floor Tile And Mastic,12" Light Grey With Flecks,Loc:33,Office a)ND b)ND c)ND
S	0020	A	Floor,All,Vinyl Floor Tile And Mastic,12" Brown With White Streaks,Loc:30,Gym Vestibule a)ND b)ND
S	0020	B	Floor,All,Vinyl Floor Tile And Mastic,12" Brown With White Streaks,Loc:30,Gym Vestibule a)ND b)ND c)ND
S	0020	C	Floor,All,Vinyl Floor Tile And Mastic,12" Brown With White Streaks,Loc:30,Gym Vestibule a)ND b)ND c)ND
S	0021	A	Door,Caulking,Grey,Loc:30,Gym Vestibule CH 0.5-5
S	0021	B	Door,Caulking,Grey,Loc:30,Gym Vestibule (na)
S	0021	C	Door,Caulking,Grey,Loc:30,Gym Vestibule (na)
S	0022	A	Floor,All,Vinyl Floor Tile And Mastic,12" Aqua Green With Flecks,Loc:35,Staff Washroom a)ND b)ND
S	0022	B	Floor,All,Vinyl Floor Tile And Mastic,12" Aqua Green With Flecks,Loc:35,Staff Washroom a)ND b)ND
S	0022	C	Floor,All,Vinyl Floor Tile And Mastic,12" Aqua Green With Flecks,Loc:35,Staff Washroom a)ND b)ND

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0023	A	Floor,All,Vinyl Floor Tile And Mastic,12" Yellow With Flecks,Loc:41,Cafeteria a)ND b)CHO.5-5
S	0023	B	Floor,All,Vinyl Floor Tile And Mastic,12" Yellow With Flecks,Loc:41,Cafeteria a)ND b)(na)
S	0023	C	Floor,All,Vinyl Floor Tile And Mastic,12" Yellow With Flecks,Loc:41,Cafeteria a) ND b)(na)
S	0024	A	Floor,All,Vinyl Floor Tile And Mastic,12" Light Brown With Brown Streaks,Loc:51,Classroom a)CHO.5-5 b)CHO.5-5
S	0024	B	Floor,All,Vinyl Floor Tile And Mastic,12" Light Brown With Brown Streaks,Loc:54,Classroom (na)
S	0024	C	Floor,All,Vinyl Floor Tile And Mastic,12" Light Brown With Brown Streaks,Loc:57,Classroom (na)
S	0025	A	Floor,All,Vinyl Floor Tile And Mastic,12" Green With Light Green Streaks,Loc:52,Classroom CHO.5-5
S	0025	B	Floor,All,Vinyl Floor Tile And Mastic,12" Green With Light Green Streaks,Loc:55,Classroom (na)
S	0025	C	Floor,All,Vinyl Floor Tile And Mastic,12" Green With Light Green Streaks,Loc:55,Classroom (na)
S	0026	A	Floor,All,Vinyl Floor Tile And Mastic,12" White With Tan Flecks,Loc:59,Classroom a)ND b)ND
S	0026	B	Floor,All,Vinyl Floor Tile And Mastic,12" White With Tan Flecks,Loc:59,Classroom a)ND b)ND
S	0026	C	Floor,All,Vinyl Floor Tile And Mastic,12" White With Tan Flecks,Loc:59,Classroom a)ND b)ND
S	0027		Sink,Mastic, White,Loc:59,Classroom ND
S	0028	A	Floor,All,Vinyl Floor Tile And Mastic,Grey With Flecks,Loc:68,Library a)ND b)ND
S	0028	B	Floor,All,Vinyl Floor Tile And Mastic,Grey With Flecks,Loc:68,Library a)ND b)ND

Sample Prefix	Sample No.	Sample Suffix	Sample Description/Location (Mandatory)
S	0028	C	Floor,All,Vinyl Floor Tile And Mastic,Grey With Flecks,Loc:68,Library a)ND b)ND
S	0029	A	Floor,All,Vinyl Floor Tile And Mastic,12" Light Blue With Blue Flecks,Loc:73,Women's Staff Washroom ND
S	0029	B	Floor,All,Vinyl Floor Tile And Mastic,12" Light Blue With Blue Flecks,Loc:73,Women's Staff Washroom a)ND b)ND
S	0029	C	Floor,All,Vinyl Floor Tile And Mastic,12" Light Blue With Blue Flecks,Loc:74,Mens Staff Washroom a)ND b)ND
S	0030	A	Door,Caulking,Grey,Loc:76,Exterior CHO.5-5
S	0030	B	Window,Caulking,Grey,Loc:76,Exterior (na)
S	0030	C	Window,Caulking,Grey,Loc:76,Exterior (na)
S	0031	A	Wall,Exterior,Cement Product,Transite,Loc:76,Exterior a)ND b)CH 10-25
S	0031	B	Wall,Exterior,Cement Product,Transite,Loc:76,Exterior a)ND b) (na)
S	0031	C	Wall,Exterior,Cement Product,Transite,Loc:76,Exterior a) ND b)(na)

APPENDIX II-B
Lead Analytical Certificates

EMSL Canada Inc.
2756 Slough Street, Mississauga, ON L4T 1G3
Phone/Fax: (289) 997-4602 / (289) 997-4607
http://www.EMSL.com torontolab@emsl.com

EMSL Canada Or	552402154
CustomerID:	55PINC50
CustomerPO:	336128.006
ProjectID:	

Attn: **Ashley Penney**
Pinchin Environmental
42 Dorey Avenue
Dartmouth, Nova Scotia, NS B3B 0B1

Phone: (902) 461-9999
Fax: (902) 461-9932
Received: 2/13/2024 09:27 AM
Collected: 2/7/2024

Project: **336128.006**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	*Collected*	*Analyzed*	*Weight*	*RDL*	*Lead Concentration*
L0001 *552402154-0001*	2/7/2024 Site: Loc. 1	2/14/2024	0.2417 g	83 ppm	2600 ppm
L0002 *552402154-0002*	2/7/2024 Site: Loc. 3	2/14/2024	0.2462 g	81 ppm	<81 ppm
L0003 *552402154-0003*	2/7/2024 Site: Loc. 4	2/14/2024	0.2492 g	80 ppm	<80 ppm
L0004 *552402154-0004*	2/7/2024 Site: Loc. 12	2/14/2024	0.2423 g	83 ppm	170 ppm
L0005 *552402154-0005*	2/7/2024 Site: Loc. 23	2/14/2024	0.2467 g	81 ppm	<81 ppm
L0006 *552402154-0006*	2/7/2024 Site: Loc. 28	2/14/2024	0.2497 g	80 ppm	<80 ppm
L0007 *552402154-0007*	2/7/2024 Site: Loc. 28	2/14/2024	0.2525 g	80 ppm	2100 ppm
L0008 *552402154-0008*	2/7/2024 Site: Loc. 64	2/14/2024	0.2512 g	400 ppm	14000 ppm

Rowena Fanto, Lead Supervisor
or other approved signatory

* Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.008% wt based on the minimum sample weight per our SOP. "<" (less than) result signifies the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. Definitions of modifications are available upon request.
Samples analyzed by EMSL Canada Inc. Mississauga, ON AIHA LAP, LLC-ELLAP Accredited #196142

Initial report from 02/20/2024 07:50:15

APPENDIX II-C
PCB Analytical Certificates

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: PINCHIN LTD.
42 Dorey Avenue
Dartmouth, NS B3B0B1
(902) 461-9999
ATTENTION TO: Ashley Penney
PROJECT: 336128.006
AGAT WORK ORDER: 24X119936
TRACE ORGANICS REVIEWED BY: Graeme Soper, Laboratory Supervisor
DATE REPORTED: Feb 23, 2024
PAGES (INCLUDING COVER): 5
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 24X119936

PROJECT: 336128.006

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Ashley Penney

SAMPLING SITE:

SAMPLED BY:

Total Polychlorinated Biphenyls in Solids

DATE RECEIVED: 2024-02-12

DATE REPORTED: 2024-02-23

Parameter	Unit	G / S	RDL	P0001, Expansion Joint Caulking, Brown SAMPLE DESCRIPTION: SAMPLE TYPE: Solid DATE SAMPLED: 2024-02-08 5642222
Total Polychlorinated Biphenyls	mg/kg		0.5	<0.5
Surrogate	**Unit**	**Acceptable Limits**		
Decachlorobiphenyl	%	60-140		113

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 24X119936

PROJECT: 336128.006

ATTENTION TO: Ashley Penney

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Feb 23, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Polychlorinated Biphenyls in Solids															
Total Polychlorinated Biphenyls	1	9999999	0.59	0.58	NA	< 0.5	114%	60%	140%	118%	60%	140%	116%	60%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 24X119936

PROJECT: 336128.006

ATTENTION TO: Ashley Penney

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Total Polychlorinated Biphenyls	ORG-120-5106	EPA SW846/8081/8080	GC/ECD
Decachlorobiphenyl	ORG-120-5106	EAP SW846 3510C/8080/8010	GC/ECD

AGAT Laboratories

Unit 122 - 11 Morris Dr.
Dartmouth, Nova Scotia
B3B 1M2
http://webearth.agatlabs.com

Phone: 902-468-8718
Fax: 902-468-8924
www.agatlabs.com

Laboratory use Only
Arrival Condition: ☐ Good ☐ Poor (complete 'notes')
Arrival Temperature: 19.6 AGAT Job Number: 24X119936
Notes:

Drinking Water Sample (y/n): _____ Reg. No. _____
Waterworks Number: _____

Report To:
Company: : Pinchin Ltd.
Contact: Ashley Penney
Address: 42 Dorey Ave, Dartmouth, NS B3B 0B1
Phone: 902.461.9999 FAX: 902.461.9932
PO#:
AGAT Quotation: 514103
Client Project #: 336128.006

Invoice to: Same (Y/N) - Circle
Company:
Contact:
Address:
Phone: Fax:
PO#/Credit Card #:

Report Information
1. Name: Ashley Penney
Email: apenney@pinchin.com
2. Name: Allain Thebeau
Email: athebeau@pinchin.com

Regulatory Requirements (Check):
☐ List Guidelines on Report ☐ Do Not List Guidelines on Report
☐ PIRI
Site Info (check all that apply):
☐ Teir 1 ☐ Res. ☐ Pot. ☐ Coarse
☐ Teir 2 ☐ Com ☐ N/Pot. ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Ind ☐ NSDFOSP
☐ Com ☐ HRM 101
☐ Res/P Storm Water
☐ Ag ☐ HRM 101
☐ FWAL Waste Water
☐ Sediment
☐ Other

Report Format
☐ Single PDF sample per page
■ Multiple PDF samples per page
☐ Excel Format Included

Turnaround Time (TAT) Business Days
Regular TAT:
■ 5 - 7 days
Rush TAT:
☐ 1 day ☐ 2 days
☐ 3 - 4 days
Date Required:
Time Required:

'24FEB12 2:41PM

SAMPLE IDENTIFICATION	DATE / TIME SAMPLED	SAMPLE MATRIX	# OF CONTAINERS	COMMENTS - Site/Sample Info, Sample Containment	Field Filtered/ Preserved	Standard Water Analysis +MS	Metals	(circle-Total, Diss or Available)	Mercury Leachate CGSB	BOD	pH	TSS	TKN	Anions	Total Phosphorus	Phenols	TPH/BTEX (PIRI) Teir 1	TPH/BTEX-Fractionation Teir 2	VOC	THM	Mercury in paint	Lead in Paint	PCB	Hazardous (Y/N)	Lab Sample #
P0001, Expansion Joint Caulking, Brown	2/8/2024	solid	1 bag	2.31g																			X		

Recd by: MB

APPENDIX III
Methodology

1.0 GENERAL

An investigation was conducted to identify the type of Hazardous Building Materials incorporated in the structure and its finishes.

Information regarding the location and condition of hazardous building materials encountered and visually estimated quantities were recorded. The locations of any samples collected were recorded on small-scale plans. As-built drawings and previous reports were referenced where provided.

Sample collection was conducted in accordance with our Standard Operating Procedures.

1.1 Asbestos

The investigation for asbestos included friable and non-friable asbestos-containing materials (ACM). A friable material is a material that when dry can be crumbled, pulverized or powdered by hand pressure, or a material that has already become crushed, pulverized, or powdered.

A separate set of samples was collected of each type of homogenous material suspected to contain asbestos. A homogenous material is defined by the US EPA as material that is uniform in texture and appearance, was installed at one time, and is unlikely to consist of more than one type or formulation of material. The homogeneous materials were determined by visual examination and available information on the phases of construction and prior renovations.

Samples were collected at a rate that is in compliance with the requirements of local regulations and guidelines. The sampling strategy was also based on known ban dates and phase out dates of the use of asbestos; sampling of certain building materials is not conducted after specific construction dates. In addition, to be conservative, several years past these dates are added to account for some uncertainty in the exact start / finish date of construction and associated usage of ACM. In some cases, manufactured products such as asbestos cement pipe were visually identified without sample confirmation.

The asbestos analysis of select materials was completed using a stop-positive approach. Only one result meeting the regulated criteria was required to determine that a material is asbestos-containing, but all samples must be analyzed to conclusively determine that a material is non-asbestos. The laboratory stopped analyzing samples from a homogeneous material once a result equal to or greater than the regulated criteria is detected in any of the samples of that material. All samples of a homogeneous material were analyzed if no asbestos is detected. In some cases, all samples were analyzed in the sample set regardless of result.

The analysis was performed in accordance with Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials, July 1993.

Analytical results were compared to the following criteria:

Jurisdiction	Friable	Non-Friable
Nova Scotia	0.5%[1]	0.5%

Where building materials are described in the report as “non-asbestos” or “does not contain asbestos”, this means that either no asbestos was detected by the analytical method utilized in any of the multiple samples or, if detected, it is below the lower limit of an asbestos-containing material in the applicable regulation. Additionally, these terms are used for materials which historically are known to not include asbestos in their manufacturing.

Asbestos materials were evaluated in order to make recommendations regarding any remedial work. The priority for remedial action was based on several factors:

- Friability (friable or non-friable)
- Condition (good, fair, poor, debris)
- Accessibility (ranking from accessible to all building users to inaccessible)
- Visibility (whether the material is obscured by other building components)
- Efficiency of the work (for example, if damaged ACM is being removed in an area, it may be most practical to remove all ACM in the area even if it is in good condition)

For a complete description of the Evaluation Criteria and Basis of Recommendations, refer to Annex A.

1.2 Lead

Samples of distinctive paint finishes, and surface coatings present in more than a limited application, where removal of the paint is possible were collected. The samples were collected by scraping the painted finish to include base and covering applications.

Analysis for lead in paints or surface coatings was performed in accordance with EPA Method No. 3050B/Method No. 7420; flame atomic absorption.

Analytical results were compared to the following criteria.

Jurisdiction	Units (%)	Units (ppm) / (mg/kg)
Nova Scotia	0.009	90

[1] Or any amount if vermiculite

Other lead building products (e.g. batteries, lead sheeting, flashing) were identified by visual observation only.

1.3 Silica

Building materials known to contain crystalline silica (e.g. concrete, cement, tile, brick, masonry, mortar) were identified by visual inspection only. Pinchin did not perform sampling of these materials for laboratory analysis of crystalline silica content.

1.4 Mercury

Building materials, products or equipment (e.g. thermostats, barometers, pressure gauges, lamp tubes), suspected to contain mercury were identified by visual inspection only. Dismantling of equipment suspected of containing mercury was not performed. Sampling of these materials for laboratory analysis of mercury content was not performed.

1.5 Polychlorinated Biphenyls

The potential for light ballast and oil filled transformers to contain PCBs was based on the age of the building, a review of maintenance records, and examination of labels or nameplates on equipment, where present and accessible. The information was compared to known ban dates of PCBs and Environment Canada publications.

Dry type transformers were presumed to be free of dielectric fluids and hence non-PCB.

Fluids (mineral oil, hydraulic, Aroclor or Askarel) in transformers or other equipment were not sampled for PCB content.

Caulking was sampled and submitted for PCB analysis following EPA 3550C/8082A.

Sample results are compared to the criteria of 50 mg/kg for solids as stated in the PCB Regulation, SOR/2008-273.

1.6 Visible Mould

The presence of mould or water damage was determined by visual inspection of exposed building surfaces. If any mould growth or water damage was concealed within building cavities it was not addressed in this assessment.

Template Testing

METHODOLOGY ANNEX A EVALUATION CRITERIA

1.0 EVALUATION CRITERIA AND BASIS OF RECOMMENDATIONS

The detailed asbestos assessment provides information regarding the location, condition, accessibility and friability of the asbestos-containing materials (ACM). In order to make recommendations for compliance with current regulations, Pinchin developed the following criteria.

2.0 EVALUATION OF CONDITION

2.1 Friable Sprayed or Trowelled Fireproofing, Thermal Insulation and Texture Finishes (Surfacing Materials)

To evaluate the condition of ACM sprayed or trowelled on fireproofing, sprayed or trowelled thermal insulation (non-mechanical), or texture, decorative or acoustic finishes, the following criteria are applied:

Good	Surface of material shows no significant signs of damage, deterioration or delamination. Good condition includes unencapsulated or unpainted fireproofing or texture finishes, where no or limited delamination or damage is observed, or encapsulated fireproofing or texture finishes where the encapsulant or paint has been applied after the damage or fallout occurred.
Poor	A sprayed material that shows signs of significant damage or is significantly delaminating or deteriorating. This may be limited to surface delamination or some portion of the substrate may be exposed.

In Locations where damage exists in isolated areas, both good and poor condition may be applicable. The extent of each condition will be recorded. Fair condition is not utilized in the evaluation of ACM sprayed or trowelled fireproofing, sprayed or trowelled thermal insulation (non-mechanical), or texture, decorative or acoustic finishes.

The evaluation of the above products above ceilings may be limited by the number of observations and by building components such as ducts or full height walls that obstruct the above ceiling observations.

2.2 Friable Mechanical or Thermal System Insulation (TSI)

To evaluate the condition of mechanical insulation on vessels, boilers, breeching, ducts, pipes, fan units, equipment etc. the following criteria are applied:

Good	Insulation is completely covered in jacketing and exhibits no evidence of damage or deterioration. No insulation is exposed. Includes conditions where the jacketing has minor damage (i.e. scuffs or stains), but the jacketing is not penetrated.
Fair	Minor penetrating damage to jacketed insulation (cuts, tears, nicks, deterioration or delamination) or undamaged insulation that has never been jacketed. Insulation is exposed but not showing surface disintegration. The extent of missing insulation ranges from minor to none. Damage can be repaired.

Poor	Original insulation jacket is missing, damaged, deteriorated or delaminated. Insulation is exposed and significant areas have been dislodged. Damage cannot be readily repaired. Includes components where insulation may have been removed incompletely.

The evaluation of mechanical insulation may be limited by the number of observations made and building components such as ducts or full height walls that obstruct observations. It is often not possible to observe each foot of mechanical insulation from all angles.

2.3 Potentially Friable Materials and Miscellaneous Friable Materials

Potentially friable ACM are products that are basically non-friable while in place but have the potential to generate friable dust upon removal or if significantly disturbed without appropriate procedures. These products may become friable if damaged. Potentially friable materials include materials such as acoustic ceiling tiles and plaster. To evaluate the condition of potentially friable materials, the following criteria are applied:

Good	No significant damage or deterioration. Still serving its intended use as a building material or finish.
Fair	Showing signs of some cracking or breakage, but is not deteriorating (e.g. cracked plaster, broken but in place ceiling tile, missing tile or section of plaster etc.). The condition is such that it is still serving its intended use as a building material or finish but may require repair for mainly cosmetic purposes.
Poor	Significant deterioration or breaking apart of the material. Material has deteriorated to the point it is not serving its intended use as building material or finish. Material has deteriorated to a point it has become friable. Normally potentially friable ACM in Poor condition is not repairable and requires at least localized removal and replacement.

2.4 Non-Friable Materials

Non-friable ACM cover a wide range of products with a wide variation in their tendency to release dust or asbestos fibres to the air. Many of these materials, (particularly where the matrix is an unweathered bitumen, asphalt or tar material) do not release fibres except in very unusual circumstances or during significant disturbance (e.g. use of abrasive power tools). Others with a cementitious matrix (asbestos-cement products) can more readily release dust due to abrasion, demolition, weathering, etc. The potential for asbestos release from non-friable ACM is always lower than from friable ACM. To evaluate the condition of non-friable Materials, the following criteria are applied:

Good	No significant damage or deterioration. Still serving its intended use as a building material or finish.

Fair	Showing signs of some cracking or breakage but is not deteriorating (e.g. cracked vinyl floor tile, missing piece of tile or transite, etc.). The condition is such that it is still serving its intended use as a building material or finish but may require repair for mainly cosmetic purposes.
Poor	Significant deterioration or breaking apart of the material to the point at which it cannot be repaired, and it will require at least local removal. Material has deteriorated to the point it is not serving its intended use as building material or finish. Material may have deteriorated to a point where traffic or disturbance may cause it to become friable.

2.5 Evaluation of ACM Debris

The identification of the exact location or presence of debris on the top of ceiling tiles is limited by the number of observations made and the presence of building components such as ducts or full height walls that obstruct observations.

The presence of fallen or dislodged ACM is noted separately from the ACM source and is referred to as Debris. Debris may be friable if from a friable ACM source or a badly deteriorated non-friable ACM source. Debris may also be non-friable (such as fallen pieces of transite sheet or mastic fittings, or broken, dislodged floor tiles).

Debris	Debris may be friable or non-friable but is always identified as debris.

2.6 Evaluation of Presumed Asbestos-Containing Material (PACM)

Presumed asbestos-containing materials (PACM), are building materials that may contain asbestos but were not sampled or analyzed due to inaccessibility or the need to perform destructive testing to obtain a reasonable sample set. Evaluation of these materials is based on the assumption that these PACM are asbestos-containing.

A list of PACM is provided in the report and they are generally not included in the detailed room by room reports. Typically, they are excluded because they are inaccessible or present in very small quantities. If PACM are evaluated, Pinchin uses the criteria that correspond with the type (and friability) of the material listed above.

3.0 EVALUATION OF ACCESSIBILITY

The accessibility of building materials known or suspected of being ACM is rated according to the following criteria:

Access (A)	Common areas of the building within reach of all building users (approximately 8 ’- 9’ from floor or standard ceiling height). Includes other areas where occupant activities may result in disturbance of material that is not normally within reach from floor level, but may be disturbed by common activities (e.g. gymnasiums, workshops, warehouses.)
Access (B)	Areas of the building accessed primarily by Maintenance/Caretaking/Janitorial Staff and within reach without use of a ladder. Includes areas within reach in Boiler Rooms, Electrical Rooms, Janitors Closets, Elevator Rooms, Mechanical Rooms, etc. Includes materials within reach from fixed ladders or catwalks, mezzanines, and accessible pipe chases.
Access (C) and Visible	Areas of the building above 8' - 9’ where use of a ladder or scaffold is required to reach the ACM. Only includes ACM that are visible to view without the removal or opening of other building components such as ceiling tiles or service access panels. Visible column on HMIS sheets will say YES.
Access (C) and not Visible	Areas of the building above 8' - 9’ where use of a ladder or scaffold is required to reach the ACM. Includes ACM that are not visible to view and require the removal of a building component to see, such as ceilings tiles or access panels to view and access. Includes rarely entered crawl spaces, attic spaces, etc. Observations will be limited to the extent visible from the access points. Visible column on HMIS sheets will say NO.
Access (D)	Areas of the building behind inaccessible solid ceiling systems, walls or equipment etc. where demolition of the ceiling, wall or equipment etc. is required to reach the ACM. Material inaccessible due to height or location or is only accessed under unusual situations. Evaluation of condition and extent of ACM is limited or impossible, depending on the surveyor's ability to visually examine materials in Access D.

4.0 ACTION MATRIX AND DEFINITIONS

Pinchin’s evaluation of the viability of a specific asbestos control option is based on the consideration of the friability, condition, accessibility and visibility of a material. The logic used is that damaged ACM located in an area frequently accessed by all building occupants is of a higher priority than damaged ACM located in an infrequently accessed service area. The action matrix considers the potential for fibre release (primarily from friable ACM) and the possible concerns from regulatory bodies and many building occupants to all damaged ACM (including non-friable).

In any building with asbestos, many current regulations require an Asbestos Management Program be implemented. Depending on the condition and the accessibility, more active measures such as repair or removal may be recommended. The following matrix provides guidance for recommended Actions in the absence of renovation or demolition. In the event of construction or maintenance activity which will disturb ACM more aggressive control or removal will be required.

4.1 Action Matrix

The following tables outline the action decisions based on the relationship of assessed factors. Table I applies to friable ACM. Table II applies to non-friable ACM.

Table I Decision Matrix for Friable ACM

	Condition			
Access	**Good**	**Fair**	**Poor**	**Debris**
(A)	Action 5[1]	Action 5[2]	Action 3	Action 1
(B)	Action 7	Action 6[3]	Action 3	Action 1
(C) Visible	Action 7	Action 6	Action 3	Action 2
(C) Not Visible	Action 7	Action 7	Action 4	Action 2
(D)	Action 7	Action 7	Action 7	Action 7

Table II Decision Matrix for Potentially Friable and Non-Friable ACM

	Condition			
Access	**Good**	**Fair**	**Poor**	**Debris**
(A)	Action 7	Action 7[4]	Action 3	Action 1
(B)	Action 7	Action 7	Action 3	Action 1
(C) Visible	Action 7	Action 7	Action 4	Action 2
(C) Not Visible	Action 7	Action 7	Action 4	Action 2
(D)	Action 7	Action 7	Action 7	Action 7

4.2 Action Definitions

The following are the definitions in the Action Matrix Table presented above:

Action Definitions	
Action 1	Clean-Up of ACM Debris Restrict access that is likely to cause a disturbance of the ACM Debris and clean up ACM Debris. Utilize appropriate asbestos precautions.

[1] If friable ACM in access (A)/Good condition is not proactively removed Action 7 (Manage) is recommended.
[2] If friable ACM in access (A)/Fair condition is not proactively removed repair is recommended.
[3] If friable ACM in access (B)/Fair condition is likely to be disturbed after repair proactive removal is recommended.
[4] Action 7 is recommended for all non-friable ACM in Fair condition however some clients may wish to repair or take some action primarily for cosmetic reasons

Action Definitions	
Action 2	Precautions for Access Which may Disturb ACM Debris Use appropriate means to isolate the debris or to limit entry to the area which may disturb the material. At locations where ACM Debris can remain in place in lieu of removal or clean-up (e.g. Debris on top of ceiling tiles or behind lockable door), Utilize appropriate asbestos precautions to enter the area if this will disturb debris. The precautions will be required until the ACM Debris has been cleaned up.
Action 3	ACM Removal Remove ACM. Utilize asbestos procedures appropriate to the scope of the removal work. Until it is removed, restrict access to the material so it is not disturbed.
Action 4	Precautions for Work Which may Disturb ACM in Poor Condition. Utilize appropriate asbestos precautions if ACM may be disturbed by work on or near ACM. This does not require restricting access to the area, only control of work which may contact or disturb the ACM. Removal is the only viable option if work will disturb ACM.
Action 5	Proactive ACM Removal Remove friable ACM where the presence of friable asbestos in Good condition is not desirable. If friable ACM in Fair condition is not removed, then Repair friable ACM.
Action 6	ACM Repair Repair friable ACM in Fair condition which is not likely to be damaged again or disturbed by normal use of the area or room. Pinchin recommends proactive removal if friable ACM is likely to be damaged or disturbed during normal use of the area or room.
Action 7	Asbestos Management Program with Routine Surveillance Implement an Asbestos Management Program, including routine surveillance of ACM. Reassess materials regularly (typically once per year).

Master Template: Methodology Annex A to Appendix I Evaluation Criteria, HAZ, August 17, 2023

APPENDIX IV
Location Summary Report

LOCATIONS LIST

Client:HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Survey Date: 2024-02-06
Last Re-Assessment:
Building Phases: A: 1972

Location No.	Name or Description	Area ft²	Floor No.	Bldg. Phase	Notes
1	Boiler Room	668	1	A	
2	Boiler Room Storage	113	1	A	
3	Copier Room	114	1	A	
4	Principal Office	152	1	A	Unable to view above ceiling tiles due to height
5	Washroom And Hallway, room no. 126	65	1	A	
6	Vice Principal Office	112	1	A	Unable to view above ceiling tiles due to height
7	Administration Office, room no. 122	238	1	A	
8	Office	87	1	A	
9	Office	112	1	A	Unable to view above ceiling tiles due to height
10	Caretaker Office, room no. 120	225	1	A	Unable to view above solid ceiling
11	Electrical Room	162	1	A	
12	Classroom, room no. 113	670	1	A	Unable to view above ceiling tiles due to height
13	Classroom, room no. 112	677	1	A	Unable to view above ceiling tiles due to height
14	Classroom, room no. 111	670	1	A	Unable to view above ceiling tiles due to height
15	Classroom, room no. 110	670	1	A	Unable to view above ceiling tiles due to height
16	Classroom, room no. 109	676	1	A	Unable to view above ceiling tiles due to height
17	Classroom, room no. 108	676	1	A	Unable to view above ceiling tiles due to height
18	Classroom, room no. 107	670	1	A	Unable to view above ceiling tiles due to height
19	Janitor Room, room no. 102	165	1	A	
20	Classroom, room no. 106	675	1	A	
21	Ramp	800	1-2	A	
22	Back Vestibule	200	1	A	
23	Classroom	1129	1	A	
24	Classroom, room no. 152	1222	1	A	
25	Classroom	1188	1	A	
26	Teacher Supplies Storage Room	250	1	A	
27	Office, room no. 134	110	1	A	
28	Gym And Stage, room no. 158	6630	1	A	
29	Gym Storage Room, room no. 157	188	1	A	
30	Gym Vestibule	183	1	A	
31	Art Supplies Storage	443	1	A	
32	Girls Washroom	285	1	A	
33	Office	67	1	A	
34	Staff Washroom	48	1	A	
35	Staff Washroom	48	1	A	
36	Storage Room	100	1	A	
37	Storage Room, room no. 137	385	1	A	Former boys changing room
38	Boys Washroom	285	1	A	
39	Pipe Chase	40	1	A	
40	Pipe Chase	40	1	A	
41	Cafeteria	1607	1	A	Unable to view above ceiling tiles due to height
42	Kitchen And Pantry, room no. 133	415	1	A	
43	Main Entrance Vestibule	115	1	A	
44	First Floor Corridor	3350	1	A	
45	Stairwell	500	1-2	A	
46	Stairwell	500	1-2	A	
47	Office, room no. 216	308	2	A	
48	Classroom, room no. 211	670	2	A	
49	Storage Room	81	2	A	
50	Classroom, room no. 210	675	2	A	
51	Classroom, room no. 209	680	2	A	
52	Classroom, room no. 208	670	2	A	
53	Classroom, room no. 207	670	2	A	
54	Classroom, room no. 206	673	2	A	
55	Classroom, room no. 205	673	2	A	
56	Classroom, room no. 204	675	2	A	
57	Classroom, room no. 203	673	2	A	

Location No.	Name or Description	Area ft²	Floor No.	Bldg. Phase	Notes
58	Storage Area	168	2	A	
59	Classroom, room no. 234	1150	2	A	
60	Classroom	1150	2	A	
61	Classroom	1220	2	A	
62	Storage Room	160	2	A	
63	Storage Room	160	2	A	
64	Mechanical Room, room no. 231	700	2	A	
65	Girls Washroom, room no. 229	380	2	A	
66	Janitor Room	80	2	A	
67	Boys Washroom	384	2	A	
68	Library, room no. 226	1440	2	A	
69	Library Office	108	2	A	
70	Storage And Server Room	150	2	A	
71	Classroom, room no. 222	1782	2	A	
72	Staff Room, room no. 218	910	2	A	
73	Women's Staff Washroom, room no. 219	140	2	A	
74	Mens Staff Washroom, room no. 220	140	2	A	
75	2nd Floor Corridor	2000	2	A	
76	Exterior	0		A	

APPENDIX V
Hazardous Materials Summary Report / Sample Log

HMIS
HAZARDOUS MATERIALS INVENTORY SYSTEM

HAZARDOUS MATERIALS SUMMARY / SAMPLE LOG

PINCHIN
1.855.PINCHIN www.pinchin.com

Client:HRCE **Site: 3 French Village Station Road, Upper Tantallon, NS** **Building Name: Tantallon Senior Elementary School** **Survey Date: 2024-02-06**

HAZMAT	Sample No	System/Component/Material/Sample Description	Locations	Bldg. Phase	LF	SF	EA	%	Type	Positive	Friability
Asbestos	S0001 ABC	Piping | Heating Water Supply | Parging Cement |	1,64	A	0	0	15	0	Chrysotile	Yes	F
Asbestos	S0002 ABC	Piping | Domestic Water (hot And Cold) | Parging Cement |	1,2,10,28,33,35,36,44,64,66,70	A	0	0	71	0	Chrysotile	Yes	F
Asbestos	S0003 ABC	Duct | Boiler | Parging Cement |	1	A	0	50	0	0	Chrysotile	Yes	F
Asbestos	S0004 ABC	Piping | Heating Water Return | Parging Cement |	1	A	0	0	5	0	Chrysotile	Yes	F
Asbestos	S0005 ABC	Wall | All | Paint | White	1,2,11,19,64	A	0	6050	0	0	None Detected	No	
Asbestos	S0006 ABC	Wall | Expansion Joint | Caulking |	76	A	150	0	0	0	None Detected	No	
Asbestos	S0007 ABCDEFG	Ceiling, Wall, Ceiling, Wall | All, Interior, Exterior | Drywall And Joint Compound |	3,4,5,6,7,8,9,10,13,15,17,21,22,23,24,25,26 27,47,51,54,55,56,59,60,68,69,70,71,72,73,74	A	0	20682	0	0	Chrysotile	Yes	NF
Asbestos	S0008 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Brown And Beige Streaked	3,9,24,50,53,56,60,71	A	0	6400	0	0	Chrysotile	Yes	NF
Asbestos	S0009 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Cream With Beige Flecks	4,6,28,47,75	A	0	7416	0	0	Chrysotile	Yes	NF
Asbestos	S0010 ABC	Other | Window | Caulking | Grey	3,4,6,9,12,13,14,15,16,17,18,20,23,24,25,26 41,47,48,50,51,52,53,54,55,56,57,59,60,61,71 72	A	761	0	0	0	Chrysotile	Yes	NF
Asbestos	S0011 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Grey With White And Beige Flecks	5	A	0	65	0	0	None Detected	No	
Asbestos	S0012 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" White With Grey Flecks	7,34,44,58	A	0	3728	0	0	Chrysotile	Yes	NF
Asbestos	S0013 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Beige With Brown Flecks	7,8,10,12,13,14,15,16,36,42	A	0	4263	0	0	Chrysotile	Yes	NF
Asbestos	S0014 ABC	Wall | Fire Stop | Firestopping (mastic) | Red	11,19	A	0	2	0	0	None Detected	No	
Asbestos	S0015 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Teal With Flecks	17	A	0	676	0	0	None Detected	No	
Asbestos	S0016 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Light Brown With Flecks	18	A	0	670	0	0	None Detected	No	
Asbestos	S0017 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Brown And Light Brown Flecks	23,48,72	A	0	2709	0	0	None Detected	No	
Asbestos	S0018	Other | Sink | Mastic, Gold |	24,60	A	0	0	2	0	Chrysotile	Yes	NF
Asbestos	S0019 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Light Grey With Flecks	20,27,33	A	0	852	0	0	None Detected	No	
Asbestos	S0020 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Brown With White Streaks	30	A	0	183	0	0	None Detected	No	
Asbestos	S0021 ABC	Other | Door | Caulking | Grey	30	A	32	0	0	0	Chrysotile	Yes	NF
Asbestos	S0022 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12"	35	A	0	48	0	0	None	No	

HAZMAT	Sample No	System/Component/Material/Sample Description	Locations	Bldg. Phase	LF	SF	EA	%	Type	Positive	Friability
		Aqua Green With Flecks							Detected		
Asbestos	S0023 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Yellow With Flecks	41,75	A	0	1895	0	0	Chrysotile	Yes	NF
Asbestos	S0024 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Light Brown With Brown Streaks	51,54,57,61,69	A	0	3354	0	0	Chrysotile	Yes	NF
Asbestos	S0025 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Green With Light Green Streaks	52,55	A	0	1343	0	0	Chrysotile	Yes	NF
Asbestos	S0026 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" White With Tan Flecks	59	A	0	1150	0	0	None Detected	No	
Asbestos	S0027	Other | Sink | Mastic, White |	59	A	0	0	2	0	None Detected	No	
Asbestos	S0028 ABC	Floor | All | Vinyl Floor Tile And Mastic | Grey With Flecks	68	A	0	1440	0	0	None Detected	No	
Asbestos	S0029 ABC	Floor | All | Vinyl Floor Tile And Mastic | 12" Light Blue With Blue Flecks	73,74	A	0	420	0	0	None Detected	No	
Asbestos	S0030 ABC	Other | Door, Window | Caulking | Grey	76	A	420	0	0	0	Chrysotile	Yes	NF
Asbestos	S0031 ABC	Wall | Exterior | Cement Product | Transite	76	A	0	100	0	0	Chrysotile	Yes	NF
Asbestos	V9000	Floor | All | Vinyl Floor Tile And Mastic | 12" Blue With Flecks	41,75	A	0	432	0	0	Confirmed Asbestos	Yes	NF
Asbestos	V9500	Ceiling | Acoustic Tile | Ceiling Tiles (lay-in) | 2x2 Pinhole	15	A	0	600	0	0	Presumed Asbestos	Yes	PF
Asbestos	V9500	Floor | All | Terrazzo |	22,31,32,37,38,43,45,46,65,67	A	0	3347	0	0	Presumed Asbestos	Yes	NF
Asbestos	V9500	Piping | Drain | Parging Cement |	28	A	12	0	0	0	Presumed Asbestos	Yes	F
Asbestos	V0000	Ceiling | Acoustic Tile | Ceiling Tiles (lay-in) | 2x2 Fiberglass	3,4,5,6,8,9,12,14,16	A	0	0	0	0	Non Asbestos	No	
Asbestos	V0000	Ceiling | Acoustic Tile | Ceiling Tiles (lay-in) | 2x2 Laminated Drywall	42	A	0	0	0	0	Non Asbestos	No	
Asbestos	V0000	Ceiling | Acoustic Tile | Ceiling Tiles (lay-in) | 2x2 Pinhole And Fissure	7,12,13,14,15,16,20,26,33,34,35,36,41,44,58	A	0	0	0	0	Non Asbestos	No	
Asbestos	V0000	Ceiling | Acoustic Tile, All | Ceiling Tiles (lay-in) | 2x2 Pinhole And Fleck	17,18,29,30,48,50,51,52,53,54,55,56,57,59,60 61,68,69,71	A	0	0	0	0	Non Asbestos	No	
Asbestos	V0000	Ceiling | Acoustic Tile | Ceiling Tiles (lay-in) | 2x4 Pinhole And Fissure	5,21,22,32,38,43,45,46,47	A	0	0	0	0	Non Asbestos	No	
Asbestos	V0000	Ceiling | Acoustic Tile | Ceiling Tiles (lay-in) | 2x4 Pinhole And Fleck	31,37,65,67,72,73,74,75	A	0	0	0	0	Non Asbestos	No	
Asbestos	V0000	Floor | All | Vinyl Floor Tile And Mastic |	44	A	0	0	0	0	Non Asbestos	No	
Asbestos	V0000	Other | Door | Caulking | Silver	22,43	A	0	0	0	0	Non Asbestos	No	
Paint	L0001	Wall | Masonry | White	1,2,11,19,64	A	0	6050	0	0	Lead (High)	Yes	-
Paint	L0002	Wall | Drywall And Joint Compound | White	3,8,9,10,21,22	A	0	4860	0	0		No	-
Paint	L0003	Wall | Drywall And Joint Compound | Purple	4,5,6,7,72,73,74	A	0	5830	0	0		No	-

HAZMAT	Sample No	System/Component/Material/Sample Description	Locations	Bldg. Phase	LF	SF	EA	%	Type	Positive	Friability
Paint	L0004	Wall | Masonry | Offwhite	12,13,14,15,16,17,18,20,23,24,25,26,27 28,29,30,31,32,33,34,35,36,37,38,41,42 43,44,45,46,47,48,49,50,51,52,53,54,55 56,57,58,59,60,61,62,63,65,66,67,68,69 70,71,75	A	0	120730	0	0	Lead (Low)	Yes	-
Paint	L0005	Ceiling | Drywall And Joint Compound | White	23,24,25,26,27	A	0	3899	0	0		No	-
Paint	L0006	Floor | Wood | Grey	28	A	0	1066	0	0		No	-
Paint	L0007	Other | Wood | Red	3,4,5,6,7,8,9,10,28,44,75	A	0	0	85	0	Lead (High)	Yes	-
Paint	L0008	Floor | Concrete (poured) | Green	64	A	0	700	0	0	Lead (High)	Yes	-
Lead Product	V9000	Bell And Spigot Fittings	19,66	A	0	0	8	0	Lead Product	Yes	-
Lead Product	V9500	Batteries In Emer. Lights	1,7,11,19,21,22,23,24,25,28,30,41,44 45,46,58,64,71,73,74,75	A	0	0	37	0	Presumed Lead Product	Yes	-
PCB	P0001	Caulking | Grey	76	A	150	0	0	0	-	No	-
PCB	V0000	Light Ballasts	1,2,3,4,5,6,7,8,9,10,11,12,13 14,15,16,17,18,19,20,21,22,23,24,25,26 27,28,29,30,31,32,33,34,35,36,37,38,39 40,41,42,43,44,45,46,47,48,49,50,51,52 53,54,55,56,57,58,59,60,61,62,63,64,65 66,67,68,69,70,71,72,73,74,75	A	0	0	0	0	-	No	-
Mould	V9000	Ceiling Tiles (lay-in) |	57	A	0	2	0	0	Mould	Yes	-
Mould	V9500	Ceiling Tiles (lay-in) |	31,57,59	A	0	18	0	0	Presumed Mould	Yes	-
Mould	V9500	Drywall And Joint Compound |	22	A	0	5	0	0	Presumed Mould	Yes	-
Hg	V9000	Light Fixture	1,2,4,5,6,7,8,11,19,34,35,36,49 62,63,64,66,70	A	0	0	46	0	Hg	Yes	-
Hg	V9500	Boiler Control	1	A	0	0	1	0	Presumed Hg	Yes	-
Hg	V9500	Light Fixture	3,9,10,12,13,14,15,16,17,18,20,21,22 23,24,25,26,27,28,29,30,31,32,33,37,38 39,40,41,42,43,44,45,46,47,48,50,51,52 53,54,55,56,57,58,59,60,61,65,67,68,69 71,72,73,74,75	A	0	0	856	0	Presumed Hg	Yes	-
Hg	V0000	Thermostat	4,6,12,13,14,15,16,17,18,20,23,24,25 26,41,47,48,50,51,52,53,54,55,56,57,59 60,61,68,71	A	0	0	3	0	-	No	-

Legend:

Sample number	
S####	Asbestos sample collected
L####	Paint sample collected
P####	PCB sample collected
M####	Mould sample collected
V####	Material visually similar to numbered sample collected
V0000	Known non Hazardous Material
V9000	Material is visually identified as Hazardous Material
V9500	Material is presumed to be Hazardous Material
[Loc. No.]	Abated Material

Units	
SF	Square feet
LF	Linear feet
EA	Each
%	Percentage

NF	Non Friable material.
F	Friable material
PF	Potentially Friable material

APPENDIX VI
Confirmed and Presumed Report

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #1 : Boiler Room
Floor: 1
Room #:
Area (sqft): 668
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Duct	Boiler (exhaust)	Parging Cement	Insulation	Canvas	C	Y		50(7)			SF	S0003ABC	Chrysotile	50-75%	Confirmed Asbestos	F
Piping	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	Y		5(7)			EA	V0002	Chrysotile	50-75%	Confirmed Asbestos	F
Piping	Heating Water Return	Parging Cement	Elbow		C	Y		5(7)			EA	S0004ABC	Chrysotile	50-75%	Confirmed Asbestos	F
Piping	Heating Water Supply	Parging Cement			C	Y		10(7)			EA	S0001AC	Chrysotile	50-75%	Confirmed Asbestos	F

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #1 : Boiler Room
Floor: 1
Room #:
Area (sqft): 668
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT

System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2300		SF	L0001	White	Pb: 2600 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #1 : Boiler Room
Floor: 1
Room #:
Area (sqft): 668
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS

Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #1 : Boiler Room
Floor: 1
Room #:
Area (sqft): 668
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	6	EA	V9000	Yes
Boiler Control	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #2 : Boiler Room Storage
Floor: 1
Room #:
Area (sqft): 113
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Piping	Domestic Water (hot And Cold)	Parging Cement			C	Y		11(7)			EA	S0002A	Chrysotile	50-75%	Confirmed Asbestos	F

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #2 : Boiler Room Storage
Floor: 1
Room #:
Area (sqft): 113
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	350		SF	V0001	White	Pb: 2600 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #2 : Boiler Room Storage
Floor: 1
Room #:
Area (sqft): 113
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #3 : Copier Room
Floor: 1
Room #:
Area (sqft): 114
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" brown and beige streaked			A	Y		114(7)			SF	S0008A	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		12(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		230(7)			SF	S0007A	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #3 : Copier Room
Floor: 1
Room #:
Area (sqft): 114
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Other	Wood	1		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #3 : Copier Room
Floor: 1
Room #:
Area (sqft): 114
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #4 : Principal Office
Floor: 1
Room #:
Area (sqft): 152
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" cream with beige flecks			A	Y		152(7)			SF	S0009A	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking, Grey			A	Y		25(7)			LF	S0010A	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		300(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #4 : Principal Office
Floor: 1
Room #:
Area (sqft): 152
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Other	Wood	1		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #4 : Principal Office
Floor: 1
Room #:
Area (sqft): 152
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9000	Yes
Thermostat	1	EA	V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #5 : Washroom And Hallway
Floor: 1
Room #: 126
Area (sqft): 65
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Wall	Interior	Drywall and joint compound			A	Y		230(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #5 : Washroom And Hallway
Floor: 1
Room #: 126
Area (sqft): 65
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Other	Wood	3		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #5 : Washroom And Hallway
Floor: 1
Room #: 126
Area (sqft): 65
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #6 : Vice Principal Office
Floor: 1
Room #:
Area (sqft): 112
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" cream with beige flecks			A	Y		112(7)			SF	V0009	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking, Grey			A	Y		12(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		330(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #6 : Vice Principal Office
Floor: 1
Room #:
Area (sqft): 112
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Other	Wood	1		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #6 : Vice Principal Office
Floor: 1
Room #:
Area (sqft): 112
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9000	Yes
Thermostat	1	EA	V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #7 : Administration Office
Floor: 1
Room #: 122
Area (sqft): 238
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" white with grey flecks			A	Y		165(7)			SF	S0012A	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		73(7)			SF	S0013A	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		450(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #7 : Administration Office
Floor: 1
Room #: 122
Area (sqft): 238
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Other	Wood	1		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #7 : Administration Office
Floor: 1
Room #: 122
Area (sqft): 238
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #7 : Administration Office
Floor: 1
Room #: 122
Area (sqft): 238
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	4	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #8 : Office
Floor: 1
Room #:
Area (sqft): 87
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		87(7)			SF	V0013	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		200(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #8 : Office
Floor: 1
Room #:
Area (sqft): 87
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT

System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Other	Wood	1		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #8 : Office
Floor: 1
Room #:
Area (sqft): 87
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	1	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #9 : Office
Floor: 1
Room #:
Area (sqft): 112
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" brown and beige streaked			A	Y		112(7)			SF	V0008	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		12(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		230(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #9 : Office
Floor: 1
Room #:
Area (sqft): 112
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Other	Wood	1		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #9 : Office
Floor: 1
Room #:
Area (sqft): 112
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #10 : Caretaker Office
Floor: 1
Room #: 120
Area (sqft): 225
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling[1]	All	Drywall and joint compound			C	Y		225(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		225(7)			SF	V0013	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Piping	Domestic Water (hot And Cold)	Parging Cement	Elbow		A	Y			1(5)		EA	S0002B	Chrysotile	50-75%	Confirmed Asbestos	F

Unable to view above solid ceiling
1 - Dated 2016

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #10 : Caretaker Office
Floor: 1
Room #: 120
Area (sqft): 225
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Other	Wood	1		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Unable to view above solid ceiling

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #10 : Caretaker Office
Floor: 1
Room #: 120
Area (sqft): 225
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	3	EA	V9500	Presumed

Unable to view above solid ceiling

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #11 : Electrical Room
Floor: 1
Room #:
Area (sqft): 162
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	500		SF	V0001	White	Pb: 2600 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #11 : Electrical Room
Floor: 1
Room #:
Area (sqft): 162
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #11 : Electrical Room
Floor: 1
Room #:
Area (sqft): 162
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #12 : Classroom
Floor: 1
Room #: 113
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		670(7)			SF	S0013C	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #12 : Classroom
Floor: 1
Room #: 113
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	L0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #12 : Classroom
Floor: 1
Room #: 113
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #13 : Classroom
Floor: 1
Room #: 112
Area (sqft): 677
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		677(7)			SF	V0013	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		600(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #13 : Classroom
Floor: 1
Room #: 112
Area (sqft): 677
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #13 : Classroom
Floor: 1
Room #: 112
Area (sqft): 677
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #14 : Classroom
Floor: 1
Room #: 111
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		670(7)			SF	V0013	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #14 : Classroom
Floor: 1
Room #: 111
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #14 : Classroom
Floor: 1
Room #: 111
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #15 : Classroom
Floor: 1
Room #: 110
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling[1]	Acoustic Tile	Ceiling Tiles (lay-in), 2x2 pinhole			C	Y		600(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	PF
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		670(7)			SF	V0013	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	All	Drywall and joint compound			A	Y		670(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height
1 - Unable to view date stamp or sample due to height.

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #15 : Classroom
Floor: 1
Room #: 110
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #15 : Classroom
Floor: 1
Room #: 110
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #16 : Classroom
Floor: 1
Room #: 109
Area (sqft): 676
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		676(7)			SF	V0013	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #16 : Classroom
Floor: 1
Room #: 109
Area (sqft): 676
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #16 : Classroom
Floor: 1
Room #: 109
Area (sqft): 676
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #17 : Classroom
Floor: 1
Room #: 108
Area (sqft): 676
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Other	Window	Caulking			A	Y		25(7)			LF	S0010B	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		670(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #17 : Classroom
Floor: 1
Room #: 108
Area (sqft): 676
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #17 : Classroom
Floor: 1
Room #: 108
Area (sqft): 676
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #18 : Classroom
Floor: 1
Room #: 107
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #18 : Classroom
Floor: 1
Room #: 107
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #18 : Classroom
Floor: 1
Room #: 107
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #19 : Janitor Room
Floor: 1
Room #: 102
Area (sqft): 165
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	500		SF	V0001	White	Pb: 2600 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #19 : Janitor Room
Floor: 1
Room #: 102
Area (sqft): 165
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed
Bell And Spigot Fittings	4	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #19 : Janitor Room
Floor: 1
Room #: 102
Area (sqft): 165
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #20 : Classroom
Floor: 1
Room #: 106
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #20 : Classroom
Floor: 1
Room #: 106
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #20 : Classroom
Floor: 1
Room #: 106
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #21 : Ramp
Floor: 1-2
Room #:
Area (sqft): 800
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Wall	All	Drywall and joint compound			A	Y		3200(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #21 : Ramp
Floor: 1-2
Room #:
Area (sqft): 800
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #21 : Ramp
Floor: 1-2
Room #:
Area (sqft): 800
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	10	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #22 : Back Vestibule
Floor: 1
Room #:
Area (sqft): 200
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		70(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF
Wall	Exterior	Drywall and joint compound			A	Y		195(7)		5(3)	SF	S0007B	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #22 : Back Vestibule
Floor: 1
Room #:
Area (sqft): 200
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS

Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #22 : Back Vestibule
Floor: 1
Room #:
Area (sqft): 200
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #22 : Back Vestibule
Floor: 1
Room #:
Area (sqft): 200
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MOULD

System	Material	Visible	Quantity	Unit	Sample Type	Sample No	Sample Description	Mould
Wall[1]	Drywall And Joint Compound	Y	5	SF	V	9500		Presumed

1 - Water damage beside exterior door

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #23 : Classroom
Floor: 1
Room #:
Area (sqft): 1129
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling	All	Drywall and joint compound			C	Y		1129(7)			SF	S0007C	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #23 : Classroom
Floor: 1
Room #:
Area (sqft): 1129
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #23 : Classroom
Floor: 1
Room #:
Area (sqft): 1129
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #23 : Classroom
Floor: 1
Room #:
Area (sqft): 1129
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	32	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #24 : Classroom
Floor: 1
Room #: 152
Area (sqft): 1222
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling	All	Drywall and joint compound			C	Y		1222(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Floor	All	Vinyl Floor Tile and Mastic, 12" brown and beige streaked			A	Y		1222(7)			SF	S0008B	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Sink	Mastic, Gold			A	N		1(7)			EA	S0018	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		12(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #24 : Classroom
Floor: 1
Room #: 152
Area (sqft): 1222
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	3600		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #24 : Classroom
Floor: 1
Room #: 152
Area (sqft): 1222
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #24 : Classroom
Floor: 1
Room #: 152
Area (sqft): 1222
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	32	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #25 : Classroom
Floor: 1
Room #:
Area (sqft): 1188
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling	All	Drywall and joint compound			C	Y		1188(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		12(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #25 : Classroom
Floor: 1
Room #:
Area (sqft): 1188
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	3600		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #25 : Classroom
Floor: 1
Room #:
Area (sqft): 1188
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #25 : Classroom
Floor: 1
Room #:
Area (sqft): 1188
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	32	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #26 : Teacher Supplies Storage Room
Floor: 1
Room #:
Area (sqft): 250
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling	All	Drywall and joint compound			C	Y		250(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #26 : Teacher Supplies Storage Room
Floor: 1
Room #:
Area (sqft): 250
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT

System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	700		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #26 : Teacher Supplies Storage Room
Floor: 1
Room #:
Area (sqft): 250
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	3	EA	V9500	Presumed
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #27 : Office
Floor: 1
Room #: 134
Area (sqft): 110
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Ceiling	All	Drywall and joint compound			C	Y		110(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #27 : Office
Floor: 1
Room #: 134
Area (sqft): 110
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #27 : Office
Floor: 1
Room #: 134
Area (sqft): 110
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #28 : Gym And Stage
Floor: 1
Room #: 158
Area (sqft): 6630
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" cream with beige flecks			A	Y		5564(7)			SF	S0009B	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Piping	Drain	Parging Cement			C	Y		12(7)			LF	V9500	Presumed Asbestos		Presumed Asbestos	F
Piping	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	Y		16(7)	3(6)	1(3)	EA	V0002	Chrysotile	50-75%	Confirmed Asbestos	F

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #28 : Gym And Stage
Floor: 1
Room #: 158
Area (sqft): 6630
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	19000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)
Other[1]	Wood	8		EA	L0007	Red	Pb: 2100 mg/kg	Lead (High)

1 - Door. 20 sf per door. Blue base, red surface

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #28 : Gym And Stage
Floor: 1
Room #: 158
Area (sqft): 6630
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	3	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #28 : Gym And Stage
Floor: 1
Room #: 158
Area (sqft): 6630
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	20	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #29 : Gym Storage Room
Floor: 1
Room #: 157
Area (sqft): 188
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	600		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #29 : Gym Storage Room
Floor: 1
Room #: 157
Area (sqft): 188
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	3	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #30 : Gym Vestibule
Floor: 1
Room #:
Area (sqft): 183
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS															
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Other	Door	Caulking, Grey			A	Y		32(7)			LF	S0021ABC	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #30 : Gym Vestibule
Floor: 1
Room #:
Area (sqft): 183
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	600		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #30 : Gym Vestibule
Floor: 1
Room #:
Area (sqft): 183
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #30 : Gym Vestibule
Floor: 1
Room #:
Area (sqft): 183
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	**Quantity**	**Unit**	**Sample**	**Hazard**
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #31 : Art Supplies Storage
Floor: 1
Room #:
Area (sqft): 443
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		443(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #31 : Art Supplies Storage
Floor: 1
Room #:
Area (sqft): 443
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	1300		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #31 : Art Supplies Storage
Floor: 1
Room #:
Area (sqft): 443
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	5	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #31 : Art Supplies Storage
Floor: 1
Room #:
Area (sqft): 443
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MOULD								
System	Material	Visible	Quantity	Unit	Sample Type	Sample No	Sample Description	Mould
Ceiling[1]	Ceiling Tiles (lay-in)	Y	3	SF	V	9500		Presumed

1 - water stained ceiling tiles

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #32 : Girls Washroom
Floor: 1
Room #:
Area (sqft): 285
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		285(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #32 : Girls Washroom
Floor: 1
Room #:
Area (sqft): 285
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	900		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #32 : Girls Washroom
Floor: 1
Room #:
Area (sqft): 285
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #33 : Office
Floor: 1
Room #:
Area (sqft): 67
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Piping[1]	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	N			9(7)		EA	V0002	Chrysotile	50-75%	Confirmed Asbestos	F

1 - Uncovered

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #33 : Office
Floor: 1
Room #:
Area (sqft): 67
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #33 : Office
Floor: 1
Room #:
Area (sqft): 67
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #34 : Staff Washroom
Floor: 1
Room #:
Area (sqft): 48
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" white with grey flecks			A	Y		48(7)			SF	S0012B	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #34 : Staff Washroom
Floor: 1
Room #:
Area (sqft): 48
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT

System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	150		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #34 : Staff Washroom
Floor: 1
Room #:
Area (sqft): 48
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	1	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #35 : Staff Washroom
Floor: 1
Room #:
Area (sqft): 48
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Piping[1]	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	N			4(7)		EA	V0002	Chrysotile	50-75%	Confirmed Asbestos	F

1 - Uncovered

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #35 : Staff Washroom
Floor: 1
Room #:
Area (sqft): 48
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	150		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #35 : Staff Washroom
Floor: 1
Room #:
Area (sqft): 48
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	1	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #36 : Storage Room
Floor: 1
Room #:
Area (sqft): 100
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		100(7)			SF	S0013B	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Piping[1]	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	N			3(7)		EA	V0002	Chrysotile	50-75%	Confirmed Asbestos	F

1 - Uncovered

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #36 : Storage Room
Floor: 1
Room #:
Area (sqft): 100
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	150		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #36 : Storage Room
Floor: 1
Room #:
Area (sqft): 100
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	1	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #37 : Storage Room
Floor: 1
Room #: 137
Area (sqft): 385
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		385(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Former boys changing room

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #37 : Storage Room
Floor: 1
Room #: 137
Area (sqft): 385
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	1200		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Former boys changing room

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #37 : Storage Room
Floor: 1
Room #: 137
Area (sqft): 385
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	5	EA	V9500	Presumed

Former boys changing room

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #38 : Boys Washroom
Floor: 1
Room #:
Area (sqft): 285
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		285(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #38 : Boys Washroom
Floor: 1
Room #:
Area (sqft): 285
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	900		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #38 : Boys Washroom
Floor: 1
Room #:
Area (sqft): 285
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #39 : Pipe Chase
Floor: 1
Room #:
Area (sqft): 40
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #40 : Pipe Chase
Floor: 1
Room #:
Area (sqft): 40
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #41 : Cafeteria
Floor: 1
Room #:
Area (sqft): 1607
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor[1]	All	Vinyl Floor Tile and Mastic, 12" blue with flecks			A	Y		72(7)			SF	V9000	Confirmed Asbestos		Confirmed Asbestos	NF
Floor	All	Vinyl Floor Tile and Mastic, 12" yellow with flecks			A	Y		1535(7)			SF	S0023ABC	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		62(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Unable to view above ceiling tiles due to height
1 - Homogenous installation with the main floor. Accent tile, no discreet place to sample.

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #41 : Cafeteria
Floor: 1
Room #:
Area (sqft): 1607
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	4800		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #41 : Cafeteria
Floor: 1
Room #:
Area (sqft): 1607
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	**Quantity**	**Unit**	**Sample**	**Hazard**
Batteries In Emer. Lights	2	EA	V9500	Presumed

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #41 : Cafeteria
Floor: 1
Room #:
Area (sqft): 1607
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	**Quantity**	**Unit**	**Sample**	**Hazard**
Light Fixture	17	EA	V9500	Presumed
Thermostat			V0000	

Unable to view above ceiling tiles due to height

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #42 : Kitchen And Pantry
Floor: 1
Room #: 133
Area (sqft): 415
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" beige with brown flecks			A	Y		415(7)			SF	V0013	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #42 : Kitchen And Pantry
Floor: 1
Room #: 133
Area (sqft): 415
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	1200		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #42 : Kitchen And Pantry
Floor: 1
Room #: 133
Area (sqft): 415
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	12	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #43 : Main Entrance Vestibule
Floor: 1
Room #:
Area (sqft): 115
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		115(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #43 : Main Entrance Vestibule
Floor: 1
Room #:
Area (sqft): 115
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	350		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #43 : Main Entrance Vestibule
Floor: 1
Room #:
Area (sqft): 115
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	1	EA	V9500	Presumed

Client: HRCE **Site: 3 French Village Station Road, Upper Tantallon, NS** **Building Name: Tantallon Senior Elementary School**

Location: #44 : First Floor Corridor **Floor: 1** **Room #:** **Area (sqft): 3350**

Survey Date: 2024-02-06 **Last Re-Assessment: 0000-00-00**

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" white with grey flecks			A	Y		3350(7)			SF	V0012	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Piping[1]	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	N			6(7)	1(4)	EA	S0002C	Chrysotile	50-75%	Confirmed Asbestos	F

1 - End of hall in front of back vestibule

Client: HRCE **Site: 3 French Village Station Road, Upper Tantallon, NS** **Building Name: Tantallon Senior Elementary School**

Location: #44 : First Floor Corridor **Floor: 1** **Room #:** **Area (sqft): 3350**

Survey Date: 2024-02-06 **Last Re-Assessment: 0000-00-00**

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	8400		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)
Other	Wood	40		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Client: HRCE **Site: 3 French Village Station Road, Upper Tantallon, NS** **Building Name: Tantallon Senior Elementary School**

Location: #44 : First Floor Corridor **Floor: 1** **Room #:** **Area (sqft): 3350**

Survey Date: 2024-02-06 **Last Re-Assessment: 0000-00-00**

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	9	EA	V9500	Presumed

Client: HRCE **Site: 3 French Village Station Road, Upper Tantallon, NS** **Building Name: Tantallon Senior Elementary School**

Location: #44 : First Floor Corridor **Floor: 1** **Room #:** **Area (sqft): 3350**

Survey Date: 2024-02-06 **Last Re-Assessment: 0000-00-00**

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	25	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #45 : Stairwell
Floor: 1-2
Room #:
Area (sqft): 500
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		500(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #45 : Stairwell
Floor: 1-2
Room #:
Area (sqft): 500
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	1500		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #45 : Stairwell
Floor: 1-2
Room #:
Area (sqft): 500
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #45 : Stairwell
Floor: 1-2
Room #:
Area (sqft): 500
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	6	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #46 : Stairwell
Floor: 1-2
Room #:
Area (sqft): 500
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		500(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #46 : Stairwell
Floor: 1-2
Room #:
Area (sqft): 500
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	1500		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #46 : Stairwell
Floor: 1-2
Room #:
Area (sqft): 500
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #46 : Stairwell
Floor: 1-2
Room #:
Area (sqft): 500
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	6	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #47 : Office
Floor: 2
Room #: 216
Area (sqft): 308
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" cream with beige flecks			A	Y		308(7)			SF	S0009C	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		12(7)			LF	S0010C	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		308(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #47 : Office
Floor: 2
Room #: 216
Area (sqft): 308
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	900		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #47 : Office
Floor: 2
Room #: 216
Area (sqft): 308
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	4	EA	V9500	Presumed
Thermostat	1	EA	V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #48 : Classroom
Floor: 2
Room #: 211
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #48 : Classroom
Floor: 2
Room #: 211
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #48 : Classroom
Floor: 2
Room #: 211
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #49 : Storage Room
Floor: 2
Room #:
Area (sqft): 81
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	280		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #49 : Storage Room
Floor: 2
Room #:
Area (sqft): 81
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	1	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #50 : Classroom
Floor: 2
Room #: 210
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS															
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" brown and beige streaked			A	Y		675(7)			SF	S0008C	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #50 : Classroom
Floor: 2
Room #: 210
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #50 : Classroom
Floor: 2
Room #: 210
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #51 : Classroom
Floor: 2
Room #: 209
Area (sqft): 680
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" light brown with brown streaks			A	Y		680(7)			SF	S0024A	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		680(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #51 : Classroom
Floor: 2
Room #: 209
Area (sqft): 680
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #51 : Classroom
Floor: 2
Room #: 209
Area (sqft): 680
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #52 : Classroom
Floor: 2
Room #: 208
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" green with light green streaks			A	Y		670(7)			SF	S0025A	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #52 : Classroom
Floor: 2
Room #: 208
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #52 : Classroom
Floor: 2
Room #: 208
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #53 : Classroom
Floor: 2
Room #: 207
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic			A	Y		670(7)			SF	V0008	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #53 : Classroom
Floor: 2
Room #: 207
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #53 : Classroom
Floor: 2
Room #: 207
Area (sqft): 670
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #54 : Classroom
Floor: 2
Room #: 206
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" light brown with brown streaks			A	Y		673(7)			SF	S0024B	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		680(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #54 : Classroom
Floor: 2
Room #: 206
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #54 : Classroom
Floor: 2
Room #: 206
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #55 : Classroom
Floor: 2
Room #: 205
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" green with light green streaks			A	Y		673(7)			SF	S0025BC	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		680(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #55 : Classroom
Floor: 2
Room #: 205
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #55 : Classroom
Floor: 2
Room #: 205
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #56 : Classroom
Floor: 2
Room #: 204
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic			A	Y		675(7)			SF	V0008	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		680(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #56 : Classroom
Floor: 2
Room #: 204
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT

System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #56 : Classroom
Floor: 2
Room #: 204
Area (sqft): 675
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #57 : Classroom
Floor: 2
Room #: 203
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" light brown with brown streaks			A	Y		673(7)			SF	S0024C	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #57 : Classroom
Floor: 2
Room #: 203
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT

System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #57 : Classroom
Floor: 2
Room #: 203
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #57 : Classroom
Floor: 2
Room #: 203
Area (sqft): 673
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MOULD

System	Material	Visible	Quantity	Unit	Sample Type	Sample No	Sample Description	Mould
Ceiling	Ceiling Tiles (lay-in)	Y	2	SF	V	9000		Yes
Ceiling[1]	Ceiling Tiles (lay-in)	Y	10	SF	V	9500		Presumed

1 - water stained ceiling tiles

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #58 : Storage Area
Floor: 2
Room #:
Area (sqft): 168
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" white with grey flecks			A	Y		165(7)			SF	S0012C	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #58 : Storage Area
Floor: 2
Room #:
Area (sqft): 168
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	400		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #58 : Storage Area
Floor: 2
Room #:
Area (sqft): 168
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #58 : Storage Area
Floor: 2
Room #:
Area (sqft): 168
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #59 : Classroom
Floor: 2
Room #: 234
Area (sqft): 1150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		600(7)			SF	S0007D	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #59 : Classroom
Floor: 2
Room #: 234
Area (sqft): 1150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT

System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	3200		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #59 : Classroom
Floor: 2
Room #: 234
Area (sqft): 1150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #59 : Classroom
Floor: 2
Room #: 234
Area (sqft): 1150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MOULD

System	Material	Visible	Quantity	Unit	Sample Type	Sample No	Sample Description	Mould
Ceiling[1]	Ceiling Tiles (lay-in)	Y	5	SF	V	9500		Presumed

1 - water stained ceiling tiles

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #60 : Classroom
Floor: 2
Room #:
Area (sqft): 1150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic			A	Y		1150(7)			SF	V0008	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Sink	Mastic, Gold			A	N		1(7)			EA	V0018	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking						25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		600(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #60 : Classroom
Floor: 2
Room #:
Area (sqft): 1150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall[1]	Masonry	3200		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

1 - Off-white base, light blue surface

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #60 : Classroom
Floor: 2
Room #:
Area (sqft): 1150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #61 : Classroom
Floor: 2
Room #:
Area (sqft): 1220
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" light brown with brown streaks			A	Y		1220(7)			SF	V0024	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		25(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #61 : Classroom
Floor: 2
Room #:
Area (sqft): 1220
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	3000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #61 : Classroom
Floor: 2
Room #:
Area (sqft): 1220
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	22	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #62 : Storage Room
Floor: 2
Room #:
Area (sqft): 160
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	800		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #62 : Storage Room
Floor: 2
Room #:
Area (sqft): 160
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	3	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #63 : Storage Room
Floor: 2
Room #:
Area (sqft): 160
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	800		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #63 : Storage Room
Floor: 2
Room #:
Area (sqft): 160
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	3	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #64 : Mechanical Room
Floor: 2
Room #: 231
Area (sqft): 700
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Piping	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	Y		4(7)			EA	V0002	Chrysotile	50-75%	Confirmed Asbestos	F
Piping	Heating Water Supply	Parging Cement	Elbow		C	Y		5(7)			EA	S0001B	Chrysotile	50-75%	Confirmed Asbestos	F

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #64 : Mechanical Room
Floor: 2
Room #: 231
Area (sqft): 700
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	2400		SF	V0001	White	Pb: 2600 mg/kg	Lead (High)
Floor	Concrete (poured)	700		SF	L0008	Green	Pb: 14000 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #64 : Mechanical Room
Floor: 2
Room #: 231
Area (sqft): 700
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #64 : Mechanical Room
Floor: 2
Room #: 231
Area (sqft): 700
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	7	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #65 : Girls Washroom
Floor: 2
Room #: 229
Area (sqft): 380
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		380(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #65 : Girls Washroom
Floor: 2
Room #: 229
Area (sqft): 380
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	1200		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #65 : Girls Washroom
Floor: 2
Room #: 229
Area (sqft): 380
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	3	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #66 : Janitor Room
Floor: 2
Room #:
Area (sqft): 80
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Piping	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	Y		2(7)			EA	V0002	Chrysotile	50-75%	Confirmed Asbestos	F

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #66 : Janitor Room
Floor: 2
Room #:
Area (sqft): 80
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	250		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #66 : Janitor Room
Floor: 2
Room #:
Area (sqft): 80
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Bell And Spigot Fittings	4	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #66 : Janitor Room
Floor: 2
Room #:
Area (sqft): 80
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #67 : Boys Washroom
Floor: 2
Room #:
Area (sqft): 384
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Terrazzo			A	Y		384(7)			SF	V9500	Presumed Asbestos		Presumed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #67 : Boys Washroom
Floor: 2
Room #:
Area (sqft): 384
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	1200		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #67 : Boys Washroom
Floor: 2
Room #:
Area (sqft): 384
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	3	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #68 : Library
Floor: 2
Room #: 226
Area (sqft): 1440
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Wall	Interior	Drywall and joint compound			A	Y		2000(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #68 : Library
Floor: 2
Room #: 226
Area (sqft): 1440
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	3000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #68 : Library
Floor: 2
Room #: 226
Area (sqft): 1440
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	42	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #69 : Library Office
Floor: 2
Room #:
Area (sqft): 108
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS

System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" light brown with brown streaks			A	Y		108(7)			SF	V0024	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		120(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #69 : Library Office
Floor: 2
Room #:
Area (sqft): 108
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT

System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	300		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #69 : Library Office
Floor: 2
Room #:
Area (sqft): 108
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY

Component	Quantity	Unit	Sample	Hazard
Light Fixture	2	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #70 : Storage And Server Room
Floor: 2
Room #:
Area (sqft): 150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Piping	Domestic Water (hot And Cold)	Parging Cement	Elbow		C	Y		5(7)			EA	V0002	Chrysotile	50-75%	Confirmed Asbestos	F
Wall	Interior	Drywall and joint compound			A	Y		300(7)			SF	S0007E	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #70 : Storage And Server Room
Floor: 2
Room #:
Area (sqft): 150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	500		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #70 : Storage And Server Room
Floor: 2
Room #:
Area (sqft): 150
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	4	EA	V9000	Yes

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #71 : Classroom
Floor: 2
Room #: 222
Area (sqft): 1782
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" brown and beige streaked			A	Y		1782(7)			SF	V0008	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking			A	Y		12(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		1000(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #71 : Classroom
Floor: 2
Room #: 222
Area (sqft): 1782
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	5100		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #71 : Classroom
Floor: 2
Room #: 222
Area (sqft): 1782
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #71 : Classroom
Floor: 2
Room #: 222
Area (sqft): 1782
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	30	EA	V9500	Presumed
Thermostat			V0000	

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #72 : Staff Room
Floor: 2
Room #: 218
Area (sqft): 910
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Other	Window	Caulking			A	Y		40(7)			LF	V0010	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall	Interior	Drywall and joint compound			A	Y		1000(7)			SF	S0007FG	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #72 : Staff Room
Floor: 2
Room #: 218
Area (sqft): 910
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	20	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #73 : Women's Staff Washroom
Floor: 2
Room #: 219
Area (sqft): 140
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Wall	Interior	Drywall and joint compound			A	Y		300(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #73 : Women's Staff Washroom
Floor: 2
Room #: 219
Area (sqft): 140
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #73 : Women's Staff Washroom
Floor: 2
Room #: 219
Area (sqft): 140
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	20	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #74 : Mens Staff Washroom
Floor: 2
Room #: 220
Area (sqft): 140
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Wall	Interior	Drywall and joint compound			A	Y		300(7)			SF	V0007	Chrysotile	0.5-5%	Confirmed Asbestos	NF

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #74 : Mens Staff Washroom
Floor: 2
Room #: 220
Area (sqft): 140
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	1	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #74 : Mens Staff Washroom
Floor: 2
Room #: 220
Area (sqft): 140
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	20	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #75 : 2nd Floor Corridor
Floor: 2
Room #:
Area (sqft): 2000
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Floor	All	Vinyl Floor Tile and Mastic, 12" cream with beige flecks			A	Y		1280(7)			SF	V0009	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Floor[1]	All	Vinyl Floor Tile and Mastic, 12" blue with flecks			A	Y		360(7)			SF	V9000	Confirmed Asbestos		Confirmed Asbestos	NF
Floor	All	Vinyl Floor Tile and Mastic			A	Y		360(7)			SF	V0023	Chrysotile	0.5-5%	Confirmed Asbestos	NF

1 - Homogenous installation with the main floor. Accent tile, no discreet place to sample

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #75 : 2nd Floor Corridor
Floor: 2
Room #:
Area (sqft): 2000
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PAINT								
System	Item	Good	Poor	Unit	Sample	Sample Description	Amount	Hazard
Wall	Masonry	4000		SF	V0004	Offwhite	Pb: 170 mg/kg	Lead (Low)
Other	Wood	27		EA	V0007	Red	Pb: 2100 mg/kg	Lead (High)

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #75 : 2nd Floor Corridor
Floor: 2
Room #:
Area (sqft): 2000
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

PB PRODUCTS				
Component	Quantity	Unit	Sample	Hazard
Batteries In Emer. Lights	6	EA	V9500	Presumed

Client: HRCE
Site: 3 French Village Station Road, Upper Tantallon, NS
Building Name: Tantallon Senior Elementary School
Location: #75 : 2nd Floor Corridor
Floor: 2
Room #:
Area (sqft): 2000
Survey Date: 2024-02-06
Last Re-Assessment: 0000-00-00

MERCURY				
Component	Quantity	Unit	Sample	Hazard
Light Fixture	18	EA	V9500	Presumed

Client: HRCE

Site: 3 French Village Station Road, Upper Tantallon, NS

Building Name: Tantallon Senior Elementary School

Location: #76 : Exterior

Floor:

Room #:

Area (sqft): 0

Survey Date: 2024-02-06

Last Re-Assessment: 0000-00-00

ASBESTOS																
System	Component	Material	Item	Covering	A*	V*	AP*	Good	Fair	Poor	Unit	Sample	Asbestos Type	Amount	Hazard	Friable
Other	Door	Caulking, Grey			A	Y		20(7)			LF	S0030A	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Other	Window	Caulking, Grey			A	Y		400(7)			LF	S0030BC	Chrysotile	0.5-5%	Confirmed Asbestos	NF
Wall[1]	Exterior	Cement Product, Transite			A	Y		100(7)			SF	S0031ABC	Chrysotile	10-25%	Confirmed Asbestos	NF

1 - Panels around windows painted red and blue. Sampled from previously damaged area

Legend:

Sample number	
S####	Asbestos sample collected
L####	Paint sample collected
P####	PCB sample collected
M####	Mould sample collected
V####	Material is visually identified to be identical to S####
V0000	Known non hazardous material
V9000	Material visually identified as a Hazardous Material
V9500	Material is presumed to be a hazardous material

Units	
SF	Square feet
LF	Linear feet
EA	Each
%	Percentage
LF	Linear feet

Other	
A	Access
V	Visible
AP	Air Plenum
F	Friable material
NF	Non Friable material
PF	Potentially Friable material
Pb	Lead
Hg	Mercury
As	Arsenic
Cr	Chromium

Access	
A	Accessible to all building occupants
B	Accessible to maintenance and operations staff without a ladder
C	Accessible to maintenance and operations staff with a ladder. Also rarely entered, locked areas
D	Not normally accessible

Condition	
Good	No visible damage or deterioration
Fair	Minor, repairable damage, cracking, delamination or deterioration
Poor	Irreparable damage or deterioration with exposed and missing material

Visible	
Y	The material is visible when standing on the floor of the room, without the removal or opening of other building components (e.g. ceiling tiles or access panels).
N	The material is not visible to view when standing on the floor of the room and requires the removal of a building component (e.g. ceilings tiles or access panels) to view and access. Includes rarely entered crawlspaces, attic spaces, etc. Observations will be limited to the extent visible from the access points.

Air Plenum	
Yes or No	The material is in a return air plenum or in a direct airstream or there is evidence of air erosion (e.g. duct for heating or cooling blowing directly on or across an ACM). This field is only completed where Air Plenum consideration is required by regulation.

Colour Coding	
	The material is known to contain regulated concentrations of asbestos; either by analytical results or visible identification (use of the V9000 code).
	The material is presumed to contain asbestos; based on visual appearances; typically a material known to historically contain asbestos; however, not sampled due to limited access or the destructive nature of the sampling.

Action					
(1)	Clean up of ACM Debris	(2)	Precautions for Access Which may Disturb ACM Debris	(3)	ACM removal
(4)	Precautions for Work Which may Disturb ACM in Poor Condition	(5)	Proactive ACM removal (Minimum repair required for fair condition)	(6)	ACM repair
(7)	Management program and surveillance				

APPENDIX VII
Photographs

S0001A (Confirmed Asbestos), Piping, Heating Water Supply, Parging Cement, Boiler Room (Location #: 1)

S0001B (Confirmed Asbestos), Piping, Heating Water Supply, Parging Cement, Mechanical Room (Location #: 64)

S0002B (Confirmed Asbestos), Piping, Domestic Water (Hot and Cold), Parging Cement, Caretaker Office (Location #: 10)

S0003A (Confirmed Asbestos), Duct, Boiler, Parging Cement, Boiler Room (Location #: 1)

S0004A (Confirmed Asbestos), Piping, Heating Water Return, Parging Cement, Boiler Room (Location #: 1)

S0007B (Confirmed Asbestos), Wall, Exterior, Drywall and joint compound, Back Vestibule (Location #: 22)

S0008A (Confirmed Asbestos), 12" brown and beige streaked, Floor, All, Vinyl Floor Tile and Mastic, Copier Room (Location #: 3)

S0009A (Confirmed Asbestos), 12" cream with beige flecks, Floor, All, Vinyl Floor Tile and Mastic, Principal Office (Location #: 4)

S0010A (Confirmed Asbestos), Grey, Other, Window, Caulking, Principal Office (Location #: 4)

S0012A (Confirmed Asbestos), 12" white with grey flecks, Floor, All, Vinyl Floor Tile and Mastic, Administration Office (Location #: 7)

S0013A (Confirmed Asbestos), 12" beige with brown flecks, Floor, All, Vinyl Floor Tile and Mastic, Administration Office (Location #: 7)

S0018 (Confirmed Asbestos), Other, Sink, Mastic, Gold, Classroom (Location #: 24)

S0021A (Confirmed Asbestos), Grey, Other, Door, Caulking, Gym Vestibule (Location #: 30)

S0021A (Confirmed Asbestos), Grey, Other, Door, Caulking, Gym Vestibule (Location #: 30)

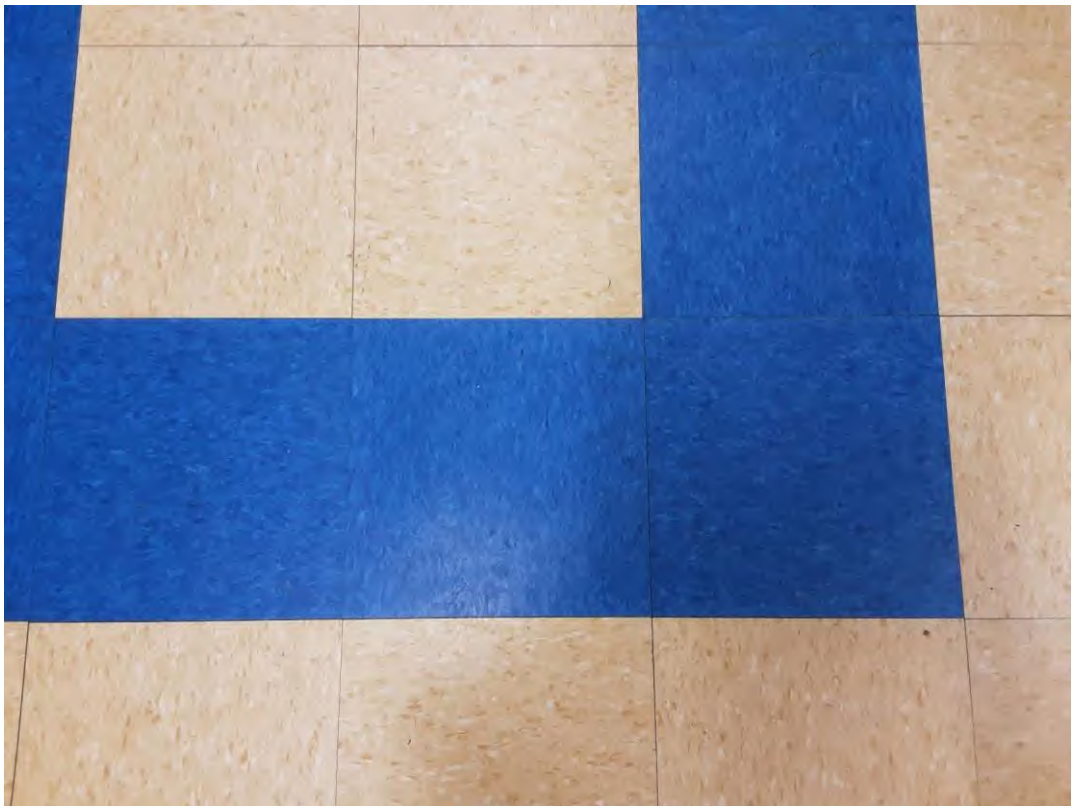
S0023B (Confirmed Asbestos), 12" yellow with flecks, Floor, All, Vinyl Floor Tile and Mastic, Cafeteria (Location #: 41)

S0024A (Confirmed Asbestos), 12" light brown with brown streaks, Floor, All, Vinyl Floor Tile and Mastic, Classroom (Location #: 51)

S0025A (Confirmed Asbestos), 12" green with light green streaks, Floor, All, Vinyl Floor Tile and Mastic, Classroom (Location #: 52)

S0030A (Confirmed Asbestos), Grey, Other, Door, Caulking, Exterior (Location #: 76)

S0031A (Confirmed Asbestos), Transite, Wall, Exterior, Cement Product, Exterior (Location #: 76)
Panels around windows painted red and blue. Sampled from previously damaged area



V9000 (Confirmed Asbestos), 12" blue with flecks, Floor, All, Vinyl Floor Tile and Mastic, Cafeteria (Location #: 41)
Homogenous installation with the main floor. Accent tile, no discreet place to sample.

V9500 (Presumed Asbestos), 2'x2' pinhole, Ceiling, ACOUSTIC TILE, Ceiling Tiles (lay-in), Classroom (Location #: 15)
Unable to view date stamp or sample due to height.

V9500 (Presumed Asbestos), Floor, All, Terrazzo, Back Vestibule (Location #: 22)

V9500 (Presumed Asbestos), Piping, Drain, Parging Cement, Gym And Stage (Location #: 28)

L0001(Lead, High), White, Wall, Boiler Room (Location #: 1)

L0004(Lead, Low), Offwhite, Wall, Classroom (Location #: 12)

L0007(Lead, High), Red, Door, Gym And Stage (Location #: 28)
Blue base, red surface

L0008(Lead, High), Green, Floor, Mechanical Room (Location #: 64)

Pb Products, V9500(Presumed), Batteries in Emer. Lights, Administration Office (Location #: 7)

Pb Products, V9000(Yes), BELL AND SPIGOT FITTINGS, Janitor Room (Location #: 19)

Mercury, V9500(Presumed), BOILER CONTROL, Boiler Room (Location #: 1)

Mercury, V9000(Yes), LIGHT FIXTURE, Boiler Room Storage (Location #: 2)

Mould, (Yes), Ceiling, Ceiling Tiles (lay-in), Classroom (Location #: 57)
Visible mould growth

PINCHIN

Halifax
Regional Centre for Education

FINAL

Asbestos Management Program

HRCE Facilities

Prepared for:

Halifax Regional Centre for Education
33 Spectacle Lake Drive
Dartmouth, Nova Scotia B3B 1W8

August 28, 2023

Pinchin File: 322126.000

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Approved Abatement Contractors

Company	Contact Name	Phone	Email
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APPENDICES

1.0 INTRODUCTION

Halifax Regional Centre for Education (HRCE) is committed to protect the health and safety of workers and occupants. This Asbestos Management Program (AMP) has been developed to meet responsibilities as an employer, and as a building owner to manage operational issues respecting asbestos and to maintain compliance with applicable regulations for disturbance of asbestos-containing materials (ACM) during demolition, renovation, alteration, maintenance, repair or other activities.

2.0 SCOPE

The AMP provides information and procedures for Asbestos Management of all HRCE owned or occupied facilities in Nova Scotia.

The AMP applies to all HRCE staff as well as all service providers and contractors performing work in HRCE facilities.

The AMP outlines requirements for HRCE personnel involved in acquisition of property which may contain ACM. It applies to all categories of property with the exception of vacant lands. If HRCE decides to lease property in the future ACM should be considered when developing their lease agreement and this AMP should be amended to address leased properties occupied by the HRCE.

The AMP is a management system to control the disturbance of ACM during demolition, renovation, alteration, maintenance, repair or other activities.

The AMP incorporates the following elements:

- Asbestos Assessments and Reassessments.
- Regulatory Requirements and HRCE Policies.
- Roles and Responsibilities.
- Notifications.
- Training Requirements.
- Emergency Reaction and Procedures.
- Record Keeping.
- Contractor Requirements.

3.0 OBJECTIVE

The AMP is a management system primarily intended to identify ACM and control disturbance of ACM by using proper procedures during demolition, renovation, alteration, maintenance, repair or other activities. The objective in preparing and instituting this AMP is to ensure that known or suspected ACM is managed

so that maintenance staff, construction workers and occupants are safeguarded in accordance with applicable regulations.

4.0 BACKGROUND INFORMATION AND HEALTH EFFECTS

The following is a very brief summary of the hazards and health effects from asbestos exposure:

- Occupational exposure to asbestos can cause fatal lung disease.
- Asbestos must become airborne and be inhaled to be hazardous. A physical disturbance or direct contact with ACM is required to cause it to become airborne. The mere presence of asbestos is not hazardous.
- Asbestos may remain in buildings so long as it is in good condition and undisturbed. No Provincial or Federal Regulations require the removal of ACM as long as it is enclosed, encapsulated or managed appropriately and removed prior to building demolition.

5.0 REGULATORY REQUIREMENTS AND HRCE POLICIES

5.1 Regulatory Requirements

This AMP was implemented in response to the following legislation in effect as of August 28, 2023.

All building operations, whether performed by HRCE, or service providers, shall adhere to the requirements outlined in this document and all applicable regulations, guidance documents and acceptable professional standards.

The following regulations and guidelines were in place at the time this AMP was prepared:

1. Occupational Health and Safety Act, N.S. Reg. 52/2013.
2. A Guide to Removal of Friable Asbestos-Containing Material.
3. A Guide to Assessment and Management of Asbestos in the Workplace.
4. Asbestos Waste Management Regulations, N.S. Reg. 53/95

6.0 HRCE POLICIES RELATED TO ASBESTOS

HRCE has established the following policies related to asbestos independent of applicable regulations:

- HRCE may opt for removal of ACM with minor damage as opposed to repair or encapsulation when cost-effective unless removal is not practicable. ACM with major damage must be removed.
- At existing leased properties where HRCE is a tenant, when ACM is discovered during any improvement, addition, renovation, demolition, maintenance, repair of any kind, or at

any other time, the Owner (Landlord) shall promptly remove the ACM from the leased premises, if possible within the existing lease agreement.

- HRCE may perform Low Risk asbestos operations, where appropriately trained to perform the work.
- All Moderate and High asbestos operations must be undertaken by an Asbestos Abatement Contractor. Asbestos Abatement Contractors may also perform Low Risk asbestos operations.

7.0 ASBESTOS-CONTAINING MATERIALS AT HRCE FACILITIES

Refer to the individual Asbestos Assessment or subsequent Asbestos Reassessment Reports prepared for the Facility, provided in Appendix G. In some cases, Hazardous Materials Assessment or Designated Substance Survey Reports have been prepared and these reports include information regarding asbestos and other hazardous materials (e.g. lead, mercury, silica, and PCBs).

All assessment reports or subsequent Asbestos Reassessment Reports have been, or will be, prepared to comply with applicable asbestos regulations and this AMP.

Asbestos Assessment Reports are key components of this AMP, as the reports define the locations of ACM and Presumed ACM (PACM) present in the facility, the condition of ACM, the friability, the type of asbestos and the approximate quantity.

7.1 Asbestos Assessments

Refer to the Asbestos Assessment or Hazardous Building Materials Assessment Report in Appendix G for further information on the methodology of the assessment(s) completed for the Facility.

HRCE will engage a Consultant to perform asbestos assessments for all facilities. The report is to be completed following a methodology compliant with applicable regulations and acceptable professional standards. The report must comment on the condition of the ACM, include recommendations for remedial action, and is to include the risk classification for any abatement required.

In facilities which are leased, copies of the initial asbestos assessment, and any subsequent reassessments, shall be provided by the Owner to HRCE, and maintained on Site, or HRCE will have an asbestos assessment report prepared and complete subsequent reassessments, limited to the leased space.

7.2 Reassessment of ACM

All ACM and PACM identified in the Facilities will be inspected at reasonable intervals, and at minimum annually, a reassessment of all ACM and PACM will be completed with written documentation.

The reassessment of ACM and PACM will be completed by a Consultant (Qualified Person) or HRCE staff, using the form provided in Appendix E.

7.2.1 Reassessment in Unassessed Areas

Where assessments have been completed in only a portion of schools, all non-sampled materials (including but not limited to ceiling tiles, vinyl floor tiles, vinyl sheet floor, etc.) are to be presumed to contain asbestos, and reassessed during their yearly inspection of the suites.

When feasible, arrangements should be made to access previously unassessed areas during the annual reassessments. If during any annual or other inspections, materials not previously sampled are found to be damaged (spalling finishes, debris, etc.), samples are to be collected and the material is to be identified as asbestos or non-asbestos. Remedial action and removal procedures are to be decided accordingly if the materials are found to contain asbestos.

7.3 Distribution of Assessment and Reassessment Reports

HRCE will ensure that each assessment and reassessment report is distributed or accessible to the following:

- HRCE JOHSC and/or Occupational Health and Safety Representative (OHS Representative).
- A hard copy will be sent to each facility. Electronic copies will be made available.
- Building Operators, Maintenance Personnel, Janitorial Staff.
- Project Managers or Construction Managers planning or performing work in a HRCE Building.
- Outside contractors that could potentially disturb ACM through their work.

8.0 PRE-CONSTRUCTION HAZARDOUS BUILDING MATERIALS ASSESSMENT

Prior to the commencement of any work that requires renovation, construction or demolition, the Facility or specific areas of the Facility to be impacted by the work shall be assessed for ACM, as well as other hazardous building materials (e.g. lead, mercury, silica, and PCBs), (the "**Pre-Construction Hazardous Building Materials Assessment**").

The Pre-Construction Hazardous Building Materials Assessment must be performed by a Consultant and include destructive or intrusive testing of enclosed areas.

Sampling may include the following:

- Prior to disturbance of materials presumed to contain asbestos listed in the assessment reports, collect samples of materials that were not previously sampled/identified (refer to Asbestos Assessment Report or Hazardous Materials Report).
- Unidentified suspect materials that were not sampled during the initial survey, but which may be present located within enclosed areas such as pipe/duct insulations in ceiling spaces, chases or shafts. If such areas will be affected by the work, entry to these areas and sampling of suspect materials shall be performed.
- Assessment of existing visible floor, wall and ceiling finishes to assess and sample concealed finishes (e.g., vinyl flooring under carpet or other vinyl flooring, drywall over plaster, etc.)
- Other hazardous building materials shall be sampled and analyzed or identified prior to disturbance as required by provincial regulatory requirements. Other hazardous building materials may include lead, mercury, silica, polychlorinated biphenyls, mould, etc.

Upon receiving the Pre-Construction Hazardous Building Materials Assessment report, if asbestos and/or other hazardous building materials are present in the area, specifications (large scale projects) or a scope of work (small scale projects) for removal shall be prepared, provided, and reviewed by the Constructor or contractor prior to any renovation, construction, or demolition work.

HRCE will employ an Abatement Contractor to perform abatement of other hazardous materials and/or ACM that may be disturbed by construction, renovation, or demolition work using appropriate regulated procedures.

9.0 REMEDIAL WORK – DAMAGED MATERIALS

Where damage is observed, HRCE will refer to the existing Asbestos or Hazardous Building Materials Assessment or subsequent Asbestos Reassessment Reports (as required) to determine if the damaged materials are ACM or PACM.

Where damaged suspected asbestos-containing materials are not included in the existing Asbestos or Hazardous Building Materials Assessment Report(s), an assessment and/or sampling of these damaged materials must be conducted prior to repair of damage, unless materials are treated as ACM, and appropriate asbestos operations are followed.

If damaged materials contain asbestos and the regulated abatement procedure to be used is not detailed in the recommendations section of the existing Asbestos or Hazardous Building Assessment Materials report, HRCE will contact a Consultant to determine applicable asbestos abatement procedures and to develop a scope of work and performance specifications, as required.

HRCE will employ an Abatement Contractor to perform the remedial work required (removal of damaged ACM) and a Consultant to perform inspection and air monitoring as soon as practicable upon receiving the report/notice of damage.

10.0 NOTIFICATION

10.1 Notification to Occupants

HRCE will inform the JOSHC of any planned sampling, assessment or abatement work that is to be conducted within the applicable HRCE building(s) to ensure that all aspects of committee involvement are complied with.

Tenants must be notified of ACM in their leased space and in common areas of the building that they have access to and may disturb the ACM.

HRCE will notify all new tenants of the presence of ACM in the space they are occupying. Notification is to be completed prior to occupancy via the tenant lease agreement.

Upon institution of this AMP, and upon completion of asbestos assessments in a recently assessed or recently purchased property, where tenants have not been notified via their lease agreement, HRCE will notify occupants of the presence of asbestos in the space they are occupying.

10.2 Notification of Contractors

Contractors that perform work which may disturb ACM within the Facility must be notified of the presence of asbestos (by providing the Asbestos or Hazardous Building Materials Assessment Report). Notification will be sent to these parties prior to project or maintenance work (e.g. janitorial, telephone, cable, etc.).

Contractors are to inform all sub-trades of the presence of all ACM or PACM identified in the work area and include this information in their respective contract agreement.

If suspect ACM not identified in the contract agreement is discovered during the course of the work, the Contractors are to stop all work which might disturb the suspect ACM and notify the appropriate HRCE personnel (i.e. Property Manager and/or Project Manager as applicable) or Constructor, as the case may be.

Prior to performing work, contractors must complete and return the Contractors Notification Package (Appendix B) and HRCE will maintain acknowledgement forms from these packages.

10.3 Notification of Maintenance Personnel

HRCE will inform their own staff that will perform janitorial work, maintenance work or project work of the presence of asbestos in the Facility in which they are working. This will be completed by providing access

to the AMP and the most recent Asbestos Assessment or Hazardous Building Materials Assessment Report and training.

10.4 Notification of Project Managers, Architects and Engineers

HRCE will inform their project managers, architects and engineers of the presence of asbestos in the facility in which they are arranging for or planning work. This will be completed by providing access to the AMP, and the most recent Asbestos Assessment or Hazardous Building Materials Assessment Report.

10.5 Notification of Authorities Having Jurisdiction

Regulations in place at the time of this AMP development do not require notifications regarding asbestos-containing materials, except for:

- A major release of a hazardous substance (per Section 63 of the Occupational Health and Safety Act).

11.0 TRAINING REQUIREMENTS

HRCE will employ a Consultant to ensure staff have received appropriate training.

HRCE employees which will not undertake asbestos abatement work or will not disturb asbestos may be provided training including the following:

- Health effects of asbestos exposure.
- Overview of the existence of applicable regulations and risk classification.
- Identification of common types of ACM (so as to not disturb them).
- Understanding a typical asbestos survey report.
- Their responsibilities under the policies in this AMP and Regulations.

HRCE employees will undertake asbestos abatement work shall receive training including the following:

- Health effects of asbestos exposure.
- Applicable regulations and risk classification.
- Identification of common types of ACM.
- Asbestos Work Procedures limited to Low Risk Operations.
- Understanding a typical asbestos survey report.
- Their responsibilities under the policies in this AMP and Regulations.

HRCE will maintain a record of training of their employees.

HRCE requires all service providers, contractors, etc. to provide appropriate training to all workers who perform work in HRCE Facilities which will, or potentially may, disturb ACM.

12.0 RESPONSE TO DISTURBANCE OF ASBESTOS, PROCEDURES AND CONTACTS

HRCE staff and contractors may encounter fallen material that is suspected confirmed to contain asbestos or uncover a material that was previously unidentified and is suspected to contain asbestos. HRCE staff and contractors shall follow the protocol "Response to Disturbance of Asbestos" in Appendix C.

13.0 CLASSIFICATION OF ABATEMENT WORK

Refer to Appendix F for the classification of asbestos work.

14.0 INSPECTION AND AIR MONITORING OF ASBESTOS WORK

14.1 Visual Inspection

The primary method of ensuring compliance when conducting asbestos removal or abatement work is visual inspection of the site and work practices by a Competent Worker or Asbestos Consultant.

14.2 Air Monitoring During Asbestos Work

Per the "Asbestos in the Workplace: A Guide to the Removal of Friable Asbestos Containing Material" dated November 21, 2013:

- During the removal of friable asbestos-containing materials, where a Glove Bag is not used, and the air from the enclosure is exhausted inside the building, daily air sampling is required outside the enclosure.
- At the completion of removal of friable asbestos-containing materials, clearance air sampling must be performed prior to dismantling of the site isolation and engineering controls.

Air sampling above the regulatory requirements may be performed, as identified in the following sections.

Air monitoring and analysis during asbestos removal or abatement will be performed using Phase Contrast Microscopy (PCM) following the NIOSH 7400 method. PCM air samples must be submitted for analysis to a laboratory participating in a recognized quality control program such as the AIHA Asbestos Analysts Testing (AAT) Program or the Quality Control Program of the IRSST (the Institut de recherche Robert-Sauvé en santé et en sécurité du travail).

The PCM method does not characterize the types of fibres present. In cases where elevated fibre concentrations are identified, or the actual asbestos concentration is required, Transmission Electron Microscopy following the NIOSH 7402 method may be used.

The acceptable limit for PCM samples is as follows:

- as low as reasonably achievable (ALARA) outside the work area, and/or 0.01 fibres/cubic centimetre (f/cc).
- 0.01 f/cc for clearance air sampling.

Where TEM analysis is performed, the acceptable limits would be 0.01 asbestos fibres/cubic centimeter.

14.3 Low Risk – Inspection and Air Monitoring

14.3.1 Inspection

The Project Manager, an assigned Competent Worker, or an Abatement Consultant, will inspect the work upon completion of work to ensure all ACM has been removed and the area adequately cleaned of dust and debris.

14.3.2 Air Monitoring

Air monitoring is not required; however, projects may be evaluated on a case by case basis, and air sampling performed where desired.

14.4 Moderate Risk and Glove Bag – Inspection and Air Monitoring

14.4.1 Inspection

An Abatement Consultant will perform daily inspections throughout the abatement, and inspect the work upon completion of work to ensure all ACM has been removed and the area adequate cleaned of visible dust and debris. Upon completion of inspection and air monitoring (if required) by the Abatement Consultant, the site isolation may be dismantled.

The Project Manager or an assigned Competent Worker may inspect for final cleanliness after the site isolation has been dismantled.

14.4.2 Air Monitoring

PCM air monitoring will be conducted daily and at completion of abatement. Air monitoring will be conducted in occupied areas adjacent to the Asbestos Work Area or Glove Bag Work Area during contaminated work.

PCM air monitoring will be used for air clearance within the Asbestos Work Areas prior to re-occupancy. Where enclosures have been constructed to define the Asbestos Work Area, aggressive clearance air sampling will be performed.

14.5 High Risk – Inspection and Air Monitoring

14.5.1 Inspection

An Abatement Consultant will perform daily inspections throughout the abatement, and inspect the work upon completion of work to ensure all ACM has been removed and the area adequate cleaned of visible dust and debris. Upon completion of inspection and air monitoring by the Consultant, the site isolation may be dismantled.

The Project Manager or an assigned Competent Worker may inspect for final cleanliness after the site isolation has been dismantled.

14.5.2 Air Monitoring

PCM air monitoring will be conducted on a daily basis.

Air monitoring will be conducted at the perimeter of the Asbestos Work Area (in occupied areas adjacent to the Work Area) to ensure no leakage from the enclosure.

Aggressive clearance air monitoring must be performed within the Asbestos Work Areas. Where PCM samples fail to meet the 0.01 f/cc criteria:

- Contractors may be requested to reclean the Asbestos Work Areas, or;
- Transmission Electron Microscopy (TEM) may be used.

Once the clearance air testing is satisfactory:

a. The site isolation and engineered controls may be removed.

b. A copy of the air sample report is to be:

    a. provided and maintained on site by the Contractor, when abatement work is part of a project;

    b. provided to the Owner, and a copy is kept on file;

    c. provided to the JOHSC or the OHS representative, if any, for the workplace and for the building

15.0 RECORD KEEPING AND DOCUMENTATION RETENTION

HRCE will keep the following records:

- Asbestos and / or Hazardous Building Materials Assessment Reports.
- Reassessment Reports.
- Tenant Notification Letters and dates posted or transmitted.
- Contractor Notification Packages and Acknowledgement Forms.
- Asbestos Project Work Records.
- Consultant Asbestos Abatement Completion Reports (including Daily Inspection and Air Monitoring Reports).
- Bulk sample analytical results from any sampling.
- Emergency response project records.

16.0 CONSULTANT QUALIFICATIONS

Consultants employed by HRCE for asbestos work are to meet the following minimum requirements:

- Display competency in asbestos and hazardous materials consulting
- Maintain a health and safety management system that meets provincial standards.
- Maintain a Comprehensive General Liability Policy, with a minimum of $5,000,000 in coverage.
- Maintain an Errors and Omissions Policy, with a minimum of $5,000,000.
- Maintain an Automobile or Fleet Policy, and Non-Owned Automobile Policy with a minimum of $2,000,000 in coverage.
- Maintain valid provincial worker's compensation coverage
- Accredited to analyze PCM air samples or use an accredited laboratory.

17.0 ASBESTOS ABATEMENT CONTRACTOR QUALIFICATIONS

Contractors employed by HRCE are to meet the following minimum requirements:

- Maintain a Comprehensive General Liability Policy, provided on an "occurrence" basis, for a minimum of $5,000,000 in coverage.
- Maintain an Asbestos Liability or Contractors Pollution Liability Policy, provided on an "occurrence" basis, with a minimum of $5,000,000 in coverage.

- Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with a minimum of $2,000,000 in coverage.
- Maintain valid provincial worker's compensation coverage.
- All supervisors and workers performing abatement work are to be trained in the procedures being used, health effects or asbestos, applicable personal hygiene procedures, personal protection equipment used and respirator care.
- All workers are to be fit tested for respirators.
- Maintain a health and safety management system that meets provincial standards.

18.0 MAINTENANCE AND JANITORIAL WORK

HRCE personnel and contracted janitorial staff will not:

- Sweep/vacuum in areas of damaged ACM.
- Sweep/vacuum/remove ACM debris.
- Disturb ACM.
- Remove ACM.

HRCE will employ an Abatement Contractor to perform these tasks, where required.

Alternately, HRCE will employ the appropriately trained trade contractor if there is other work to be completed that will disturb ACM (e.g. installing electrical equipment through an asbestos-containing plaster wall).

19.0 MAINTENANCE OF THE AMP

This AMP is to be re-evaluated, and possibly revised, each time there is a substantial change to the any provincial regulation, or policy change. This AMP must be reviewed at least annually and updated as necessary.

20.0 ROLES AND RESPONSIBILITIES

This section defines the roles and responsibilities of HRCE personnel instituting this AMP and provide effective management of ACM at their facilities.

The AMP Facilitator has the primary responsibility to administer the AMP and ensure it is instituted and effective.

The following table summarizes the responsibilities of HRCE personnel:

Reference No.	Responsibility/Task	AMP Section Reference	AMP Facilitator	Facility Manager	Project Team	Client Staff	Consultant
1	Maintenance of the AMP	19.0	X				
2	Employ a Consultant to prepare Asbestos Assessment Reports for any facility where one is not available/prepared	7.1	X	X			
3	Employ a Consultant to prepare Asbestos Assessment Reports in newly purchased facilities	7.1	X	X			
4	Employ a Consultant to reassess facilities where ACM has been confirmed	7.2	X	X			
5	Distribute Asbestos Assessment and Reassessment Reports	7.3	X				
6	Upon receiving assessment and reassessment reports, employ a contractor to perform remedial abatement work to remove damaged ACM. Use applicable provincial procedures	9.0	X	X			
7	As required, prior to performing asbestos work, engage a Consultant to perform inspection and air monitoring	14.0	X	X	X		
8	Ensure that an intrusive pre-construction assessment for ACM is performed prior to any renovation, alteration or demolition	8.0		X	X		X
9	Conduct bulk sampling of suspect materials that have not been sampled or presume the materials to be an ACM	8.0		X	X		X
10	Employ a Consultant (as applicable) to prepare a scope of work prior to large scale abatement as part of construction, renovation or demolition.	9.0		X	X		
11	Provide existing occupants at the outset of this AMP, or occupants in newly purchased facilities, a letter notifying the lessee of ACM within their space, and instruction not to disturb the ACM.	10.1	X	X			

Reference No.	Responsibility/Task	AMP Section Reference	AMP Facilitator	Facility Manager	Project Team	Client Staff	Consultant
12	Ensure all Project Managers, Architects, Engineers and others arranging for, or planning, work in the Facility are provided with the most current asbestos (re)assessment report.	10.4	X	X	X	X	
13	Provide contractors working in HRCE facilities the most current asbestos information and notification via the Contractor Information Package	10.2		X	X	X	
14	Employ a Consultant to train HRCE personnel	11.0	X				
15	Response to an uncontrolled spill or disturbance of asbestos following emergency procedures in Appendix C	12.0	X	X	X	X	
16	Keep all records as required by this program (excepting contractor package acknowledgement)	15.0	X				
17	Keep records of contractor package acknowledgement for each project (contractors to submit via email and keep record)	15.0	X	X	X		
18	Ensure Consultants meet the required qualifications	16.0	X	X	X		
19	Ensure contractors meet the required qualifications	17.0		X	X		X
20	Ensure maintenance and janitorial work is performed so that it does not disturb ACM and unnecessary disturbance of ACM is avoided	18.0				X	
21	Report any unplanned disturbance to ACM or damage to ACM	12.0	X	X	X	X	

GLOSSARY

Amended Water	Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.
Asbestos-Containing Material(s) (ACM)	Material identified by an appropriate laboratory analytical method (e.g. EPA 600/R-93/116, NIOSH 9000, or NIOSH 9002) to contain at least 0.5% of any type of asbestos, and vermiculite that is identified to contain any amount of asbestos using EPA method 600/R-04/004 if other analytical methods do not identify the presence of asbestos.
Asbestos	Any and all types of asbestos (generally considered as Actinolite; Amosite; Anthophyllite; Chrysotile; Crocidolite; Tremolite, and Libby Amphibole).
Asbestos Work Area	Area where work is being performed which will or may disturb ACM including overspray and fallen material or settled dust that may contain asbestos.
Competent Worker	In relation to specific work, means a worker who, • qualified because of that person's knowledge, training and experience to do the assigned work in a manner that will ensure the health and safety of every person in the workplace; and • knowledgeable about the provisions of the Occupational Health and Safety Act and regulations that apply to the assigned work, and the potential or actual danger to health or safety associated with the assigned work.
Encapsulation	The application of a liquid sealant to asbestos-containing materials; the sealant may penetrate and harden the material (penetrants) or cover the surface with a protective coating (bridging sealants). Also called encasement. This is generally not advisable.
Enclosure	Enclosure of ACM means the construction of solid enclosure (walls, ceiling, bulkhead etc.) around ACM, or An Enclosure means the site isolation including hoarding walls, polyethylene sheeting and seals that isolates an Asbestos Work Area.
Friable Material	Material that: when dry, can be crumbled, pulverized or powdered by hand pressure, or is crumbled, pulverized or powdered. Includes previously non-friable asbestos-containing material that has become damaged to the extent that it may be crumbled, pulverized, or reduced to powder by hand pressure.
Glove Bag Removal	A method of removing friable insulation from a piping system using a prefabricated bag which isolates the section of insulation being removed.
HEPA Filter	High Efficiency Particulate Aerosol filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.
HEPA Filtered Negative Pressure Unit:	Portable air handling unit which extracts air directly from the Asbestos Work Area and discharges the air to the exterior of the building after passing through a HEPA filter.

JOHSC	Joint Occupational Health and Safety Committee.
Phase Contrast Microscopy (PCM)	A method which uses an optical microscope to determine airborne fibres, normally in an occupational setting. Results are presented as a number of fibres per cubic centimetre (f/cc). The method of analysis is based on the US National Institute for Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, issue 2, Asbestos and Other Fibres by PCM (August 15, 1994).
Transmission Electron Microscopy (TEM)	A method which uses an electron microscope to determine airborne asbestos fibres. Results are presented in fibres per cubic centimetre of air (f/cc). The method of analysis is The U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7402, Issue 2: Asbestos by TEM (Aug 15, 1994).
Low, Moderate and High Procedures	Work classifications and procedures defined under provincial health and safety regulations.
US EPA	United States Environmental Protection Agency.

APPENDIX A

Letter of Notification to Tenants Regarding Asbestos in Premises

LETTER OF NOTIFICATION TO TENANTS REGARDING ASBESTOS IN PREMISES

The following wording should be utilized in communicating the presence of asbestos to a tenant or lessee.

To Occupant

This letter is being provided as notification of the presence of asbestos within the building at [building name and/or address]. HRCE has recently had an asbestos assessment performed of the entire building and has established a program to manage all asbestos in a safe and prudent fashion.

Our Consultant inspected all areas of the building and made recommendations, where necessary, for removal or repair of asbestos. All such work [has been completed/will be completed shortly] with appropriate inspection and supervision. All asbestos remaining is subject to the Asbestos Management Program (AMP) as required by Provincial Regulations and our own due diligence. A copy of the assessment report and the AMP are available for review at the [Office].

The continuing presence of the remaining asbestos does not pose a risk of exposure to occupants as long as it remains under this management program. Staff have been given appropriate training and are aware of its presence.

If you have any concerns, please contact the AMP Facilitator at [phone number].

APPENDIX B

Contractor Notification and Acknowledgement Form

CONTRACTOR NOTIFICATION AND ACKNOWLEDGEMENT FORM

HRCE has identified the presence of various asbestos-containing materials (ACM) within [HRCE Facility name] located at [address]. An asbestos inventory report showing the locations and amounts of these materials is available for viewing from the AMP Facilitator.

The disturbance of ACM is to be undertaken by Asbestos Abatement Contractors that maintain the appropriate insurance coverage and meet the requirements set out in the Asbestos Management Program (AMP).

The following activities may disturb asbestos materials. The AMP Facilitator must be notified of the following:

- Any removal, repair or disturbance of any ACM.
- Ceiling entry which may disturb sprayed-fireproofing or pipe insulation, or debris on the ceiling.
- Any other operation which may generate airborne asbestos from friable asbestos.
- The disturbance of any material excluded from the Facility's asbestos assessment report.
- Discovery of any material excluded from the survey.

Declaration by Contractor

The Contractor and their sub-contractors shall follow the work procedures as specified by HRCE's AMP and shall not disturb ACM without using proper procedures in accordance the provincial regulations and guidelines, and this AMP, including prior notification to the AMP Facilitator. All asbestos waste will be packaged, transported and disposed of in accordance with applicable regulations.

Notification of Asbestos Abatement

All Contractors who perform work at facilities where ACM is present must be notified of the presence of the ACM if their work may bring them into contact, or close proximity to, the ACM. This notification may include janitorial, security, telephone, computer cabling suppliers, mechanical maintenance contractors, etc.

All contractors who perform work, including telephone, computer cabling suppliers, electrical and mechanical contractors, etc., at HRCE facilities, where asbestos-containing spray-applied insulation is present above ceilings are to be notified that Moderate Risk Procedures may be required for any entry to, or work within the ceiling space, determined by condition of material, scope of work, and potential for disturbance of the material.

Contractors are to:

- Notify municipal Landfill site as per provincial regulations.
- Inform all sub trades of the presence of ACM identified in the contract documents.
- If suspect ACM not identified in the contract documents are discovered during the course of the work, the Contractors are to stop all work which might disturb the suspect ACM. The contractor is to notify the Constructor (if applicable), HRCE and the JOHSC or OHS Representative for the workplace.

By signing below, the Contractor acknowledges they have received, read and understand the requirements of HRCE's AMP.

Building (Address): _____

Project: _____

Contractor: _____

Name and Title: _____

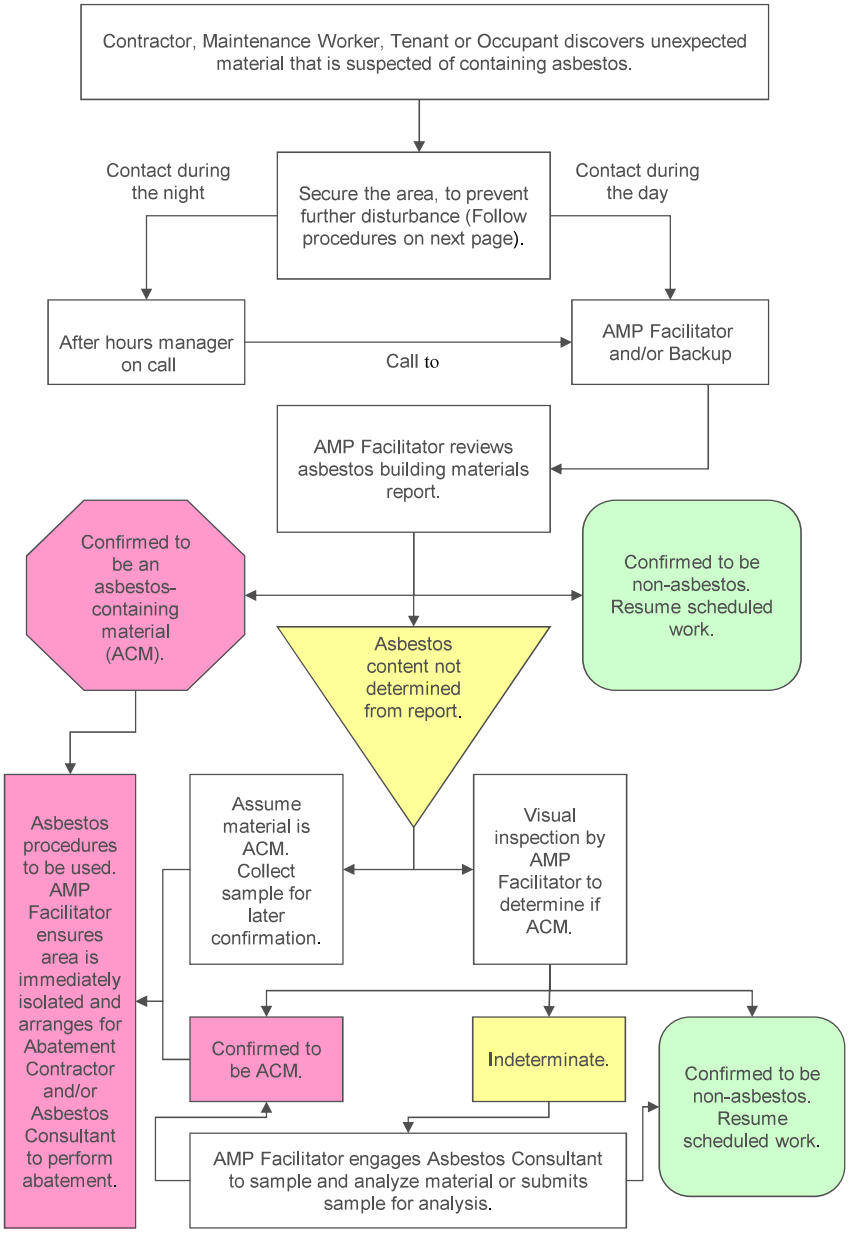
Signature: _____

Date: _____

APPENDIX C

Response to Disturbance of Asbestos

EMERGENCY RESPONSES AND NOTIFICATION IN THE EVENT OF ASBESTOS-SUSPECT MATERIAL DISCOVERED DURING MAINTENANCE OR CONTRACTED WORK OR REPORTED BY OCCUPANT/TENANT



EMERGENCY REACTION IN THE EVENT OF SUSPECTED ASBESTOS SPILL

If asbestos-containing materials or suspect materials have been disturbed improperly, follow these directions:

- Do not clean up, cover, move or contact asbestos-containing or suspect material. Cease work in the area and do not resume work that risks disturbing the suspect material. Workers are to leave the area and the HRCE AMP Facilitator is to be notified immediately.
- Isolate the area by locking doors if this can be done without blocking emergency or fire routes.
- If it is not possible to safely isolate the area, the AMP Facilitator will notify appropriate persons not to enter the area. If possible, post security to prevent unnecessary access.
- The AMP Facilitator will arrange to shut down ventilation systems to the affected area including supply, return and exhaust.
- The AMP Facilitator will determine if asbestos is contained in the debris. If material cannot be confirmed asbestos-free by records or appearance, follow procedures below.
- The AMP Facilitator will contact an Asbestos Consultant to sample the material or identify the material visually.
- If the material is confirmed or assumed to contain asbestos, the AMP Facilitator is to contract an Asbestos Abatement Contractor to clean-up contaminated area.
- At their option, the AMP Facilitator may decide to employ an Asbestos Consultant to perform air monitoring and consulting, prior to, during, and/or after clean-up to determine airborne fibre concentrations prior to, and during, the work and to ensure airborne fibre levels are within acceptable limits to re-occupy the space. The AMP Facilitator must notify the Joint Occupational Health and Safety Committee of the results of air monitoring or testing.
- Enable ventilation systems after air monitoring or clean up of ACM.

APPENDIX D

Asbestos Project Work Record

ASBESTOS PROJECT WORK RECORD

Building: _____
(Building Address or Name)

Date: _____
(Today's Date)

Project Number: _____
(HRCE Project Number or Purchase Order Number)

Project Type:

☐ Emergency ☐ Planned Project

☐ Low Risk ☐ Moderate Risk ☐ Glove Bag ☐ High Risk

Area of Work: _____
(Room Name, Number, Floor etc.)

_____

Description: _____
(Brief description of abatement, material, system, etc.)

_____

Project Start Date: _____
(Mobilization date)

Project End Date: _____
(After dismantling/clean-up)

Contractor: _____
(Contracting firm or employee)

Telephone: _____
(Contractor or employee telephone)

Consultant: _____
(Name of consulting firm/contact if any)

Telephone: _____
(Consultant telephone)

Pre-Construction Assessment for asbestos-containing material (ACM) and other hazardous building materials (e.g. lead, mercury, silica, and PCBs) performed and report provided to Contractor?

☐ Yes ☐ No (Explain) _____

Air Sampling during abatement?

☐ Yes ☐ No

Clearance Air Monitoring performed after abatement?

☐ Yes ☐ No

Air Monitoring results to Joint Occupational Health and Safety Committee (if applicable)?

☐ Yes ☐ No

Asbestos Survey Updated to Reflect Changes in ACM Inventory?

☐ Yes ☐ No, no changes to ACM inventory resulted

☐ No, to forward copies to Consultant prior to next re-assessment

Asbestos waste removed from site and disposed of?

☐ Yes, ACM waste documentation attached ☐ No, ACM waste not generated

☐ No, ACM waste remains on site for later disposal

Append the following information relating to asbestos abatement to this work record, if applicable, and file Asbestos Work Record and attachments with Asbestos Management Program. Check where attached.

Submittals including Insurance	☐ Yes	☐ No
Waste Documentation	☐ Yes	☐ No
Specifications, Change Orders, Drawings	☐ Yes	☐ No
Consultant Inspection Reports	☐ Yes	☐ No
Air Monitoring Results	☐ Yes	☐ No
Analytical Certificates	☐ Yes	☐ No
Provincial Regulatory reports	☐ Yes	☐ No
Additional Correspondence	☐ Yes	☐ No

APPENDIX E

Reassessment of ACM

REASSESSMENT OF ACM

Upon completion of Reassessment, fill out the following form in its entirety and file with this facility's Asbestos Management Program and Assessment Report.

Use of this form is not necessary if an Asbestos Consultant has produced a detailed Reassessment Report which identified the damaged ACM identified in the building during the Reassessment (along with the associated locations, quantities, accessibility, and any required abatement recommendations).

Building: _____

Dates of Reassessment: _____

Name of person completing reassessment: _____

Signature of surveyor: _____

Others present: _____

_____

_____

Summary of Findings:

(If no deterioration was noted, indicate here): _____.

(Specifically indicate only areas requiring action in the table below).

(Attached photographs to this form as required).

Room or Location	Material	Comments Regarding Condition: Disturbed/Undisturbed (if other, explain)	Action Required

Room or Location	Material	Comments Regarding Condition: Disturbed/Undisturbed (if other, explain)	Action Required

Page _____ of _____

APPENDIX F

Classifications of Abatement Work

CLASSIFICATIONS OF ABATEMENT WORK

Nova Scotia regulations/guidelines do not specifically classify asbestos work procedures, and only prescribe removal of friable materials including the use of Glove Bags.

In the absence of defined work classifications, the following are the generally accepting work classifications:

Low Risk

- installation or removal of ACM ceiling tiles (less than 7.5 m²) without damage*.
- installation or removal of non-friable ACM, other than ceiling tiles, without damage*.
- damaging* non-friable ACM that is wetted and where the work is done using non-powered hand-held tools.

Moderate Risk

- removal of less than one square metre of drywall where ACM joint-filling compounds were used.
- enclosure of friable ACM.
- application of tape, a sealant or other covering to pipe or boiler insulation that is ACM.
- installing or removing ACM ceiling tiles that cover an area of 7.5 m^2 or more if the work is done without damaging the tiles.
- damaging non-friable ACM using non-powered hand-held tools if the material is not wetted.
- cleaning or removing filters used in air handling equipment in a building that has sprayed ACM insulation.
- glove bag removals of ACM insulation.
- Work that may expose a worker to asbestos and that is not classified as a Low Risk or High Risk operation, is also to be classified as a Moderate Risk operation.

High Risk

- removal or disturbance of friable ACM.
- the removal of all or part of a false ceiling to access a work area, if ACM is likely to be lying on the surface of the false ceiling.
- spray application of a sealant to friable ACM.

- cleaning or removal of air-handling equipment, including rigid ducting but not including filters, in a building that has sprayed ACM insulation.
- repair, alteration or demolition of a kiln or furnace made, in part, of refractory materials that are ACM.
- Use of power tools not attached to dust-collecting devices with HEPA filters on non-friable ACM.

* ***damage*** *includes breakage, cutting, abrading, grounding, sanding, and vibration.*

APPENDIX G

Site Specific Report(s)

Facility Specific Contacts

Contact Name	Title	Address	Phone Number	Email Address

MECHANICAL LEGEND

HWS	NEW HOT WATER HEATING SUPPLY
HWR	NEW HOT WATER HEATING RETURN
EHWS	EXISTING HOT WATER HEATING SUPPLY
EHWR	EXISTING HOT WATER HEATING RETURN
	EXISTING PIPING TO BE REMOVED. REFER TO NEW FLOOR PLANS FOR CONNECTION OF NEW TO EXISTING
	ELBOW TURNED UP
	ELBOW TURNED DOWN
	DIRECTION OF FLOW
	VALVE (SEE SPEC FOR TYPE)
	RELIEF VALVE PIPED TO DRAIN
	HOSE END DRAIN VALVE
	CIRCUIT BALANCING VALVE
	TEMPERATURE SENSING BULB WELL WITH THERMOMETER
CTE	CONNECT TO EXISTING. EXACT LOCATION TO BE DETERMINED ON SITE. SIZE TO MATCH EXISTING UNLESS OTHERWISE NOTED
LWCO	FLOAT TYPE LOW WATER CUT OFF WITH MANUAL RESET TEST-N-CHECKS.

AIR DISTRIBUTION

	RECTANGULAR AND ROUND SUPPLY AIR DUCT SECTION UP
	RECTANGULAR AND ROUND SUPPLY AIR DUCT SECTION DOWN
	RECTANGULAR AND ROUND RETURN AIR DUCT SECTION UP
	RECTANGULAR AND ROUND RETURN AIR DUCT SECTION DOWN
	RECTANGULAR AND ROUND DUCTWORK (NEW)
FC	FLEXIBLE CONNECTIONS
A / 100	GRILLE, DIFFUSER, REGISTER TYPE AIR FLOW IN CFM

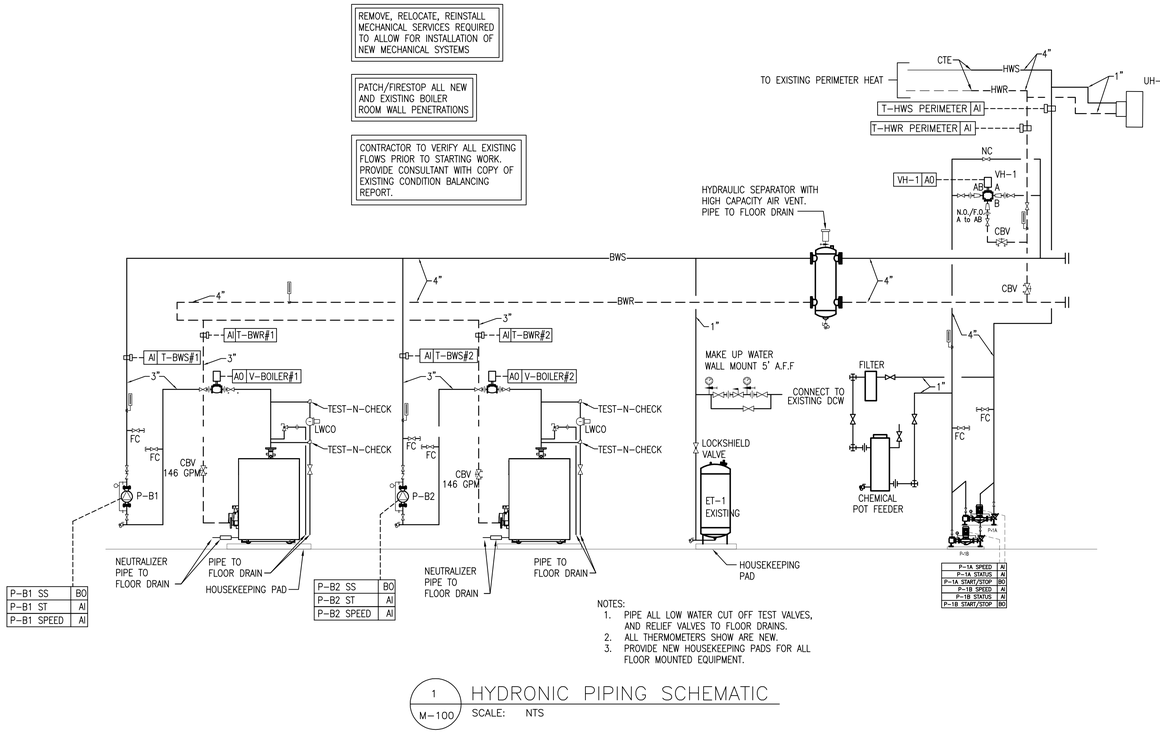
CONTROLS LEGEND

AO	ANALOG OUTPUT
AI	ANALOG INPUT
BO	BINARY OUTPUT
BI	BINARY INPUT
	WIRING BY ELECTRICAL CONTRACTOR
	WIRING BY CONTROLS CONTRACTOR
DM, D, EA, NC, ES	MOTORIZED DAMPER WITH END SWITCH

REMOVE, RELOCATE, REINSTALL MECHANICAL SERVICES REQUIRED TO ALLOW FOR INSTALLATION OF NEW MECHANICAL SYSTEMS

PATCH/FIRESTOP ALL NEW AND EXISTING BOILER ROOM WALL PENETRATIONS

CONTRACTOR TO VERIFY ALL EXISTING FLOWS PRIOR TO STARTING WORK. PROVIDE CONSULTANT WITH COPY OF EXISTING CONDITION BALANCING REPORT.



NOTES:
1. PIPE ALL LOW WATER CUT OFF TEST VALVES, AND RELIEF VALVES TO FLOOR DRAINS.
2. ALL THERMOMETERS SHOW ARE NEW.
3. PROVIDE NEW HOUSEKEEPING PADS FOR ALL FLOOR MOUNTED EQUIPMENT.

1 / M-100 HYDRONIC PIPING SCHEMATIC
SCALE: NTS

Halifax Regional
Centre for Education

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

No	ISSUE/REVISION	DATE
2	ISSUED FOR TENDER	2024/03/31
1	ISSUED FOR REVIEW	2024/03/28

SEAL

CLIENT

REGISTERED PROFESSIONAL ENGINEER
D. Spears
9466
PROVINCE OF NOVA SCOTIA

PROJECT
TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT
BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT
MECHANICAL LEGEND, HYDRONIC SCHEMATIC

DRAWN: STAFF	PROJECT No: 24-001
SCALE: AS NOTED	DRAWING No: M-100
DATE: 2021.03.01	

In Imper 0 1 2

DUMAC#24-001

DEMOLITION NOTES:

1. REMOVE OIL FIRED BOILER, CAP HWS & HWR PIPING AT MAINS. REMOVE ALL ASSOCIATED BOILER CONTROLS. REMOVE BOILER BASES RAILS AND PRIMARY PUMPS. REFER TO NEW PIPING PLAN FOR TIE IN OF NEW TO EXISTING PIPING.
2. REMOVE BOILER BREECHING BACK TO EXISTING CHIMNEY. DEMO EXISTING MASONRY CHIMNEY TO JUST ABOVE ROOF LEVEL AND CAP WITH STAINLESS STEEL COVER. FASTEN AND SEAL WEATHER TIGHT.
3. REMOVE EXISTING OIL SUPPLY PIPING FROM BOILER TO OIL TANK.
4. REMOVE EXISTING HWS/HWR PIPES TO LOCATION SHOWN. REFER TO DETAIL 2/M-101 FOR CONNECTION TO NEW PIPING.
5. REMOVE EXISTING EXPANSION TANK, AND ALL ASSOCIATED PIPING.
6. EXISTING CONTROLS COMPRESSOR TO REMAIN.
7. EXISTING ELECTRIC HOT WATER TANK, EXISTING PUMP, AND ASSOCIATED PIPING TO REMAIN.
8. REMOVE EXISTING INDIRECT DOMESTIC HOT WATER STORAGE TANK, DOMESTIC HOT RECIR. PUMP AND PIPING AS INDICATED ON DRAWING.
9. REMOVE, RELOCATE AND RECONNECT EXISTING EXPANSION TANK. SEE 2/M-101 FOR NEW LOCATION.
10. EXISTING FLOOR DRAIN TO REMAIN.

PATCH/FIRESTOP ALL NEW AND EXISTING BOILER ROOM WALL PENETRATIONS

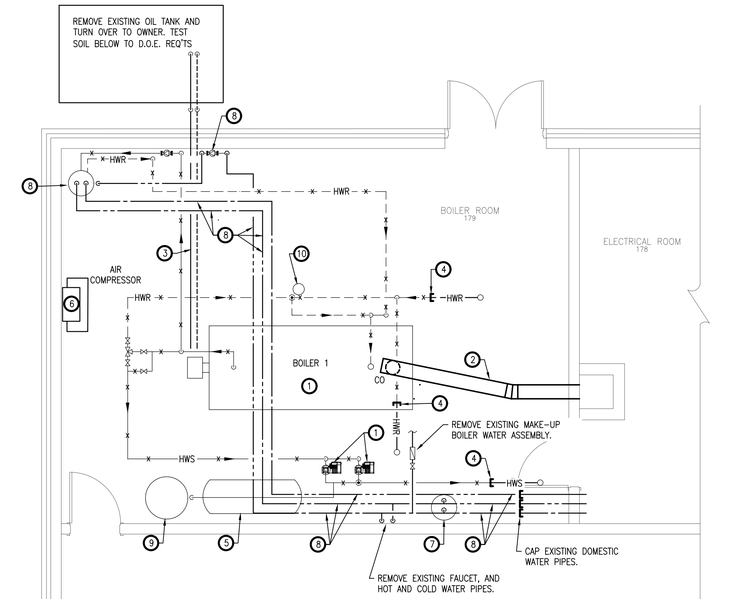
MECHANICAL CONTRACTOR IS TO X-RAY SLAB PRIOR TO SAW CUTTING FOR NEW SERVICES

ALL DEMOLITION TO BE COORDINATED WITH OWNER. MECHANICAL CONTRACTOR TO TURN OVER ANY EQUIPMENT THE OWNER WISHES TO SALVAGE.

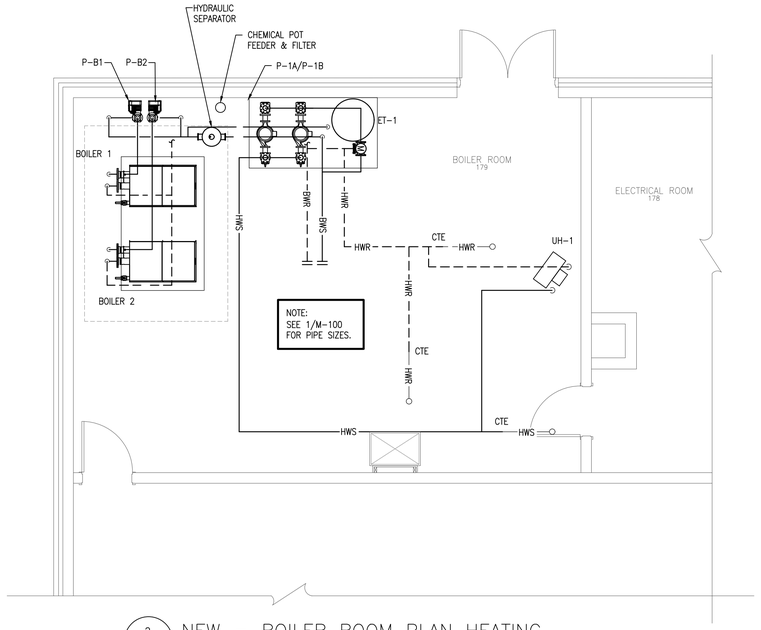
REPAIR ALL DAMAGED PIPE INSULATION ON ALL EXISTING BOILER ROOM PIPING TO REMAIN. RE-IDENTIFY AS REQUIRED

REMOVE, RELOCATE, REINSTALL MECHANICAL SERVICES REQUIRED TO ALLOW FOR INSTALLATION OF NEW MECHANICAL SYSTEMS

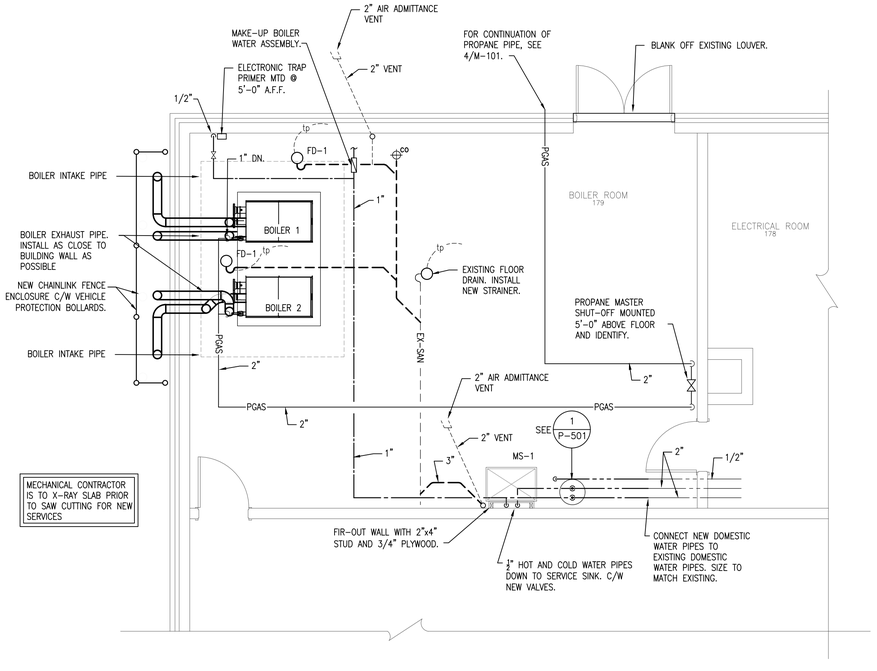
CONTRACTOR TO VERIFY EXISTING HEATING DISTRIBUTION PUMP FLOWS PRIOR TO STARTING WORK. PROVIDE CONSULTANT WITH COPY OF EXISTING CONDITION BALANCING REPORT.



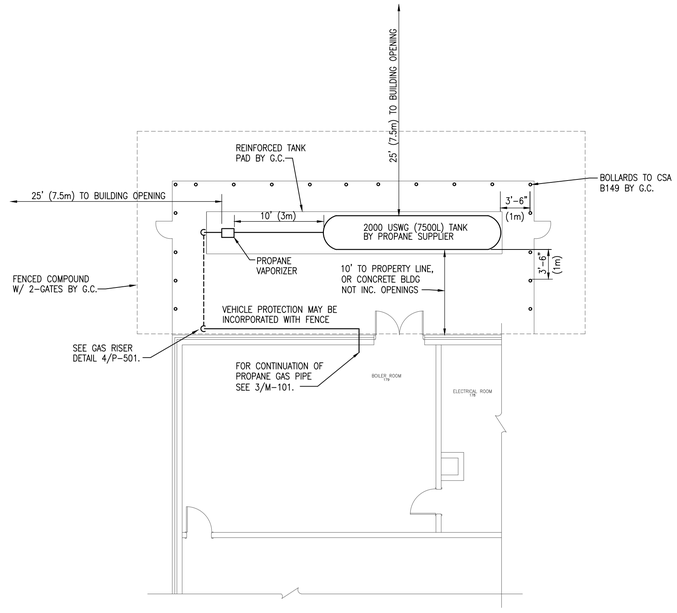
1 M-101 DEMOLITION – BOILER ROOM PLAN
SCALE: 1/4" = 1' 0"



2 M-101 NEW – BOILER ROOM PLAN HEATING
SCALE: 1/4" = 1' 0"



3 M-101 NEW – BOILER VENT & PLUMBING PLAN
SCALE: 1/4" = 1' 0"



4 M-101 NEW – PROPANE TANK
SCALE: 1/8" = 1' 0"

Halifax Regional Centre for Education

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

No	ISSUE/REVISION	DATE
2	ISSUED FOR TENDER	2024/03/31
1	ISSUED FOR REVIEW	2024/03/28

SEAL

CLIENT

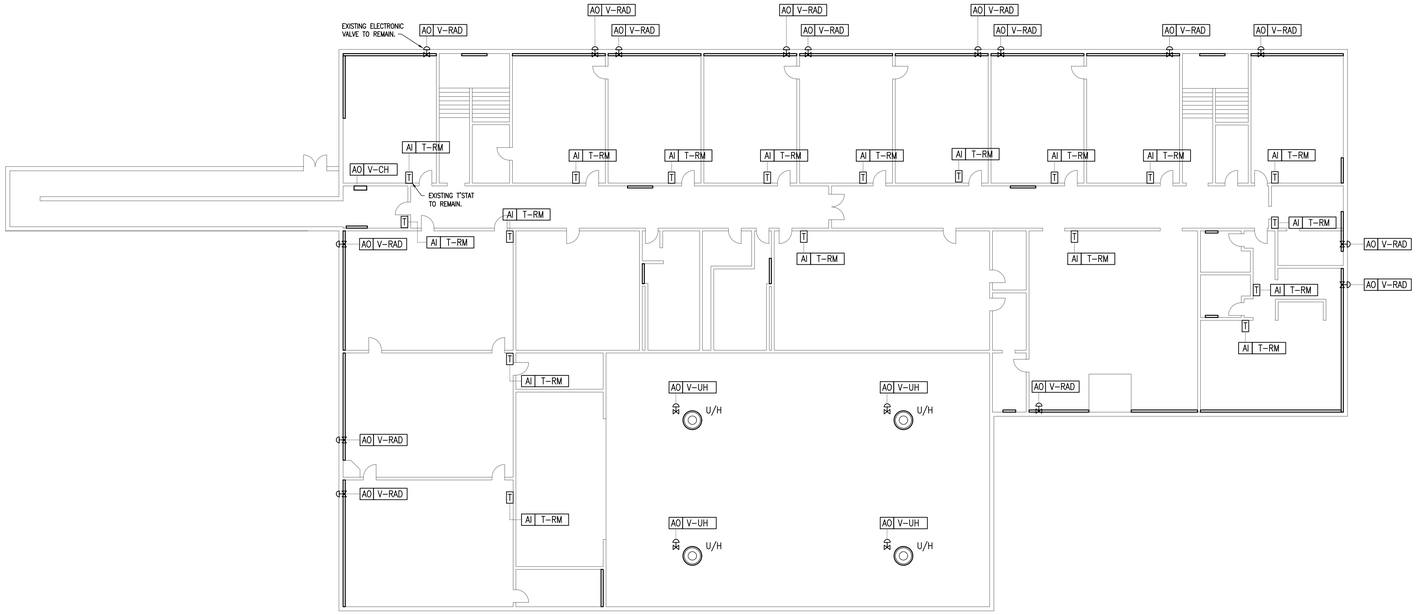
PROJECT
TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT
BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT
MECHANICAL DEMOLITION, NEW MECHANICAL PLANS

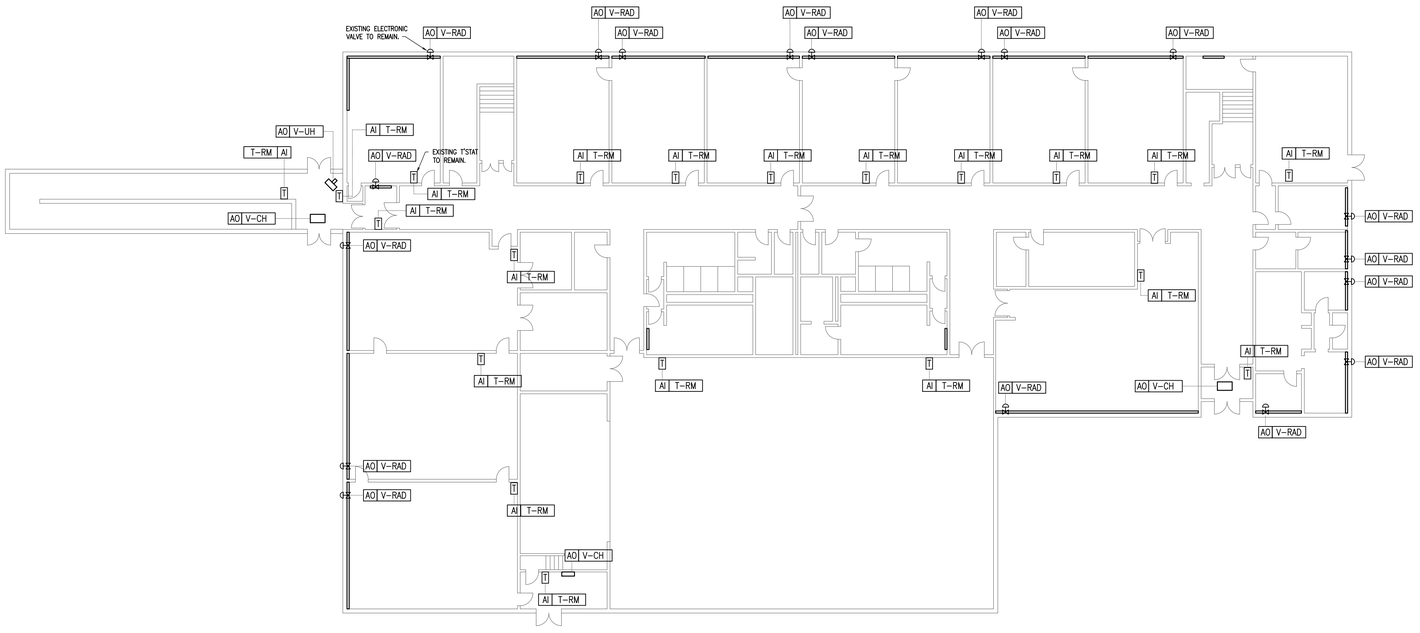
DRAWN	PROJECT No
STAFF	24-001
SCALE	DRAWING No
AS NOTED	M-101
DATE	
2021.03.01	

In Imper 0 1 2

DUMAC#24-001



2 M-102 SECOND FLOOR PLAN – CONTROLS
SCALE: 1/16" = 1' 0"



1 M-102 FIRST FLOOR PLAN – CONTROLS
SCALE: 1/16" = 1' 0"

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9466
PROVINCE OF NOVA SCOTIA

PROJECT
TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT
BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT
FIRST AND SECOND FLOOR PLANS HEATING

DRAWN	PROJECT No
STAFF	24–001
SCALE	DRAWING No
AS NOTED	M-102
DATE	
2021.03.01	

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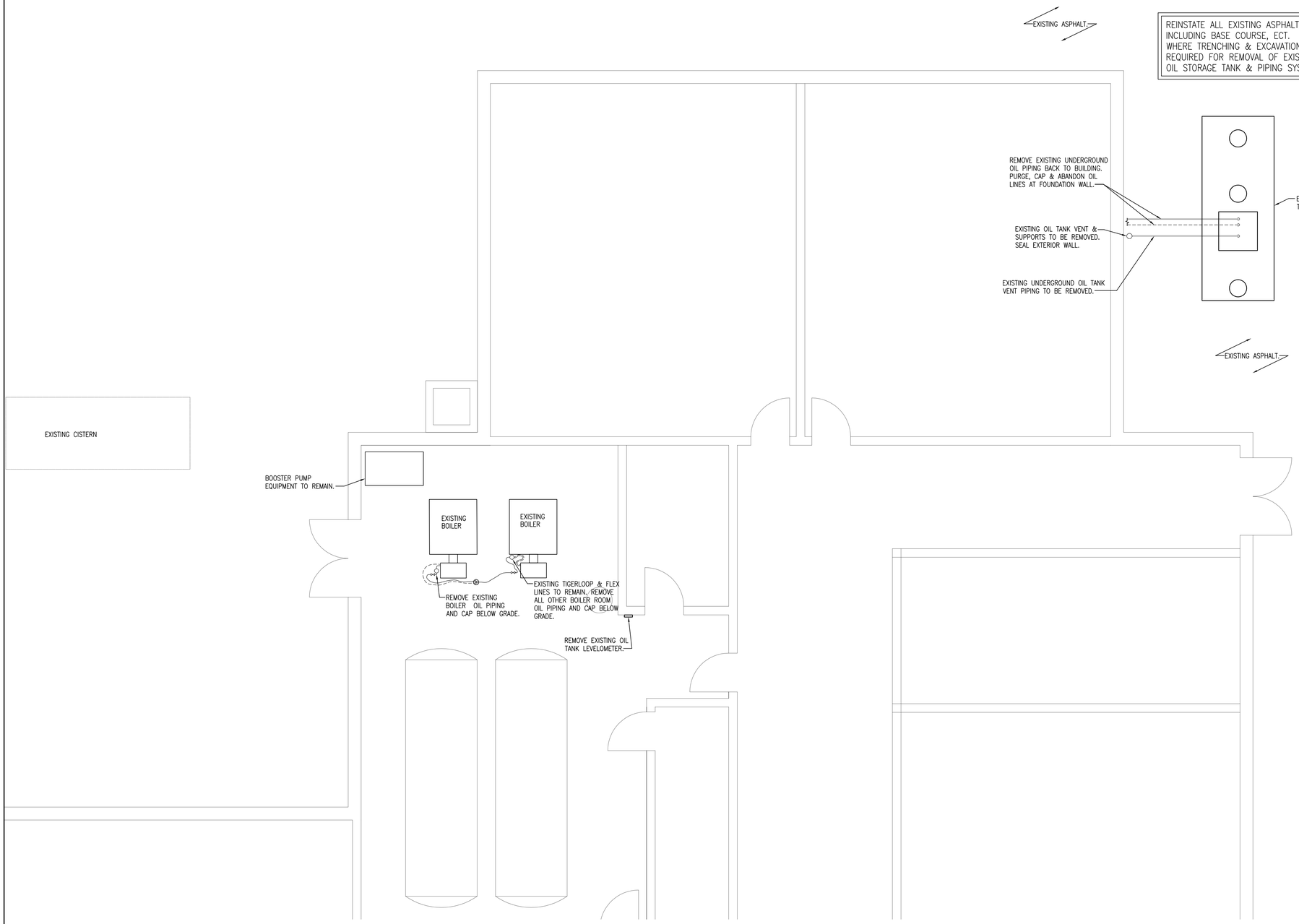
MECHANICAL LEGEND

———ELOS———	EXISTING OIL SUPPLY
------ELOR------	EXISTING OIL RETURN
———LOS———	NEW OIL SUPPLY
------LOR------	NEW OIL RETURN
SV	SOLENOID VALVE
	ISOLATION VALVE
	UNION

NOTES

1. THE MECHANICAL CONTRACTOR IS RESPONSIBLE TO START-UP AND BLEED OIL PIPING AND TO UNDERTAKE START-UP OF THE BOILER PLANT ONCE WORK IS COMPLETE.

REINSTATE ALL EXISTING ASPHALT, INCLUDING BASE COURSE, ECT. WHERE TRENCHING & EXCAVATION IS REQUIRED FOR REMOVAL OF EXISTING OIL STORAGE TANK & PIPING SYSTEM.



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PROJECT

TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT

BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT

OIL TANK & PIPING LEGEND & DEMOLITION PLAN

DRAWN	PROJECT No
STAFF	24-001
SCALE: 1/4" = 1' 0"	DRAWING No: M-103
DATE: 2021.03.01	

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EXISTING CISTERN

EXISTING ASPHALT

PROVIDE TRENCH FOR NEW BURIED OIL LINES. REINSTATE ALL EXISTING ASPHALT INCLUDING BASE COURSE, ECT. WHERE TRENCHING IS REQUIRED.

PATCH ALL EXISTING ASPHALT WHERE TRENCHING IS REQUIRED.

UNDERGROUND ¾" LOS (X2) & ¾"LOR C/W SECONDARY CONTAINMENT. SLOPE TO SECONDARY CONTAINMENT SUMP.

PROVIDE TRENCH FOR NEW BURIED OIL LINES. REINSTATE ALL EXISTING ASPHALT INCLUDING BASE COURSE, ECT. WHERE TRENCHING IS REQUIRED.

EXISTING ASPHALT

PIPING TO BE MINIMUM 24" BELOW GRADE.

UNDERGROUND 2" CONDUIT FOR SOLENOID VALVE & OIL TANK MONITOR WIRING.

VALVE & CAP ABOVE GRADE FOR FUTURE.

PVC JUNCTION BOX

TANK VENT. TERMINATE 10" ABOVE GRADE.

SV

SV

PIPE STAND SUPPORT

RELOCATED OIL TANK.

PIPE STAND SUPPORT

NEW CHAINLINK FENCE ENCLOSURE C/W VEHICLE PROTECTION BOLLARDS.

EXISTING ASPHALT

NEW CONCRETE PAD

EXISTING ASPHALT

NEW VEHICLE PROTECTION BOLLARD.

SECONDARY CONTAINMENT SUMP

VALVE & CAP FOR FUTURE

TERMINATE CONDUIT TO LEAK DETECTION MONITOR PANEL. SEE 1, M-502 FOR CONTINUATION

TERMINATE CONDUIT TO JUNCTION BOX. REFER TO DETAILS 2 & 3 ON M-502 FOR CONTINUATION.

BOOSTER PUMP EQUIPMENT TO REMAIN.

LEAK DETECTION MONITOR PANEL

½" LOS.

EXISTING BOILER

EXISTING BOILER

PROVIDE NEW TIGERLOOP & FLEX LINES.

CONNECT EXISTING TIGERLOOP & FLEX LINES TO NEW OIL PIPING.

OIL TANK VACUUM MONITOR PANEL.

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TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT

BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT

OIL PIPING PLAN

DRAWN	PROJECT No
STAFF	24-001
SCALE	DRAWING No
1/4" = 1' 0"	M-104
DATE	
2021.03.01	

0 1 2
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PUMP SCHEDULE

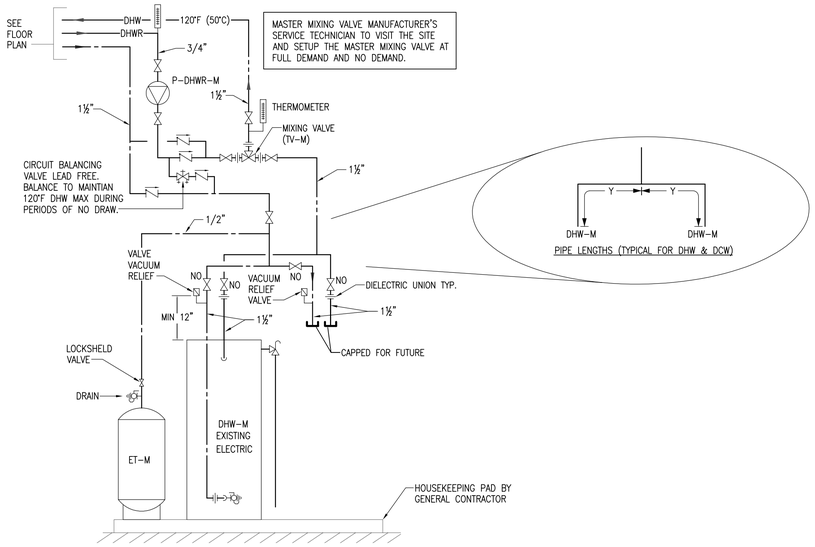
SYMBOL	SERVICE	LOCATION	STANDARD OF ACCEPTANCE		FLUID	FLOW at P.D.	MOTOR			ACCESSORIES AND/OR REMARKS
			MANUFACTURER	MODEL			RPM	WATTS	VOLTAGE	
P-DHWR-M	DOM HOT WATER	BOILER ROOM	BELL AND GOSSETT	NBF-25	DHW	2 GPM @ 6 FT HD	2950	125	120/1	LEAD FREE, 3 SPEED SELECTOR SWITCH

EXPANSION TANK SCHEDULE

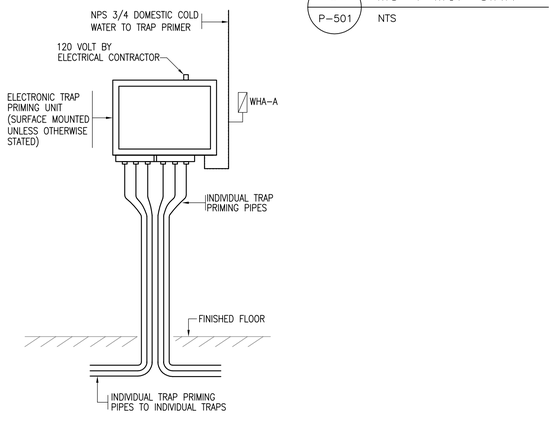
SYMBOL	SERVICE	LOCATION	STANDARD OF ACCEPTANCE		MINIMUM ACCEPTANCE VOLUME	TOTAL VOLUME	ACCESSORIES AND/OR REMARKS
			MANUFACTURER	MODEL			
ET-M	DOM HOT WATER	BOILER ROOM	WATTS	DETA-30	5.0 GAL	15 GAL	SUITABLE FOR POTABLE WATER

MIXING VALVE SCHEDULE

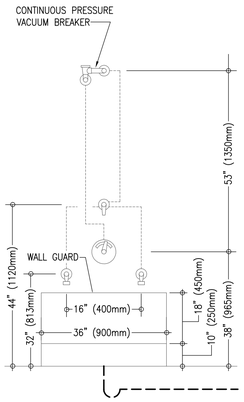
SYMBOL	SERVICE	LOCATION	STANDARD OF ACCEPTANCE		FLOW RATE	PRESSURE DROP	MIN. FLOW TO ASSE 1017	ACCESSORIES AND/OR REMARKS
			MANUFACTURER	MODEL				
TV-M	DOM HOT WATER	BOILER ROOM	POWERS	LFIS075VL	16 GPM	5 PSI		LEAD FREE BRONZE



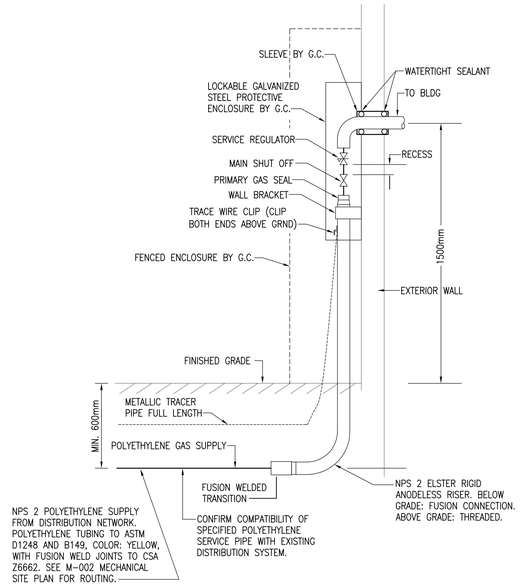
1 P-501 ELECTRIC DOM. HW. TANK SCHEMATIC
NTS



2 P-501 TRAP PRIMING UNITS
NTS



3 P-501 MS-1 MOP SINK
NTS



4 P-501 GAS RISER DETAIL @ BLDG.
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TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT
BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT
PLUMBING DETAILS AND SCHEDULES

DRAWN	PROJECT No
STAFF	24-001
SCALE	DRAWING No
AS NOTED	P-501
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DUMAC#24-001

PUMP SCHEDULE

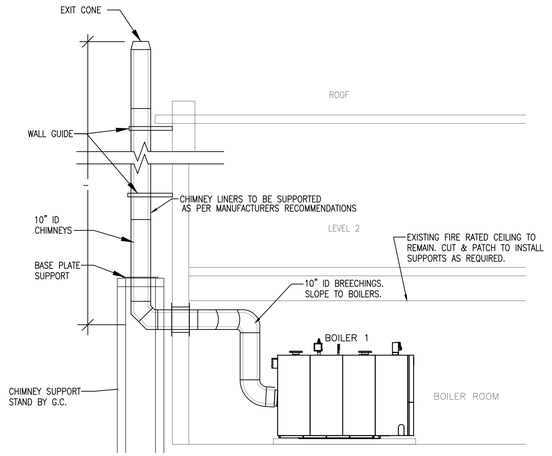
SYMBOL	SERVICE	LOCATION	STANDARD OF ACCEPTANCE		FLUID	FLOW at P.D. GPM at FT.HD	MOTOR			REMARKS
			MANUFACTURER	MODEL			RPM	WATTS/ HP	VOLTAGE	
P-B1	BOILER 1	BOILER ROOM	BELL & GOSSETT	ECOCIRC XL 27-320	WATER	150 @ 15	-	1500 / 2	208/3	ECM
P-B2	BOILER 2	BOILER ROOM	BELL & GOSSETT	ECOCIRC XL 27-320	WATER	150 @ 15	-	1500 / 2	208/3	ECM
P-1A & 1B	BUILDING HEAT	BOILER ROOM	BELL & GOSSETT	E80-3x3x7C	WATER	200 @ 35	1800	2240 / 3	208/3	VFD FACTORY MOUNTED ON MOTOR

HEATING SCHEDULE

SYMBOL	STANDARD OF ACCEPTANCE			CAPACITY MBH	FLOWRATE GPM	EAT °F	EWT °F	LWT °F	AIRFLOW CFM	MOTOR			ACCESSORIES &/OR REMARKS
	MANUFACTURER	MODEL	ARRANGEMENT							RPM	HP	VOLT	
UH-1	ENG A	H-1	HORIZONTAL	32.2	3.30	60	180	160	550	1500	1/20	120/1	

PROPANE FIRED BOILER SCHEDULE

SYMBOL	SERVICE	LOCATION	STANDARD OF ACCEPTANCE		INPUT RATING MBH	VOLTAGE	ACCESSORIES AND/OR REMARKS
			MANUFACTURER	MODEL			
B-1	HYDRONIC HEATING	BOILER RM	VIESSMANN	CI2-1500- CA1	1500	120/1	
B-2	HYDRONIC HEATING	BOILER RM	VIESSMANN	CI2-1500- CA1	1500	120/1	



1 / M-501 CHIMNEY SECTION
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PROJECT
TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT
BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT
MECHANICAL SCHEDULES AND DETAILS

DRAWN	PROJECT No
STAFF	24-001
SCALE: AS NOTED	DRAWING No: M-501
DATE: 2021.03.01	

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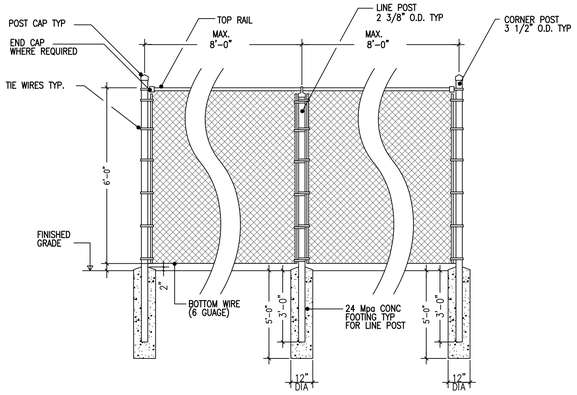
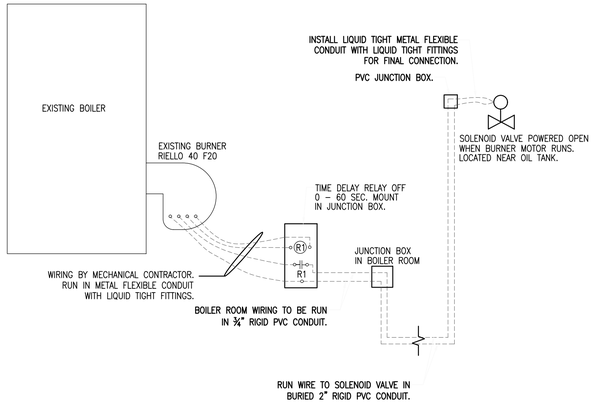
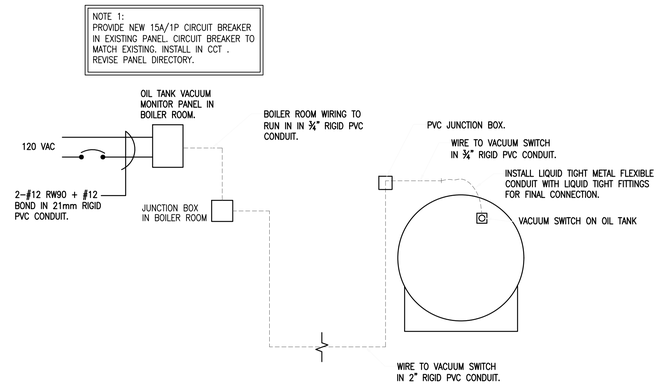


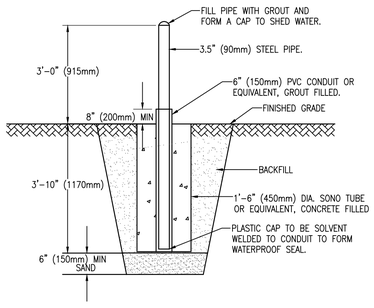
4 / M-502 CHAIN LINK FENCE DETAIL
NTS



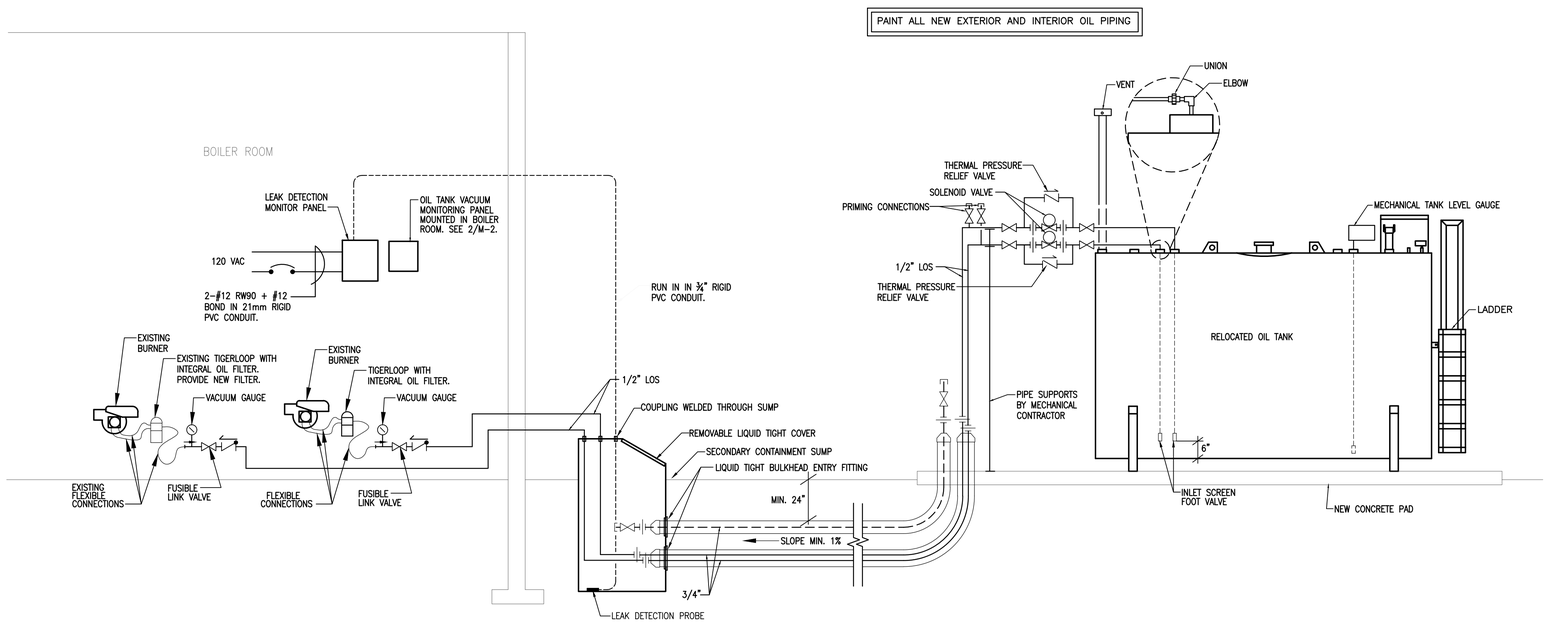
3 / M-502 SOLENOID VALVE WIRING DIAGRAM
BOILER 1 & 2



2 / M-502 OIL TANK MONITOR CONTROL DETAIL
NTS



5 / M-502 BOLLARD DETAIL
NTS



1 / M-502 OIL PIPING SCHEMATIC
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PROVINCE OF NOVA SCOTIA

PROJECT
TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT
BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT
MECHANICAL DETAILS

DRAWN	PROJECT No
STAFF	24–001
SCALE	DRAWING No
AS NOTED	M-502
DATE	
2021.03.01	

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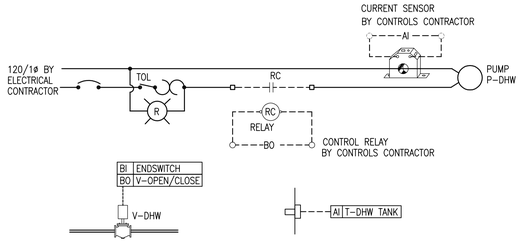


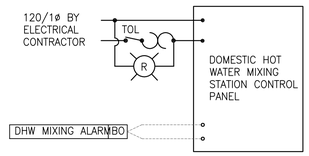
SEQUENCE OF OPERATION:

DOMESTIC HOT WATER TANKS ARE SET TO MAINTAIN A MINIMUM TEMPERATURE OF 140°F.

ON A CALL FOR DOMESTIC HOT WATER HEATING, V-DHW OPENS. WHEN ENDSWITCH MAKES, P-DHW STARTS.

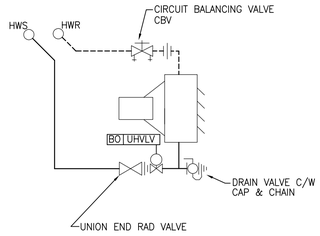
1 M-601 DHW PUMP WIRING SCHEMATIC

P-DHWR-M



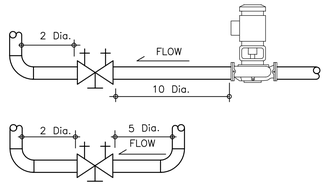
7 MC608 DHW MIXING STATION WIRING SCHEMATIC

NTS



2 M-601 UNIT HEATER SCHEMATIC – DOWNFED

NTS

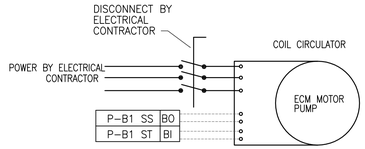


3 M-601 CIRCUIT BALANCING VALVE INSTALLATION

NTS

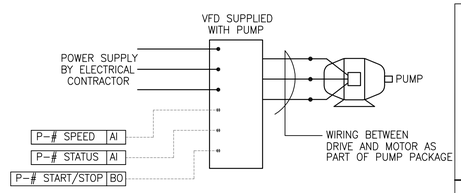
4 M-601 TYPICAL PIPE IDENTIFICATION

NTS



6 M-601 ECM PUMP WIRING SCHEMATIC

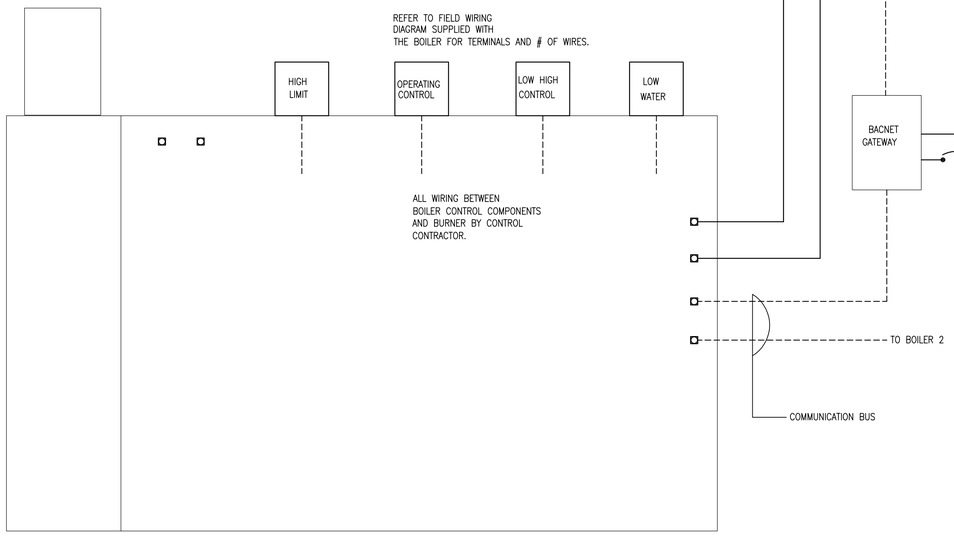
NTS, P-B1/P-B2



8 MC608 PUMP WITH VFD WIRING SCHEMATIC

P-1A/B

BOILER MOUNTED CONTROL



AI-READ	BURNER STARTS
AI-READ	BOILER OUTPUT VALUE
AI-READ	ACTIVE SYSTEM/BOILER TEMPERATURE
AI-READ	ACTUAL SYSTEM OUTPUT – VALUE
AI-READ	ACTUAL SYSTEM FLOW/BOILER WATER TEMPERATURE
AI-READ	FUEL CONSUMPTION
AI-READ	SET BOILER WATER TEMERATURE (EFFECTIVE)
AI-READ	RETURN TEMPERATURE 17A
AI-READ	BOILER WATER TEMPERATURE
AI-READ	FLUE GAS TEMPERATURE
AI-READ/WRITE	SET BOILER WATER TEMPERATURE
AI-READ/WRITE	BURNER HOURS RUN STAGE 1
AI-READ/WRITE	BURNER HOURS RUN STAGE 2
AI-READ/WRITE	SET FLOW TEMPERATURE SYSTEMS/BOILERS
MULTISTATE INPUT-READ	COMMON ALARM
AI-READ	OUTSIDE TEMPERATURE

PUMP ALTERNATION

ALTERNATE LEAD-LAG PUMPS EVERY 300 HOURS OF OPERATION. IF AFTER ALTERNATION, THE NEW LEAD PUMP STATUS FAILS WITHIN A MINUTE OF BEING ENERGIZED, THEN THE BAS WILL SHUT OFF THIS PUMP, RESTART THE OTHER PUMP AND SEND AN ALARM.

IF A PUMP STATUS FAILS DURING OPERATION THEN THE BAS WILL SHUT OFF THE PUMP, START THE LAG PUMP AND SEND AN ALARM.

BOILER CONTROL

THE BOILER PLANT PROVIDES HEAT FOR HOT WATER HEATING, AND OUTSIDE AIR TEMPERING.
THE BAS COMMUNICATES WITH THE BOILER CONTROLS VIA A BACNET GATEWAY PROVIDED BY THE BOILER MANUFACTURER.
ALL POINTS READ/WRITTEN ARE TO INCLUDE (BUT ARE NOT LIMITED TO) THOSE LISTED ON DETAIL 1/M-601.

BOILERS WILL NOT MAINTAIN TEMPERATURE AND WILL OPERATE ON A CALL FOR HEAT FROM THE BAS.

ON A CALL FOR HEAT THE BAS WILL ENABLE THE BOILER PLANT AND THE LEAD BOILER PUMP WILL BE ENABLED.
BOILERS INTERNAL LOGIC WILL STAGE AND MODULATE THE BOILERS AS REQUIRED TO SUIT THE DESIRED WATER SUPPLY TEMPERATURE SETPOINT. THE BAS WILL WILL WRITE A RESET SIGNAL TO THE PLANT BASED ON THE OUTDOOR AIR TEMPERATURE UP TO A MAXIMUM OF 180°F (ADJUSTIBLE).

IF A BOILER FAILS TO OPERATE ON A CALL FOR HEAT THE ON BOARD CONTROLS WILL FORWARD AN ALARM TO THE BAS VIA THE GATEWAY.

THE EXISTING SEQUENCES OF OPERATION OF THE HEATING LOOP, AND AHUs ARE TO REMAIN IN PLACE.

5 M-601 BOILER 1 CONTROL PANEL SCHEMATIC

SIMILAR FOR BOILER 2

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PROVINCE OF NOVA SCOTIA

PROJECT

TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT

BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT

CONTROL DETAILS

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STAFF	24-001
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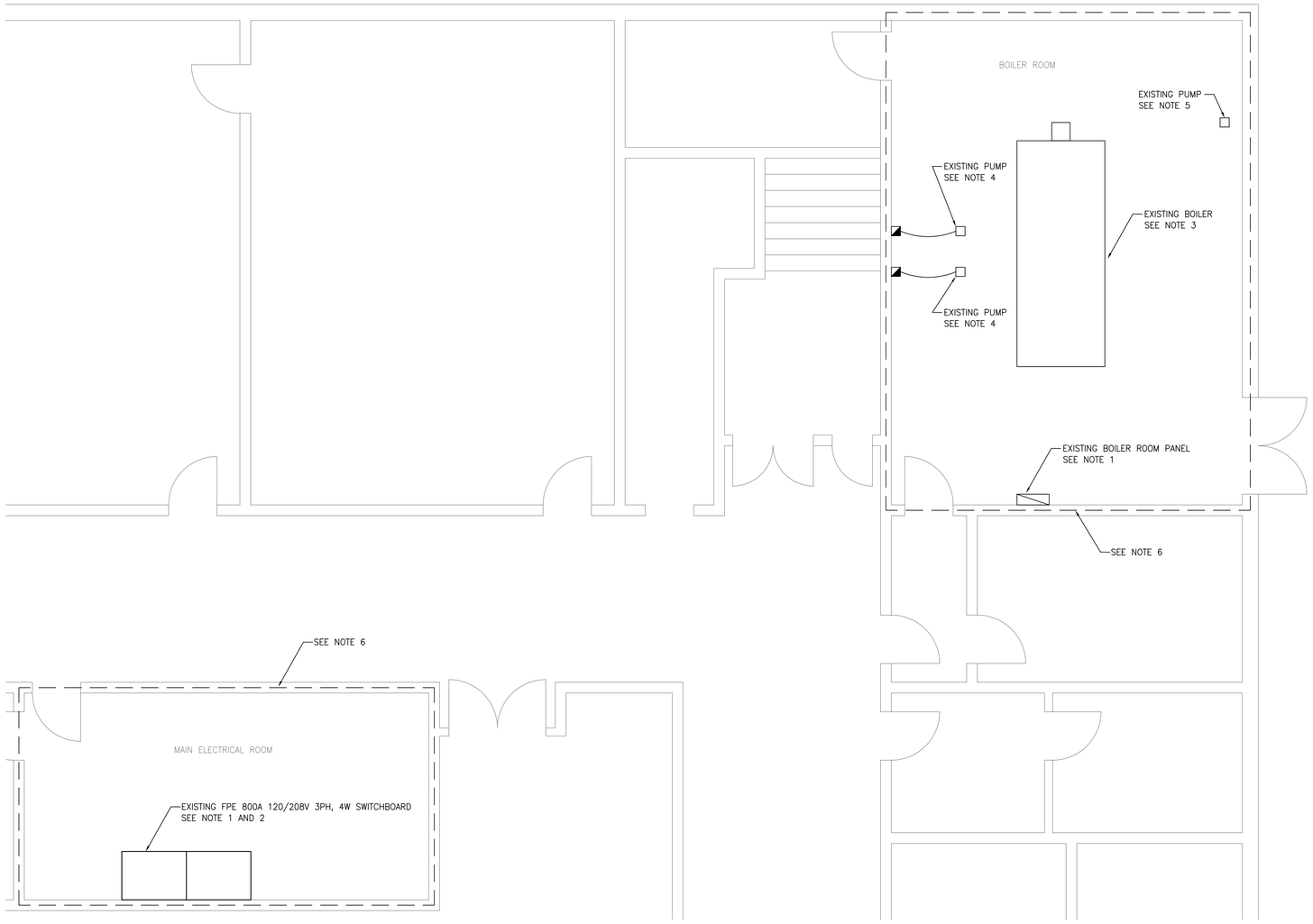

1 / ED101 DEMOLITION – BOILER ROOM PLAN ELECTRICAL
SCALE: 1/4" = 1' 0"

NOTES:

1. DISCONNECT AND REMOVE EXISTING BOILER ROOM PANEL AND FEEDER BACK TO SWITCHBOARD RETAIN CONDUIT. INSTALL NEW PANEL 1101 IN ITS PLACE. INSTALL NEW FEEDER BACK TO EXISTING 100A/3P BREAKER IN SWITCHBOARD USE EXISTING CONDUIT. REFER TO PARTIAL POWER RISER. REFEED ALL CIRCUITS TO REMAIN IN SERVICE FROM THIS PANEL. MATCH CIRCUIT BREAKERS AND WIRE SIZES. INSTALL LAMICOID PLATE ON PANEL 1101 AND SWITCHBOARD.
2. PROVIDE NEW 50A/3P CIRCUIT BREAKER IN EXISTING FPE SWITCHBOARD C/W ALL REQUIRED BUS JUMPERS AND MOUNTING HARDWARE. PROVIDE LAMICOID ID PLATE.
3. MECHANICAL CONTRACTOR IS REMOVING EXISTING BOILER ELECTRICAL CONTRACTOR IS TO DISCONNECT AND REMOVE ALL ASSOCIATED CONDUIT, WIRE, STARTERS, ETC BACK TO SOURCE.
4. MECHANICAL CONTRACTOR IS REMOVING PUMPS. ELECTRICAL CONTRACTOR IS TO DISCONNECT AND REMOVE ALL ASSOCIATED CONDUIT, WIRE, STARTERS, ETC BACK TO SOURCE.
5. MECHANICAL CONTRACTOR IS REMOVING RECIRC PUMP. ELECTRICAL CONTRACTOR IS TO DISCONNECT AND REMOVE ALL ASSOCIATED CONDUIT, WIRE, STARTERS, ETC BACK TO SOURCE.
6. SEAL AND FIRESTOP ALL OPENINGS IN ELECTRICAL ROOM AND BOILER ROOM WALLS (BOTH EXISTING AND NEW) MADE TO ACCOMMODATE ELECTRICAL SERVICES.

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PROJECT
TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT
BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT
ELECTRICAL DEMOLITION

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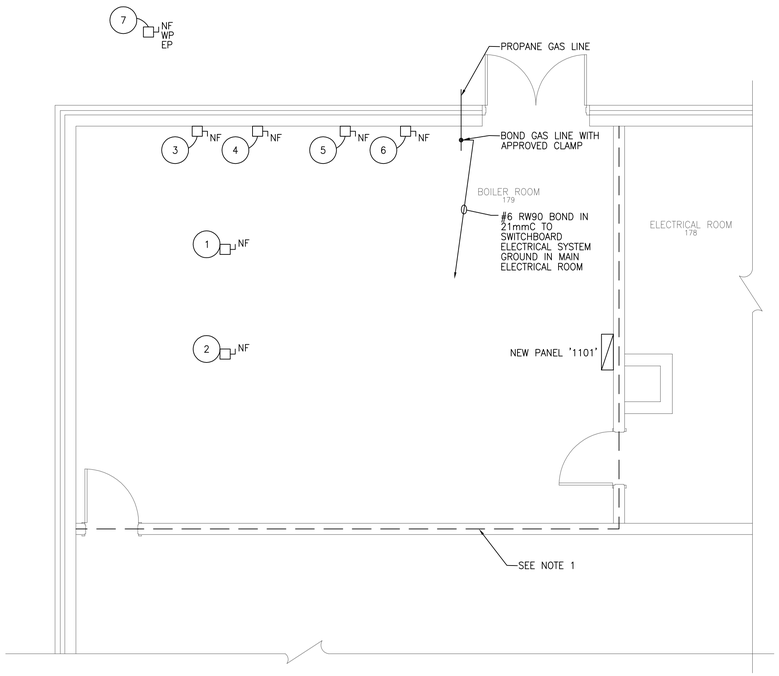
In Imper 0 1 2

DUMAC#24-001



1 / E-101 — NEW – BOILER ROOM PLAN ELECTRICAL

SCALE: 1/4" = 1' 0"

NOTES:
1. SEAL AND FIRESTOP ALL OPENINGS IN BOILER ROOM WALLS (BOTH EXISTING AND NEW) MADE TO ACCOMMODATE ELECTRICAL SERVICES.

VOLTS 120/208 — PANEL 1101 — TYPE PRL-1a
PHASE 3 — LOCATION BOILER ROOM — MAINS 225 AMPS
WIRE 4 — FED FROM SWITCHBOARD — ENTER AT BOTTOM — MTG. S

DESIGNATION	WATTS A	WATTS B	WATTS C	CIR. No.	BKR NO	A B C	BKR NO	CIR. No.	WATTS A	WATTS B	WATTS C	DESIGNATION
BOILER #1 EQ#1	1800			1	20A		3P	2	900			
BOILER #2 EQ#2		1800		3	20A		15	4		900		PUMP P-B1 EQ#3
TRAP PRIMER EQ#8			200	5	15A		A	6			900	
				7			3P	8	900			
				9			15	10		900		PUMP P-B2 EQ#4
				11			A	12			900	
				13			3P	14	1200			
				15			15	16		1200		PUMP P-1A EQ#5
				17			A	18			1200	
				19			3P	20	1200			
				21			15	22		1200		PUMP P-1B EQ#6
				23			A	24			1200	
				25			3P	26				
				27			20	28				SPARE
				29			A	30				
				31			3P	32				
				33			20	34				SPARE
				35			A	36				
				37				38				
				39				40				
△ SPARE				41	20A		15A	42				SPARE △

SPACE FOR EXISTING CIRCUITS TO BE REFED FROM THIS PANEL IN SERVICE. SEE NOTE 1 ED101

ø'A' TOTAL
ø'B' TOTAL
ø'C' TOTAL

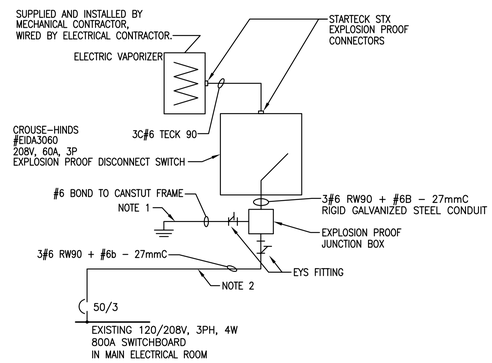
TOTAL LOAD _____ KW _____ AMP

1. DO NOT SHARE NEUTRALS
△ GROUND FAULT CIRCUIT INTERRUPTER BREAKER

NOTE: TRACE AND IDENTIFY ALL CIRCUITS FED FROM THIS PANEL. PROVIDE NEW TYPED PANEL DIRECTORY.

ELECTRICAL SPECIFICATIONS

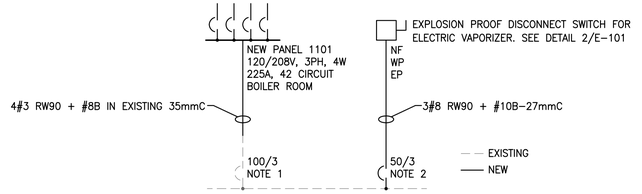
1. PROVIDE ALL MATERIALS, LABOUR, SCAFFOLDS, TOOLS AND EQUIPMENT NECESSARY TO COMPLETE THE ELECTRICAL INSTALLATION AND HAVE ALL SYSTEMS READY FOR OPERATION.
2. DO THE ENTIRE WIRING IN ACCORDANCE WITH THE REQUIREMENTS OF THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND ALL LOCAL AND PROVINCIAL ORDINANCES.
3. OBTAIN AND PAY FOR ALL FEES AND PERMITS REQUIRED BY ANY AUTHORITY HAVING JURISDICTION.
4. ALL MATERIAL SHALL BE NEW AND CSA APPROVED, EXCEPT WHERE OTHERWISE NOTED.
5. PROVIDE GROUNDING TO ALL EQUIPMENT AS SHOWN ON THE DRAWINGS IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE.
6. THIS CONTRACTOR TO COORDINATE LOCATIONS OF ELECTRICAL EQUIPMENT WITH ALL OTHER TRADES.
7. THIS CONTRACTOR TO PROVIDE ALL MATERIALS AND LABOUR TO ENSURE A FULLY WORKABLE SYSTEM.
8. ANY DISCREPANCIES IN THE ELECTRICAL DESIGN TO BE REPORTED TO THE ENGINEER.
9. THIS CONTRACTOR TO NOTIFY ELECTRICAL INSPECTION AUTHORITIES TO ARRANGE FOR INSPECTIONS AT THE APPROPRIATE STAGES OF CONSTRUCTION.
10. COORDINATE WORK AND LOCATION OF EQUIPMENT WITH OTHER DIVISIONS.
11. THESE SPECIFICATIONS, TOGETHER WITH THE DRAWINGS, ARE INTENDED TO PROVIDE COMPLETE SUPPLY AND INSTALLATION OF THE COMPLETE ELECTRICAL SYSTEMS AS FURTHER DISCRIBED AND AS ITEMS NECESSARY OR REQUIRED TO MAKE A FINISHED, WORKMANLIKE, FIRST-CLASS INSTALLATION, EVEN THOUGH EACH AND EVERY ITEM OF LABOUR AND MATERIAL MAY NOT BE MENTIONED OR SHOWN ON PLANS AND SPECIFICATIONS.
12. ALL CUTTING AND PATCHING IS THE RESPONSIBILITY OF ELECTRICAL CONTRACTOR, UNLESS NOTED OTHERWISE.
13. PROVIDE APPROVED FIRE STOPPING AROUND ALL NEW ELECTRICAL PENETRATIONS MADE THROUGH RATED ASSEMBLIES.
14. PROVIDE SHOP DRAWINGS TO CONSULTANT FOR APPROVAL.



2 / E-101 — ELECTRICAL PROPANE VAPORIZER WIRING DIAGRAM

N.T.S.

NOTES:
1. INSTALL A CANSTUT FRAME TO SUPPORT ELECTRICAL EQUIPMENT AT PROPANE TANK. BOND ALL STEEL WITH RW90 GREEN CONDUCTOR.
2. CONVERT RIGID PVC TO RIGID GALVANIZED STEEL CONDUIT BELOW GRADE. INSTALL RIGID GALVANIZED STEEL CONDUIT TO EYS FITTING, JUNCTION BOX, AND EXPLOSION PROOF DISCONNECT SWITCH.



3 / E-101 — PARTIAL POWER RISER DIAGRAM

N.T.S.

NOTES:
1. REUSE EXISTING 100A/3P BREAKER IN SWITCHBOARD TO FEED NEW PANEL '1101'.
2. PROVIDE A NEW 50A/3P CIRCUIT BREAKER TO MATCH EXISTING C/W MOUNTING HARDWARE. #HLL36050 BREAKER AND HDC MH BUS KIT.

ELECTRICAL LEGEND

NF / WP / EP — NON-FUSED DISCONNECT SWITCH, WP DENOTES WEATHERPROOF, EP DENOTES EXPLOSION PROOF

BRANCH CIRCUIT WIRING PANEL 120/208V, 3PH, 4W, 225A MAINS 42 CIRCUIT, COPPER MAINS, DOOR AND TRIM.

(12) — INDICATES MECHANICAL EQUIPMENT NUMBER. REFER TO MOTOR STARTER AND CONTROL LIST

MOTOR STARTER AND CONTROL LIST

E–ELECTRICAL CONTRACTOR; M–MECHANICAL CONTRACTOR; U–USERS EQUIPMENT; X–PROVIDE; S–SITE SERVICES CONTRACTOR
1–STOP–START; 2–ON–OFF; 3–HAND–OFF–AUTO; 4–PILOT LIGHT; 5–CONTROL RELAY
6–VARIABLE FREQUENCY DRIVE; 7–DOUBLE VOLTAGE RELAY; 8–AQUASTAT; 9–END SWITCH; 10–CONTROL VALVE
11–SOLENOID; 12–MOTORIZED DAMPER; 13–FLOAT SWITCH; 14–PRESSURE SWITCH; 15–INTEGRAL SWITCH
16–AIRFLOW SWITCH; 17–CONTROL TRANSFORMER; 18–THERMOSTAT; 19–INTEGRAL CONTROL PANEL; 20–FIRE ALARM SHUTDOWN
21–CURRENT SENSOR; 22–LOW FLOW SWITCH; 23–HIGH LIMIT; 24–LOW LIMIT; 25–BUILDING AUTOMATION SYSTEM
26–REVERSE ACTING THERMOSTAT; 27–INTERVAL TIMER; 28–RECEPTACLE SIZE 5–20R; 29–CO/NO SENSOR; 30–REMOTE PANEL
31–JUNCTION BOX; 32–MOMENTARY CONNECTION STOP/START BUTTON; 33–FAN SPEED CONTROL; 34–MOTOR CIRCUIT PROTECTION
35–LEVEL CONTROL

EQUIPMENT NO.	LOCATION	EQUIPMENT	SUPPLIED UNDER	INSTALLED UNDER	WIRED UNDER	EQUIPMENT RATING KW	HP	MCA	MOCP	VOLTAGE	PHASE	PANEL & CIRCUIT NO.	STARTER: MANUAL TOGGLE PILOT LIGHT (IN COVER)	MAGNETIC COMBINATION FUSE TYPE CONTROL TRANS. AUXILIARY CONTACT BREAKER TYPE SIZE EEMAC NON FUSED TYPE NOTE	HAND–OFF–AUTO AUTO–OFF ON–OFF ON LIGHT RED SLOW LIGHT AMBER SLOW/FAST OFF AUTO CSA ENCLOSURE TYPE LEGEND ABOVE LEGEND ABOVE SUPPLIED UNDER INSTALLED UNDER WIRED UNDER (IN COVER)	LOCATE AT MOTOR: DISCONNECT SWITCH VARIABLE FREQUENCY TERMINAL BLOCK LEGEND ABOVE LEGEND ABOVE LEGEND ABOVE NOTE SUPPLIED UNDER INSTALLED UNDER WIRED UNDER	LOCATE AT MOTOR: DISCONNECT SWITCH VARIABLE FREQUENCY TERMINAL BLOCK LEGEND ABOVE LEGEND ABOVE LEGEND ABOVE NOTE SUPPLIED UNDER INSTALLED UNDER WIRED UNDER	REMOTE CONTROL: LEGEND ABOVE LEGEND ABOVE LEGEND ABOVE LEGEND ABOVE LEGEND ABOVE SUPPLIED UNDER INSTALLED UNDER WIRED UNDER	LEGEND ABOVE LEGEND ABOVE LEGEND ABOVE LEGEND ABOVE SUPPLIED UNDER INSTALLED UNDER WIRED UNDER	LINE DIAGRAM INTERLOCK WITH EQUIP. NO. INTERLOCK WITH EQUIP. NO. INTERLOCK WITH EQUIP. NO. INTERLOCK WIRED BY	FEEDER DETAILS RW90	EQUIPMENT NO.
1	BOILER ROOM	BOILER #1	M	M	E				20	120	1	1101-1				X			25	M M M			2#12+#12B-21mmC	1
2	BOILER ROOM	BOILER #2	M	M	E				20	120	1	1101-3				X			25	M M M			2#12+#12B-21mmC	2
3	BOILER ROOM	PUMP P-B1	M	M	E		2			208	3	1101-2,4,6				X		X	25	M M M			3#12+#12B-21mmC	3
4	BOILER ROOM	PUMP P-B2	M	M	E		2			208	3	1101-8,10,12				X		X	25	M M M			3#12+#12B-21mmC	4
5	BOILER ROOM	PUMP P-1A	M	M	E		3			208	3	1101-14,16,18				X		X	25	M M M			3#12+#12B-21mmC	5
6	BOILER ROOM	PUMP P-1B	M	M	E		3			208	3	1101-20,22,24				X		X	25	M M M			3#12+#12B-21mmC	6
7	EXTERIOR	VAPORIZER	M	M	E	11.8			50	208	3	SWITCHBOARD				X							3#8+#10B-27mmC	7
8	BOILER ROOM	TRAP PRIMER	M	M	E					120	1	1101-5							25	M M M			2#12+#12B-21mmC	8
9																								9
10																								10

DUMAC#24–001

Halifax Regional
Centre for Education

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

No	ISSUE/REVISION	DATE
2	ISSUED FOR TENDER	2024/03/31
1	ISSUED FOR REVIEW	2024/03/28

SEAL

REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF NOVA SCOTIA — D.M. DOMARESKI — 3369

CLIENT

PROJECT
TANTALLON ELEMENTARY SCHOOL BOILER REPLACEMENT
BOUTILIER'S POINT ST.
MARGARET'S BAY, Nova Scotia

SUBJECT
NEW FLOOR PLAN, MOTOR STARTER AND CONTROL LIST, PANEL SCHEDULE AND DETAILS

DRAWN STAFF
PROJECT No 24–001
SCALE AS NOTED
DRAWING No E-101
DATE 2021.03.01

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Halifax

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