COLES ARCHITECTURE ENGINEERING PROJECT MANAGEMENT

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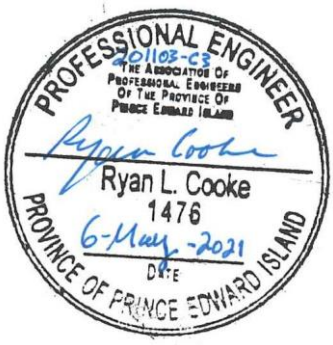
SPECIFICATIONS

ELIOT RIVER ELEMENTARY SCHOOL
CORNWALL, PEI

CONTRACT #3 – SPRINKLER



Coles Associates Ltd.
Project #: 201103

Issued for Tender: May 06, 2021

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1 General

1.1 CONTRACT #3 SPRINKLER - DRAWING LIST

.1 A3-000 Cover Page

.2 ARCHITECTURAL DRAWINGS
- .1 A3-100 First Floor Phasing Plan - Existing Layout
- .2 A3-101 Second Floor Phasing Plan - Existing Layout
- .3 A3-102 Third Floor Phasing Plan - Existing Layout
- .4 A3-103 First Floor Phasing Plan - Approximate Final Layout
- .5 A3-104 Second Floor Phasing Plan - Approximate Final Layout
- .6 A3-105 Third Floor Phasing Plan - Approximate Final Layout

.3 MECHANICAL DRAWINGS
- .1 M3-400 Fire Suppression - First Floor Plan
- .2 M3-401 Fire Suppression - Second Floor Plan
- .3 M3-402 Fire Suppression - Third Floor Plan
- .4 M3-403 Fire Suppression Details, Schedules and Penthouse Plan

END OF SECTION

1 General

1.1 LIST OF APPENDICES

.1 APPENDIX 'A'
Hazardous Assessment Report (January 26, 2021)

.2 APPENDIX 'B'
COVID-19 Contractor Affidavit

END OF SECTION

1 General

1.1 TENDER CALL

.1

The Government of Prince Edward Island, as represented by the Minister of Transportation & Infrastructure will receive sealed tenders at the Security Desk at the main entrance of the Jones Building, 11 Kent Street, Charlottetown, PEI, CIA 7N8. Tenders must be submitted on the forms provided and be in a sealed envelope clearly marked to indicate the project being tendered on.

ELIOT RIVER ELEMENTARY SCHOOL
CONTRACT #3 - SPRINKLER
CORNWALL, PE

Tenders for the General Contract will be accepted until 2:00 PM (local time) on Thursday, 27 MAY 2021.

Project comprises the involves the installation of a new sprinkler system at the existing Montague Consolidated School, located in Montague, PEI

All enquiries are to be directed to the Consultant, Coles Associates Ltd a minimum of three (3) days prior to tender closing as follows:

Attention: Nick White, GSC, C. Tech., RSE.
Email: nwhite@colesassociates.com
Phone: 902-368-2300

Tender documentation will only be available electronically. Electronic documents will be posted electronically to the Government tender page:
https://www.princeedwardisland.ca/en/tenders

Electronic documents will be issued to Construction Association of PEI (CAPEI) as well as to NB and NS Construction Associations. Addenda will only be posted to the Government tender site and issued to the Construction Associations. It is the Contractor's responsibility to ensure that they have incorporated all addenda into their bid submission.

- Tender envelopes must be clearly marked with the Project Name.
- Tender documents will need to be received prior to 2:00 PM (local time) on the date specified in the tender.
- No submissions will be accepted after the 2:00 PM closing time.
- The tender opening will not be opened to the public.
- Tender envelops will be opened immediately after the tender closing and there will be a representative of CAPEI present to witness the opening.

The lowest or any tender will not necessarily be accepted.

END OF SECTION

1 General

1.1 SUMMARY OF WORK

.1 The project involves the installation of a wet-pipe sprinkler system for Eliot River Elementary School, with specific conditions as follows:

- .1 The Contractor is to complete the works at the school over two (2) summers, 2021 & 2022. The summer periods are generally defined as the time between July 1st and September 1st of each year. During these time periods the Contractor has access to all spaces within the school. Outside of these periods, the Contractor may only complete work within utility spaces as coordinated with the Owner.
- .2 This contract is to obtain water service within 1.8m of the foundation wall, the connection is to be made in 2021 with a separate civil works contract. However the line will not be pressurized until 2022.
- .3 This contract is to complete the sprinkler distribution works in coordination with parallel and separate interior renovation contracts. It is advised that the Contractor complete works in the renovation zones concurrent with the separate contract.
- .4 This contract may complete the facility sprinkler distribution at the rate at which their forces allow. However this division will be responsible for removing and reinstating the existing ceiling grid for area's not yet under renovation. In spaces which have already been renovated during the 2021-2022 period, which have an new ceiling grid, the Contractor will be required to replace the ceiling grid if damaged by their works (and not done in coordination with the fit-up contractor).
- .5 The Contractor is to provide a sprinkler head arrangement which is sufficient for the final layout of the building as presented in the drawings, and the works will not be considered complete until the final sprinkler-head distribution is provided.
- .6 Substantial completion will not be permitted or provided to the contractor until the system is pressurized from the final municipal source, the distribution is complete, and all alarm devices and equipment is tested and commissioned.

.2 All in accordance with the requirements of the specifications and drawings listed on their respective Index of Specifications and Drawings.

1.2 ENQUIRIES

.1 Direct all inquiries during the tender period to:

Coles Associates Ltd.
P.O. Box 695
85 Fitzroy Street, Suite 201
Charlottetown, PEI
C1A 1R6

Phone: (902) 368-2300
Email: nwhite@colesassociates.com
CC: tellsworth@colesassociates.com

Attention: Nick White, GSC, C. Tech., RSE

.2 All enquiries are to be directed to the Consultant a minimum of three (3) days prior to tender closing in order to allow the Consultant to issue an addendum a minimum of two (2) days prior to tender close.

1.3 TENDERING PROCEDURE

.1 General Contractors:

.1 Submit their tender for the entire work of this Contract, INCLUDING the work of the Civil, Mechanical, Sprinkler and Electrical subcontracts, directly to the Owner in accordance with the requirements of the Invitation to Tender and this specification.

.2 Civil, Mechanical, Sprinkler and Electrical Subcontractors:

.1 Bidders for the work of the Civil, Mechanical, Sprinkler and Electrical subcontracts will submit their tenders directly to the General Contract bidders, for incorporation by the General Contractors into their General Contract tenders.

.3 General Contract bidders shall take particular care to ensure that their tender is submitted on the proper tender form.

.1 Civil, Mechanical, Sprinkler and Electrical subcontract bidders will submit their tenders to the General Contract bidder, on, or in a form acceptable to the individual General Contract bidders, to whom bids are submitted.

1.4 SPECIFICATION EXPLANATION

.1 Whenever the words "as shown," "as noted," "as called for," "indicated," or similar phrases are used, they shall be understood to refer to this specification and/or the accompanying drawings and addenda.

.2 The words "provided", "install" or similar words shall mean the work described shall be completely supplied, and erected or installed by the Contractor, unless otherwise noted.

.3 All materials are to be new unless noted otherwise.

1.5 EXAMINATION OF SITE

.1 All bidders submitting tenders for this work shall first examine the site and all conditions thereon and/or therein, including:

.1 Existing conditions visually evident at the time of tender upon which the Work of this Contract will be installed.

.2 Conditions attached to, abut against or in any other way affected by existing conditions.

.2 All tenders shall take into consideration all such conditions as may affect the work under this Contract.

.3 No extra payment will be made to the Contractor, above the Contract Price, for costs resultant from failure to determine the conditions that affect the Work.

.4 There will be a schedule Bidder's tour, date as stated in the timing requirements.

1.6 EXISTING CONDITIONS

.1 If in the performance of the contract, subsurface or latent conditions at the site are found to be materially different from those indicated by the drawings and specifications, or unknown conditions not usually inherent in work of the character shown and specified, the attention of the Consultant shall be called immediately in writing to such conditions before they are disturbed. Upon such notice or resulting from his own observation of such conditions the Consultant shall promptly make such changes in the drawings and specifications as he finds necessary to conform to the different conditions and any increase or decrease in the cost shall be adjusted as provided under Changes in the Work.

1.7 DOCUMENT INTERPRETATION

.1 The Consultant's interpretation of Contract Documents shall be final.

.2 Should the Bidder find discrepancies in, or omissions from the drawings, specifications or other tender documents, or be in doubt as to their meaning or interpretation, the Bidder should at once notify the Consultant in writing for clarification.

.3 Any instructions or clarifications to Bidders issued during the period of bidding will be in

the form of Addenda and are to be included in the tender. Addenda will form part of the Contract Documents.

.4 The Owner, User Groups or Consultant will not be responsible for verbal instructions.

.5 Addenda will be posted online via https://www.princeedwardisland.ca/en/tenders.

.6 Every effort will be made to issue addenda not less than two (2) days prior to the time for the closing of tenders, at the Consultant's discretion.

1.8 PREPARATION AND SUBMISSION OF BIDS

.1 Contractors shall submit their bids on the Tender Form provided, which will be received at the time and place indicated on the Invitation to Tender. Late tenders will not be accepted and will be returned unopened to the bidder.

.2 Bidders shall fill in all information requested on the Tender Form.

.1 This form must be completely filled out in ink, or be typewritten with the signature in longhand. The completed forms shall be without interlineation, alteration or erasure.

.2 Failure to fill in the Tender Form, as provided, in its entirety may result in the rejection of the bid; however, bidders are not obligated to provide alternative prices to products listed on the Appendix provided for that specific purpose, as part of the tender form.

.3 Tender amount shall be stated both in writing and in figures.

.4 Signatures shall be without alteration or erasure.

.5 Receipt of addenda for the project shall be acknowledged by filling in the addendum number and date of issue for each addendum on the appropriate line on the Tender Form. These lines shall be initialed by the person signing the tender after they have been filled in.

.3 Each tender submitted will be accepted on the understanding that it covers all the Work called for in the specifications and on the drawings, regardless of any notations by Bidder that certain parts of the required Work are omitted from their proposal.

.4 Each bid must:

.1 Give the full business address of the Bidder and be signed by him with his usual signature.

.2 Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name of one of the members of the partnership or by some authorized representative, followed by the signature and designation of the person signing.

.3 Bids by corporations must be signed with the legal name of the corporation, followed by the name of the Province of incorporation, and by the signature designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person signed shall also be typed or printed below the signature.

.4 A bid by a person who affixes to his signature the word "president," "secretary," or "agent," or other designation, without disclosing his principal, may be held to be the bid of the individual signing on behalf of the corporation.

.5 A bid of any individual or any group of individuals operating as co-partners or the bid of any corporation which may be submitted shall be executed and authorized so that it shall be and it will constitute a legal binding act of the persons, co-partners, or corporate entity making the bid.

.5 Bidders shall include with their tender, in the space designated in Section 00 41 13, Appendix A, the name of each Subcontractor and/or Supplier, as designated, whose price has been included in their tender and who will perform the trade work. Substitution for another Subcontractor in the event that the listed Subcontractor is unable to do the work shall be subject to the approval of the Owner and contingent on evidence satisfactory to the Owner that the original Subcontractor's price was legitimately carried

in the Tender, and that the original Subcontractor is now incapable of carrying out the work required under the subcontract, or that he refuses to carry out the work and provides documented reasons for such incapacity or refusal.

.6 The term "Own Forces," as a subcontractor, may be used by a Bidder where the Bidder is equipped to and in fact normally carries out the trade work using employees in the direct employment of the Contractor or a wholly owned subsidiary company. Other designations such as "Own Estimate" are unacceptable and may be cause for rejection of the tender by the Owner.

.7 When a Bidder indicates "Own Forces" as a subcontractor, the Bidder may be required to demonstrate to the Owner that he has the resources, experience and employees necessary, available and qualified to perform the trade work in a manner and quality satisfactory to fulfill the obligations of the Contract Documents and that the trade work is a normal and continual part of his business operation.

.8 A Bidder, whose tender is accepted, that included "Own Forces" for a subcontract will if requested, provide the Owner with payroll records verifying that the employees carrying out the "Own Forces" subcontract work are direct employees of the Contractor or of a wholly owned subsidiary company of the Contractor.

.9 Each bidder shall be prepared, if so requested by the Owner, prior to the award of the Contract to present evidence of his experience, qualifications and financial ability to carry out the terms of the Contract.

.10 The Owner will evaluate Tenders submitted for this project. The criteria to be considered by the Owner in awarding the Contract will include a combination of:

.1 Bid price;

.2 Scheduling;

.3 Compliance;

.4 Expertise;

.5 Qualifications of the Contractor and named Subcontractors / Suppliers and

.6 Any other such conditions as may be determined by the Owner to be in the best interests of the Owner. A decision on the acceptance of a Tender will be made by the Owner based on the results of the Owner's evaluation.

.11 Bidders may, at their own discretion, submit Alternatives to items identified as "Acceptable Material".

.1 All proposed Alternatives shall be listed in Appendix "B", ALTERNATIVE PRICES and be identified by name and model number where applicable and each Alternative shall have an associated tender price change "INCREASED BY" $_____ or "DECREASED BY" $_____ or "N/A," as compared with the "Acceptable Material" item carried in the tender amount.

.2 Alternate prices will include ALL related costs associated with charges from Accepted Material. No additional costs will be accepted for failure of the Contractor to identify the full impact of using alternate systems.

.3 Alternate prices will NOT be used in determining the tender price or as the basis for awarding the tender.

.12 Bidders are to complete any other appendices forming part of the Tender Form as directed under Section 00 41 13 - Bid Form.

.13 Tender Forms and accompanying documents shall be enclosed in a sealed envelope marked "TENDER" and bearing the following identification.

.1 Name of project.

.2 Name of Contractor submitting tender.

.14 Envelope to be addressed to the recipient of tenders indicated in the Invitation to Tender and delivered by hand, registered mail or courier.

.15 Submit one (1) only signed copy of Tender Form.

.16 Accompanying the Tender Form shall be:

.1 One (1) copy of Bid Guarantee, together with Surety's Letter of Consent, as specified.

.2 One (1) copy of a preliminary schedule demonstrating the full scope of work to be completed within the identified time for the completion of the contract work.

.3 One (1) copy of a letter from Bidder's insurance provider identifying a list of any claims made against the Bidder within the last five (5) years.

.17 Tender forms and securities must bear original signatures.

.18 Where the bid amount is shown in both written words and number and the two are in conflict, written words will take precedence.

1.9 BID GUARANTEE

.1 Each tender submitted shall be accompanied by the following Security:

.1 For a General Contract Tender less than Three Million Dollars ($3,000,000.00), including Mechanical and Electrical Subcontract values:

.1 A Bid Bond equal to at least ten percent (10%) of the tender amount and a Letter of Surety from a bonding company guaranteeing to supply a Performance Bond in the amount of fifty percent (50%) of the total contract amount.
OR

.2 A security Deposit equal to at least ten percent (10%) of the tender amount.

.2 General Contract Tender more than Three Million Dollars ($3,000,000.00), including Mechanical and Electrical Subcontract values:

.1 A Bid Bond equal to at least ten percent (10%) of the tender amount and a Letter of Surety from a bonding company guaranteeing to supply a Performance Bond in the amount of fifty percent (50%) of the total contract amount and a Labour and Materials Payment Bond in the amount of fifty percent (50%) of the total contract amount.

.3 All Bonds and Letters of Surety supplied by General Contractors, made payable to the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure.

.1 Bonds and Letters of Surety supplied by the General Contractor to the Owner shall be from a recognized surety company, satisfactory to, and approved by the Owner.

.2 If a performance bond is utilized, it shall be maintained in force for a period of not less than twelve (12) months after the issuance of the total performance criteria.

.3 Security Deposits, provided by General Contractors, must be in the form of a Certified Cheque or Bank Draft drawn on a Bank to which the Bank Act applies or a credit Union, payable to the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure.
OR

.4 Bonds of the Government of Canada, unconditionally guaranteed, as to the principal and interest by the Government of Canada if such Bonds are:

.1 Payable to the bearer, or

.2 Accompanied by a duly executed instrument of transfer to the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure, in the form prescribed by the Domestic Bonds of Canada Regulations, or

.3 Negotiated as to principal or as to principal and interest in the name of the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure, pursuant to the Domestic Bonds of Canada Regulations.

.5 Security deposits submitted by subcontractors, to General Contractors, shall be in a form satisfactory to the General Contractor.

1.10 CONTRACT SECURITY

.1 Upon award of a contract the General Contractor is to provide the following contract security:

.1 General Contract Tender less than Three Million Dollars ($3,000,000.00), including Mechanical and Electrical Subcontract values:

.1 A Performance Bond in the amount of fifty percent (50%) of the total contract amount.
OR

.2 A Security Deposit in an amount equal to at least ten percent (10%) of the contract amount.

.2 General Contract Tender more than Three Million Dollars ($3,000,000.00), including Mechanical, Sprinkler and Electrical Subcontract values:

.1 A Performance Bond and a Labour and Materials Payment Bond, each in the amount of fifty percent (50%) of the total contract amount.

.3 All Bonds provided by General Contractors, made payable to the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure.

.1 Bonds shall be from a recognized surety company, and approved by the Owner.

.2 If a performance bond is utilized, it shall be maintained in force for a period of not less than twelve (12) months after the issuance of the total performance criteria.

.4 Security Deposits, provided by General Contractors, must be in the form of a Certified Cheque or Bank Draft drawn on a Bank to which the Bank Act applies or a Credit Union, payable to Minister of Finance, Province of Prince Edward Island.
OR

.5 Bonds of the Government of Canada, unconditionally guaranteed, as to the principal and interest by the Government of Canada if such Bonds are:

.1 Payable to the bearer, OR

.2 Accompanied by a duly executed instrument of transfer to the Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure, in the form prescribed by the Domestic Bonds of Canada Regulations, or

.3 Negotiated as to principle or as to principle and interest in the name of the Owner, pursuant to the Domestic Bonds of Canada Regulations, or

.4 Contract security shall be provided at the expense of the Contractor, bonds shall be provided by an established surety company satisfactory to, and approved by the Owner. Certified Cheques or Bank Drafts shall be drawn on an account with a recognized financial institution.

.6 If in accordance with the Bid Guarantee requirements the successful Contractor has used a Certified Cheque or Bank Draft as a bid guarantee, the Certified Cheque or Bank Draft will be securely retained and, subject to the progress of the work being acceptable to the Owner and Consultant, will be held without interest until the date of Substantial Performance for the Contract, as defined under Definition 19 of CCDC2-2008, at which time it will be returned to the Contractor.

1.11 RECEIPT AND OPENING OF BIDS - UPDATED FOR COVID 19

.1 We have developed modifications to the tender process to minimize everyone's potential exposure to COVID-19.

.1 Sealed tenders will be received at the Security Desk located at the main entrance to the Jones Building, 11 Kent Street, Charlottetown, PE, C1A 7N8 until 2:00 PM, local time, on date of Tender closing .

.2 Sealed tenders are to be clearly marked with the Bidder's Name and the Project Name.

.3 Tender documents will need to be received prior to 2:00 PM local time on the date specified in the Tender. No submission will be accepted after that time.

.4 Amendments to submitted offer will be permitted if received in writing prior to bid closing and if endorsed by same party or parties who signed and sealed offer. Amendments may be submitted by fax to Department of Transportation & Infrastructure, fax number (902) 569-0590.

1.12 ADJUSTMENT AND WITHDRAWAL OF BIDS

.1 Bids may be withdrawn or adjusted in writing by mail, delivered in person or facsimile transmission delivered to the party to whom the bids were submitted, provided such withdrawal or adjustment is prior to the time fixed for the opening of the bids. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal or adjustment of the bid after the expiration of the time within which bids may be submitted.

.1 All withdrawals or adjustments to previously submitted tenders must be faxed to Department of Transportation & Infrastructure, fax number (902) 569-0590, prior to the time fixed for the opening of bids.

.2 Neither the Owner nor Coles Associates Ltd. accepts responsibility for the Contractors inability to submit faxed modifications within the allotted time for such circumstances, including but not limited to power and equipment failures, transmission failures, paper outages, busy fax line, etc.

.3 Adjustments must be signed by the same person who signed the original bid.

1.13 AWARD OF CONTRACT

.1 The Contract, if awarded, will be awarded as promptly after the opening of bids as is possible, and at the discretion of the Owner. The award date will not extend beyond the period indicated on the Tender Form following the scheduled time of tender closing, without first obtaining permission of the three (3) low bidders, or low bidder only, at the discretion of the Owner.

.2 The Form of Agreement, (Contract) which the successful Bidder will be required to enter into with the Owner, may be seen on application to the Consultant. The drawings, specifications and any addenda issued during the tender period, will be suitably marked for identification at the time the Form of Agreement is signed by both parties, shall be considered as being included in the Contract, together with the completed Tender form and are hereinafter referred to as the "Contract Documents." All of these documents shall be read together and construed as one document. Following execution of the Contract, the Contractor shall receive from the Owner one (1) complete signed set of Contract Documents.

.3 Final award of Contract shall be subject to approval of all agencies having direct interest in the project.

.4 Where identical bids are received, the low bidder will be selected on the basis of a coin toss by the Owner in the presence of the identical bidders.

1.14 ACCEPTANCE / REJECTION OF TENDERS

.1 Bids shall remain open to acceptance and irrevocable for a period of thirty (30) days after the bid closing date.

.2 The Owner reserves the right to reject any and all tenders.

.3 In making the decision to award the Contract pursuant to this invitation to tender, the Owner may take into account:

.1 The history of work performance of each Bidder on similar or different types of work in prior Contracts with the Owner.

.2 The Bidder's qualifications to perform the work, the quality of the Bidder's past work, the Bidder's financial capability to do the work, the past history of the

Contractor's construction scheduling ability to meet the Owner's specified substantial completion targets and the competence of the Bidder.

.4 If the tender is accepted the Contract will be awarded as promptly after the opening of bids as is possible. The selection of the tender that is accepted shall be at the sole discretion of the Owner.

.5 Each Bidder shall be prepared, if so requested by the Owner, prior to the award of the Contract to present evidence of their experience, qualifications and financial ability to carry out the terms of the Contract.

1.15 REJECTION OF BIDS

.1 The Owner reserves the right to reject any and all bids.

.2 The lowest or any bid will not necessarily be accepted.

.3 Bids submitted which indicate "own forces" for subcontract work, that in the opinion of the Owner cannot be successfully completed by the Contractor's employees will not be accepted.

.4 Bids not submitted on the required form will be rejected.

.5 Bids which are incomplete or qualified will be rejected.

.6 All Bidders acknowledge that they shall have no claim against, or entitlement to damages from the Owner or Consultant by reason of the Owner's rejection of their individual bids or all bids.

1.16 SUBCONTRACT WORK

.1 Contractor is to ensure that all Subcontractors understand the full extent of their responsibilities in order to complete the entire work of the project. Subcontract work may appear in various Sections of Specifications and on various Drawings.

.2 Contractors and their Subcontractors are advised to become familiar with all specifications and drawings.

1.17 CONDITIONS OF WORK AND EMPLOYMENT IN PEI

.1 All Construction Companies and Contractors and subcontractors submitting tenders for this work, or a portion thereof, are advised, in their own interest, to contact the Construction Association of Prince Edward Island, the accredited association for commercial and industrial sectors of the construction industry, to inquire and determine the terms and conditions of work and employment in the Province of Prince Edward Island.

1.18 COVID-19

.1 The parties acknowledge that the obligations of each party from time to time to meet certain terms and conditions of this Contract, may be impeded by the COVID-19 pandemic and related issues. The parties agree to act in good faith by making all reasonable accommodations as the circumstances of the pandemic may require and each party will exercise reasonable efforts to comply with this Contract notwithstanding the effect of the pandemic. No party will require or encourage any person acting on its behalf to violate the terms of any public health directive or to perform any act which would place such person at a material risk of contracting the COVID-19 virus.

.2 This contractor acknowledges that any costs associated with COVID-19 construction protocol related to all required Health and Safety measures during the duration of this construction contract, as referenced in the Tender Documents, shall be included in the base bid for this Contract.

.3 COVID-19 Implications:

.1 Until further notice, and as directed by the Provincial Chief Public Health Office (CPHO), all works shall be conducted with the intent and spirit of the health directives given. As such, bidders shall include provisions within their bids to

achieve social and physical distancing between all workers during travel times to and from the site, working, rest breaks, lunch breaks, etc. For more information related to CPHO and COVID-19 refer to the following links provided by the Government of PEI:

.1 Government of PEI:
www.princeedwardisland.ca/covid19

.2 Government of Canada:
www.canada.ca/coronavirus

.3 CAPEI:
www.capei.ca/

.4 In response to the current COVID-19 pandemic we will require all Contractors to:

.1 Develop a written work site specific Pandemic Preparedness plan based on the criteria in the CAPEI industry guide "PANDEMIC PLANNING FOR THE CONSTRUCTION INDUSTRY - A GUIDE" found at the following link:
https://capei.ca/member_access/LiveEditor/images/pdf/INDUSTRY_GUIDE_COVID_19.pdf

.5 The successful Contractor shall have designated an on-site staff person with the authority to enforce the requirements of the 'Pandemic Preparedness Plan' throughout the project(s) or until such directive is deferred by the Chief Provincial Health Office (CPHO). The Owner will require that the Contractor develop a written site specific Pandemic Preparedness Plan and have it available upon award of this tender.

1.19 LABOUR

.1 No prospective employee in the Province of Prince Edward Island shall, with relation to his employment or eligibility for employment, be discriminated against or favored by reason of sex, racial origin, religious views, or political affiliations.

.2 Contractors, to the extent possible, are encouraged to maximize the employment of the local labour force for the Work of this Contract.

1.20 COMPLIANCE WITH STATUTES

.1 It shall be the sole responsibility of the Contractor to prepare and submit any required applications, reports, payments or contributions with respect to Sales Taxes, Income Taxes, Canada Pension Plan contributions, Employment Insurance Premiums, Harmonized Sales Taxes or any other similar matter which may be required by law to be made by the Contractor in connection with the services to be performed under this Agreement.

.2 The Agreement shall be interpreted and applied in accordance with the laws, and in the courts, of the Province of Prince Edward Island.

.3 The Contractor agrees to accept sole responsibility to comply with all federal, provincial and municipal legislation which may have application to the Work and agrees to comply with all provincial and federal legislation affecting conditions of work and wage rates including the Employment Standards Act R.S.P.E.I. 1988, Cap. E-6.2, the Workers Compensation Act R.S.P.E.I. 1988, Cap. W-7.1, or any other laws that impose obligations in the nature of employers' obligations. The Consultant agrees to follow the Public Service Commission Human Resource Policies listed below while working on Government sites, in Government vehicles or alongside Government staff.

.1 Prince Edward Island Public Service Commission, Human Resource Policies

.1 9.05 Violence in the Workplace Policy
https://psc.gpei.ca/sites/psc.gpei.ca/files/HRPolicy/HRManual_9.05.pdf

.2 9.08 Drug, Alcohol and Medication Policy
https://psc.gpei.ca/sites/psc.gpei.ca/files/9.08%20AlcoholDrugandMedicationPolicy.pdf

.3 11.01 Policy for the Prevention and Resolution of Harassment in the

Workplace
https://psc.gpei.ca/files/PDF%20Files/hrp-manual/hrppm_11.01.pdf

.4 The Contractor, before undertaking any Work shall provide to Government either a certificate of good standing by the Workers Compensation Board or written confirmation from the Workers Compensation Board that such certificate is not required.

.5 The Contractor agrees to accept the full cost of doing those things required under this paragraph and will not charge or seek reimbursement from Government in any way, such costs having been taken into consideration and included in the rates of payment stipulated in the Payments, Records and Accounts section of this Agreement.

1.21 TAXES

.1 The Harmonized Sales Tax (HST) shall be EXCLUDED from the tender amount. The Contractor, as per current Provincial Regulations, shall include on all invoices the Harmonized Sales Tax (HST) as an additional line item. This would be in addition to the tender amount which does not include HST.

.2 Vendors are required to charge HST on invoices to Province of PEI Departments, Agencies, Crown Corporations, and Regional Health Authorities.

1.22 ACCEPTABLE PRODUCTS

.1 The Bidder shall carry in his tender the base bid product(s) identified in the specifications as "Acceptable Material", or Approved Equals as they are identified throughout the tender period.

.2 The Bidder is also encouraged to carry the products of other manufacturers, that are not considered equals, as "Alternatives Prices," listing them by name on the Appendix provided for that specific purpose, as part of the Tender Form, together with the price difference compared to the specified products, when such Appendix is identified under Section 00 41 13 - Bid Form.

1.23 APPROVED EQUALS

.1 Submission for an Approved Equal is to contain literature and descriptive information with full specification data. Where the requested item is contained on a printed document with other items, it is to be clearly identified.

.2 The Consultant will not search catalogs, e-mails or websites or contact suppliers to obtain the necessary information for proper evaluation.

.3 Submission by Bidders for evaluation of products requested to be considered as equal must be submitted to Consultant no less than 5 working days prior to closing of tenders. No consideration will be given to approving equals after the close of tenders, except when the specified product is found to have been discontinued by the manufacturer.

.4 The consideration of a product(s) for Approved Equal status and the acceptance of individual products as approved equals is entirely at the discretion of the Consultant.

.5 When products are given Approved Equal status these products may, at the discretion of bidders, be carried in their tender price, provided that ALL costs related to changes to the contract work required to incorporate the Approved Equal product are included in the tender price.

.6 The acceptance of a product by the Consultant as an "Approved Equal," even where not specifically indicated on the Approved Equals listing in the Addendum, is to be understood as being contingent upon the provision of the particular series, model and/or type, complete with all options to meet the specified requirements of the Acceptable Material product.

.7 Products given approved status that are found, during construction period, to not have all specified options available, or to have discontinued production of same, or to have made other design changes since the time of approval, will not be accepted for use on this project, except when financial compensation has been mutually agreed upon between the Contractor and the Owner and deemed acceptable by the Consultant.

Compensation will not be paid to the Contractor for products acknowledged by the Consultant to be superior to the specified products.

1.24 ALTERNATIVES

.1 Alternative products, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "B" provided as part of the Tender Form, and are to be understood as being offered only for the Owner's consideration as substitutes for the specified Acceptable Material products, at the amount of increase or decrease in the tender amount indicated in the Appendix. These products and related prices are not to be included in the tender amount.

.2 Alternative products and their related increase or decrease in the base bid amount are not used as the basis for awarding tenders.

.3 When alternative products are listed in Appendix "B", ALL costs related to changes to the contract work required to incorporate the alternative product into the work are to be included in the amount stated in Appendix "B".

.4 Alternative products may or may not be accepted at the discretion of the Owner at the price difference quoted, without any other monetary consideration. If requested, bidders shall promptly supply full details of any or all Alternatives listed. Specific written direction from the Consultant must be given to the Contractor to substitute an alternative product.

.5 Alternative prices shall include all fees, taxes and markups.

1.25 UNIT PRICES

.1 Unit Prices, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "C", as part of the Tender Form and are to be understood as being offered only for the Owner's consideration; to be accepted or not accepted, at the Owner's discretion in a timely manner during the Work of the Contract, ONLY as a method of adjustment to the Contract Work for changes in the Work, should the Owner opt for the Unit Price Method.

.2 Unit prices shall include all fees, taxes and markups.

1.26 SEPARATE PRICES

.1 Separate Prices, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "D", as part of the Tender Form and are to be understood as being offered only for the Owner's consideration; to be accepted or, not accepted, in whole or in part, at the Owner's discretion. If used the Separate Prices may be incorporated into the Contract Work either at the time of Award of Contract or in a timely manner during the Work of the Contract, at the Owner's discretion.

.2 Separate Prices shall include all fees, taxes (excluding HST) and markups.

1.27 GUARANTEES

.1 The Contractor will be required to guarantee the work of this Contract in accordance with the requirements of GC12.3 of the Agreement.

.2 Not withstanding the above, the bidder's attention is directed to the fact that certain individual items on this project may be required to be guaranteed by the manufacturer for periods in excess of twelve months. These specific requirements are to be found in various Sections of the specifications for this project.

1.28 PAYMENT OF WORKERS

.1 The Contractor shall, in addition to any fringe benefits, pay the workers employed by the Contractor on the work at wage rates, not less than those established by the Minimum Wage Order, issued under authority of the Labour Act, which is in effect. The Contractor shall pay workers employed on the work at intervals of not less than twice per month.

.2 The Contractor shall require each Subcontractor, or person doing any part of the work, to covenant with the Owner that workers are employed at the wage rates and in the

manner required by this provision.

.3 Where any person employed by the Contractor or any Subcontractor, or other person engaged on the Work of this Contract, is paid less than the amount required to be paid under the provisions of this Contract, the Owner may deduct from any monies payable to the Contractor, under this or any other Contract, and pay to such person, a sum sufficient to bring the person's wages up to the amount required to be paid under this Contract.

.4 No claim for extra payment from the Contractor will be considered by the Owner concerning any change in the Minimum Wage Order which may occur during prosecution of the Contract.

1.29 CONFIDENTIALITY AND FREEDOM OF INFORMATION

.1 By submitting your bid, you agree to disclosure of the information supplied, subject to the provisions of the Freedom of Information and Protection of Privacy (FOIPP) Act.

.2 Anything submitted in your bid that you consider to be "confidential information" because of its proprietary nature should be marked as "Confidential", and will be subjected to appropriate consideration under the Freedom of Information and Protection of Privacy Act.

.3 During the delivery and installation of goods and/or services, you may have access to confidential or personal information. Should this occur, you must ensure that such information is not released to any third party or unauthorized individual.

.4 Any information provided on this contract may be subjected to release under the Freedom of Information and Protection of Privacy Act. You will be consulted prior to the release of any information.

1.30 TIMING REQUIREMENTS

.1 This project will require the achievement of the following project milestones.

.1	Tender Call	06 MAY 2021
.2	Pre-tender Site Meeting	13 MAY 2021 @ 9:00 AM
	.1 Contractors are asked to meet at main entrance of Montague Consolidated School, located at 622 Princess Drive, Montague, PE.	
.3	Tender Close	27 MAY 2021 @ 2:00 PM
	.1 Location of Closing: Jones Building, 11 Kent Street.	
.4	Tender Award	02 JUN 2021
.5	Construction Start	Immediately following award.
.6	Substantial Completion:	01 SEP 2021
.7	Owner Occupancy	01 SEP 2021

END OF SECTION

1 General

1.1 TENDER

.1 SUBMITTED BY:

_____(Name)

_____(Address)

_____(Contact)

DATE: _____

FOR: PROJECT NAME: ELIOT RIVER ELEMENTARY SCHOOL
CONTRACT #3 - SPRINKLER
LOCATION: CORNWALL, PE

TO: PROJECT OWNER: GOVERNMENT OF PRINCE EDWARD ISLAND, AS REPRESENTED BY THE MINISTER OF TRANSPORTATION & INFRASTRUCTURE
LOCATION: 11 KENT STREET, CHARLOTTETOWN

Having examined ALL the drawings and specifications for this project, as well as any addenda issued, as prepared by Coles Associates Ltd. and/or their consultants; WE HEREBY OFFER to furnish all materials, plant and labour necessary for the full and proper completion of the Contract work for:

PROJECT NAME: ELIOT RIVER ELEMENTARY SCHOOL
CONTRACT #3 - SPRINKLER
LOCATION: CORNWALL, PE

INCLUDING all prime cost allowances and Government sales or other taxes in force at this date, EXCLUDING Harmonized Sales Tax (HST) but not any other additional or deductible allowances or taxes which may be applicable subsequent to this date, and which shall be payable by or to the Owner, in accordance with the above mentioned Documents, for the bid amount of:

_____(Dollars)
($)

in lawful money of Canada.

In submitting this Tender we recognize the necessity to complete the information requested by any appendices, as well as, the right of the Owner to reject all Tenders or to accept any Tender at the price submitted, on the condition that revised Tenders will not be called for if minor changes are made.

In the event of this Tender being accepted within thirty (30) days of the time stated for the closing of Tenders, and our failing or declining to enter into a Contract, then our Bid Guarantee, submitted with our Tender shall be forfeited to the Owner in lieu of any damages which the Owner may suffer by reason of our failure or refusal to enter into such Contract.

In the event of our Tender not being accepted with thirty (30) days of the time stated for the closing of Tenders, our Bid Guarantee, submitted with our Tender will be returned to us forthwith, unless a satisfactory arrangement is made with us covering its retention for a further stated period.

If we are notified of the acceptance of this Tender within the above specified time, we will:

.1 Enter into a formal Contract Agreement with the Owner.
.2 Furnish the Performance Bond and Labour and Materials Payment Bonds, or other form of Contract Security, when specifically permitted, as Contract Security in accordance with the requirements of the specifications.
.3 Furnish a cost breakdown of the Contract sum, the total aggregating the amount of our Tender, in accordance with the requirements of the specifications.
.4 Furnish a certified copy of all insurance policies.
.5 Furnish a certified copy of all insurance policies carried by the named subtrades.
.6 Complete the entire work on or before the dates stated.
.7 Provide and update as required a Construction Schedule which clearly shows the state of progress required to complete the work on the date specified.
.8 Enter into subcontract agreements where applicable.

1.2 ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

.1 Addendum No. _____ Issued: _____ _____ initial

Addendum No. _____ Issued: _____ _____ initial

Addendum No. _____ Issued: _____ _____ initial

Addendum No. _____ Issued: _____ _____ initial

Addendum No. _____ Issued: _____ _____ initial

1.3 FORM OF TENDER APPENDICES

.1 Appendix 'A' must be completed by bidders.
.2 Appendix 'B' (only the items indicated) may be completed by bidders, any other items are at the bidder's discretion.
.3 Appendix 'C' must be completed by bidders.
.4 Appendix 'D' must be completed by bidders.

1.4 DOCUMENTS ACCOMPANYING BID FORM

.1 As per Section 00 21 13, Par 1.8.16
  .1 One (1) copy of Bid Guarantee, together with Surety's letter of consent. _____ initial
  .2 One (1) copy of preliminary schedule. _____ initial
  .3 One (1) copy of letter from Bidders Insurance Provider identifying list of claims made against Bidder within last five (5) years. _____ initial

1.5 SUPERINTENDENT

.1 Name of Superintendent _____.
.2 Years of Experience with Contractor _____.

1.6 CONFLICT OF INTEREST

.1 The Contractor warrants that as at the date of this Agreement, no conflict of interest, or any circumstance that might interfere with independent and objective exercise of judgment, exists or is likely to arise in relation to execution of this Agreement or its subject matter. The Contractor shall immediately notify Government, in writing, if any such actual or potential conflict of interest should arise at any time during the Term. In the event Government discovers or is notified by the Contractor of an actual or potential conflict of interest, Government, in its sole discretion, may either:

.1 Allow the Contractor to resolve the actual or potential conflict to the satisfaction of Government;
OR

.2 Terminate the Agreement in accordance with the Termination section of this Agreement.

1.7 CONTRACTOR'S SIGNATURE

.1 Signed sealed and submitted for and on behalf of:

_____
(Company Name)

_____

_____
(Address)

_____ _____
(Authorized Signature) (Witness)

_____ _____
(Name and Title) (Name and Title)

_____
(Date)

1.8 APPENDIX 'A'

.1 Herewith are identified the Subcontractors we propose to use on this project. Carrying Sub-Contractor options next to identified work, is not acceptable and may be cause for rejection of the Tender by the Owner.

Automatic Sprinkler: _____

COMPANY: _____

AUTHORIZED SIGNATURE: _____

1.9 APPENDIX 'B'

.1 ALTERNATIVE PRICES

We herewith submit for consideration by the Owner the following systems or products as Alternatives to the Base Bid items indicated below and identify the increase or decrease, as applicable, in our tender price, for each item should it be selected by the Owner for installation in lieu of the Base Bid item. The change in tender price includes for all necessary modifications to the base bid systems.

Alternative prices shall include all fees, taxes and markups.

SECTION ITEM BASE BID ALTERNATIVE:	TENDER PRICE INCREASED BY:	TENDER PRICE DECREASED BY:
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____

COMPANY: _____

AUTHORIZED SIGNATURE: _____

1.10 APPENDIX 'C'

.1 UNIT PRICE COMPONENT

We submit herewith our Unit Prices for the additions or deletions to the work listed below. The Unit Prices listed apply to performing the Units of Work, in accordance with the requirements of the appropriate specifications herein, only during the time scheduled for such work in the project work schedule.

Unit prices shall include all fees, taxes and markups.

	UNIT OF WORK	ONE (1) UNIT PRICE ONLY FOR EITHER ADDITION OR DELETION
.1	_____	$ _____
.2	_____	$ _____
.3	_____	$ _____
.4	_____	$ _____

COMPANY: _____

AUTHORIZED SIGNATURE: _____

1.11 APPENDIX 'D'

.1 SEPARATE PRICES

We submit herewith our Separate Price for the addition of the work listed below and amounts are NOT included in our Stipulated Price. In accordance with the requirements of the appropriate specifications herein, only during the time scheduled for such work in the project work schedule.

Separate prices shall include all fees, taxes and markups.

	UNIT OF WORK	ONE (1) UNIT PRICE ONLY FOR EITHER ADDITION OR DELETION
.1	_____	$ _____
.2	_____	$ _____
.3	_____	$ _____
.4	_____	$ _____

COMPANY: _____

AUTHORIZED SIGNATURE: _____

END OF SECTION

1 General

1.1 FORM OF AGREEMENT

.1 The Form of Agreement between Contractor and Owner shall be Canadian Construction Documents Committee CCDC2-2008, "Stipulated Price Contract", including the Definitions and General Conditions therein dated 2008 including items GC1.1 inclusive to GC12.3, and the modifications to items GC1.1 to GC12.3 incorporated into Section 00 73 00 - Supplementary Conditions of this Specification.

.2 Document CCDC2-2008 may be examined at the Construction Association office in Charlottetown, PEI.

END OF SECTION

1 General

1.1 GENERAL

.1 The Definitions and General Conditions governing the Work shall be those specified in the following amendments and supplements to those provisions, and shall apply to all Sections of this Specification.

.2 Where any Article or portion of Article conflicts with the Laws of the Province concerned, such Article or portion of the Article is hereby stricken.

.3 The following amendments shall apply to the Definitions of CCDC2 Stipulated Price Contract 2008.

1.2 DEFINITIONS

.1 Paragraph 4 Consultant, add the following:

.1 The Consultant shall be the Owner's Prime Consultant, Coles Associates Ltd., 85 Fitzroy Street, Charlottetown, PEI.

.2 Paragraph 12 Owner, add the following:

.1 The Owner shall be Government of Prince Edward Island as represented by the Minister of Transportation & Infrastructure.

.3 Paragraph 19 Subcontractor, add the following:

.1 All dealings with the Subcontractor shall be through the medium of the Contractor, who will be responsible for the proper coordination and execution of the Sub-contractor's work.

.4 New Paragraph 27 Engineer:

.1 This shall mean the designated engineering representative(s) of the Consultant.

1.3 ARTICLE GC1.1 CONTRACT DOCUMENTS

.1 Paragraph 1.1.8 - Delete as written and substitute:
1.1.8 The Contractor shall receive up to fifteen (15) sets of drawings and specifications at no cost from the Owner. Additional sets of drawings will be supplied at cost of reproduction. The above covers the requirements for all trades.

.2 Paragraph 1.1.11 - Add new Paragraph as follows:
1.1.11 The Contract Documents are prepared solely for use by the party with whom the Consultant has entered into a Contract and there are no representations of any kind made by the Consultant to any party with whom the Consultant has not entered into a Contract.

.3 Paragraph 1.1.12 - Add new Paragraph as follows:
1.1.12 Electronic documents are and shall remain the Consultant's property. Copies of electronic documents may be made available for the preparations of shop drawings at the Consultant's sole discretion and for a fee.

1.4 ARTICLE GC3.1 CONTROL OF THE WORK

.1 Paragraph 3.1.1 - add new Sub-Clause 3.1.1.1 as follows:

.1 The Contractor shall co-ordinate his own work and the work of all Subcontractors so as to facilitate and expedite the progress of the work.

.2 Paragraph 3.1.1 Add new Sub-Clause 3.1.1.2 as follows:

.1 It is the responsibility of the Contractor to immediately notify the Consultant of any signs of distress or any other indications of actual or potential damage to the contract work, without regard to his awareness of any errors, inconsistencies or omissions in the Contract Documents.

.3 Add new Paragraph 3.1.3 as follows:

.1 Before ordering any materials or doing any Work, Contractor shall verify all compensation has been allowed on account of differences between actual site

dimensions and the measurements indicated on the drawings. Any difference, which may be found, shall be submitted to the Consultant for consideration before proceeding with the work.

.4 Add new Paragraph 3.1.4 as follows:

.1 The Contractor will be responsible for effecting the removal from the site of any trade, firm, group or person who is delaying the Work, or whose Work is unsatisfactory. The Contractor will arrange for other competent trades people to complete the Work at no expense to the Owner.

1.5 ARTICLE GC3.6 SUPERVISOR

.1 Add new Paragraph 3.6.3 as follows:

.1 The Consultant may require the Contractor to inform him, in writing, of the name and experience of the supervisory personnel he intends to use on the project.

1.6 ARTICLE GC3.8 LABOUR AND PRODUCTS

.1 Add new Paragraph 3.8.4 as follows:

.1 All manufactured articles, materials and equipment shall be installed, applied, connected, erected, used, cleaned, conditioned and commissioned as directed by the manufacturer unless specified to the contrary.

1.7 ARTICLE GC3.9 DOCUMENTS AT THE SITE

.1 Add new Paragraph 3.9.2 as follows:

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Notice of Change.
.7 Change Orders.
.8 Other Modifications to Contract.
.9 Field Test Reports.
.10 Approved Work Schedule.
.11 Health and Safety Plan and Other Safety Related Documents.
.12 CSA Z317.13-07 - Infection Control Guidelines.
.13 Other documents as specified.

1.8 ARTICLE GC4.1 CASH ALLOWANCES

.1 Article GC4.1 - Delete this article.

1.9 ARTICLE GC4.2 CONTINGENCY ALLOWANCE

.1 Article GC4.2 - Delete this article.

1.10 ARTICLE GC5.2 APPLICATIONS FOR PROGRESS PAYMENT

.1 Paragraph 5.2.2 - add two new Sentences as follows:

.1 Payment shall be less any holdback release, which may have been made in accordance with the specific terms of this Agreement as dictated by GC 5.6. Any such holdback release by the Owner to the Contractor shall be a payment to the Contractor in trust for the specific Subcontractor in respect of whose work the release is made.

.2 Payments shall be less 15% Mechanics' Lien Holdback amount claimed against each progress claim.

.2 Add new paragraph 5.2.6 as follows:

.1 Authorized Change Orders shall be listed on the application for payment indicating the amount claimed against each to date of claim.

.3 Paragraph 5.2.7 - Add new sentences as follows:

.1 Payment for materials will be considered only if such materials are properly stored on site in a secure enclosure acceptable to the Consultant. Security of materials so stored is the responsibility of the Contractor.

.4 Add new Paragraph 5.2.8 as follows:

.1 With the second and all subsequent applications for payment the Contractor shall include a statutory declaration form CCDC 9B, or other similar form acceptable to the Consultant, declaring that all labour and materials entering into the work, including Subcontractors, covered by the previous application, have been paid. With application for release of lien holdback, the Contractor shall include a statutory declaration form CCDC 9A, or other similar form acceptable to the Consultant.

.2 With the second and all subsequent applications for payment the Contractor shall include a Letter of Clearance from the PEI Workers Compensation Board.

1.11 ARTICLE GC5.3 PROGRESS PAYMENT

.1 Paragraph 5.3.1 - Add new Sentence as follows:

.1 When any claim for payment during the course of construction includes for completed or partially completed Work, which in the opinion of the Consultant is defective or otherwise unacceptable, a sum of monies determined by the Consultant to be two (2) times the value of the defective or unacceptable Work, or two (2) times the value of the Work required to correct the defect or an amount solely at the Consultants discretion, will be withheld from the claim.

.2 Paragraph 5.3.1 - Add 3 new Sentences as follows:

.1 Deficiency monies may be held back at any time during the course of the project for Work deemed incomplete or unacceptable.

.2 It remains the Contractor's responsibility to undertake his own deficiency reviews and ensure the entire Work conforms to the Contract including quality, completeness and commissioning.

.3 Two final deficiency reviews will be conducted by the Consultant. The first review with the Owner and Contractor will identify any minor items which may remain outstanding, and the second review will confirm that these items have been completed. All other deficiency reviews where deficiencies are incomplete or not ready for requested inspections, will be charged at cost to the Contractor. The invoice for the additional reviews will be submitted to the Owner with a corresponding amount deducted from the Contractor's progress payment.

1.12 ARTICLE GC5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Paragraph 5.5.1, Add new Sub-Clause .3 as follows:

.1 5.5.1.3 Submit with application for payment letter of clearance from The Workers Compensation Board to the Owner stating that the Contractor is in good standing with the Board.

1.13 ARTICLE GC5.7 FINAL PAYMENT

.1 Paragraph 5.7.2 - Add new Sentence as follows:

.1 Any delay in delivering the required Project Record Drawings (As-Builts) as described in Section 01 78 00 - Closeout Submittals will have the effect of delaying the final payment to the Contractor until the Consultant has received them complete and in good condition.

1.14 ARTICLE GC6.2 CHANGE ORDER

.1 Delete Paragraph 6.2.1 and replace with a new paragraph as follows:

.1 6.2.1 When a change in Work is proposed or required, the Consultant will provide the Contractor with a written description of the proposed change in the Work. The Contractor shall promptly present, in forms acceptable to the Consultant, a detailed breakdown of the costs associated with the change, if any; and the adjustment in the Contract Time, if any. The breakdown shall include:

.1 Actual (not list) costs of material, as well as Subtrade and Supplier costs.

.2 Labour costs, including fringe benefits and wage levies.

.3 Equipment rental (excluding hand and small power tool).

.2 Change Orders calling for normal changes or additions to the Work will be priced in detail giving actual material trade prices (not list prices) and actual labour costs and wage levies (including Employment Insurance, Worker's Compensation, Holiday Pay) and actual equipment rental.

.3 Each Change Order will be considered as a whole to complete the work, inclusive of all Sub-Contract and/or General Contract work.

.4 To these prices, the Contractor will add:

.1 For Work less than $2,500, involving the General Contractor only, the General Contractor adds 20% to his costs.

.2 For Work over $2,500, involving the General Contractor only, the General Contractor adds 15% to his costs.

.3 For Work less than $2,500, involving a Subcontractor only, the Subcontractor adds 20% to his costs, submits this price to the General Contractor who adds 10%.

.4 For Work over $2,500, involving a Subcontractor only, the Subcontractor adds 15% to his costs, submits this price to the General Contractor who adds 5%.

.5 For Work less than $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 20% to his costs, submits his price to the General Contractor who adds 10%; to this amount the General Contractor adds the cost of his own Work plus 20% of the cost of his own Work only. The General Contractor does NOT add a further 10% to the cost of his own Work.

.6 For Work over $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 15% to his cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his own Work plus 15% of the cost of his own Work only. The General Contractor does NOT add a further 5% to the cost of his own Work.

.7 Deletions to Contract: A mark-up by either Sub-Contractor or General Contractor shall not be charged or credited on credit Change Orders.

.8 Supervision related to Change Orders shall be considered as included in the allowable mark-up, and shall not be added as additional charges for a Change order.

.5 Note: Costs related to management, supervision, estimating, scheduling, bonding, insurance, as built drawings, copying, courier, safety, cleaning, site overhead, site vehicle, hand and small power tools etc. are covered by the mark up indicated in Paragraph 6.2.1.4 and shall not be included on Change Orders.

1.15 ARTICLE GC6.3 CHANGE DIRECTIVE

.1 Delete Paragraphs 6.3.6.1, 6.3.6.2 and 6.3.6.3 and replace with the following.

.2 The Owner or the Consultant, without invalidating the contract, may make changes by altering, adding to, or deducting from the work, the contract sum being adjusted accordingly. All such work shall be executed under the conditions of the Contract.

.3 Where work is required to proceed immediately, work may proceed under a Change

Directive. The Contractor will be instructed to proceed on a time and materials basis and maintain accurate accounting records for the cost of the change.

.4 Change Directives calling for changes to the Work will be priced in detail giving actual material trade prices (not list prices) and actual labour costs and wage levies (including Employment Insurance, Worker's Compensation, Holiday Pay) and actual equipment rental.

.5 Each Change Directive will be considered as a whole to complete the work, inclusive of all Sub-Contract and/or General Contract work.

.6 To these prices, the Contractor will add:

.1 For Work less than $2,500, involving the General Contractor only, the General Contractor adds 20% to his costs.

.2 For Work over $2,500, involving the General Contractor only, the General Contractor adds 15% to his costs.

.3 For Work less than $2,500, involving a Subcontractor only, the Subcontractor adds 20% to his costs, submits this price to the General Contractor who adds 10%.

.4 For Work over $2,500, involving a Subcontractor only, the Subcontractor adds 15% to his costs, submits this price to the General Contractor who adds 5%.

.5 For Work less than $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 20% to his costs, submits his price to the General Contractor who adds 10%; to this amount the General Contractor adds the cost of his own Work plus 20% of the cost of his own Work only. The General Contractor does NOT add a further 10% to the cost of his own Work.

.6 For Work over $2,500, involving the General Contractor and a Subcontractor, the Subcontractor adds 15% to his cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his own Work plus 15% of the cost of his own Work only. The General Contractor does NOT add a further 5% to the cost of his own Work.

.7 Deletions to Contract: A mark-up by either Sub-Contractor or General Contractor shall not be charged or credited on credit Change Orders

.8 Supervision related to Change Orders shall be considered as included in the allowable mark-up, and shall not be included in the labour changes for a Change order.

1.16 ARTICLE GC9.1 PROTECTION OF WORK AND PROPERTY

.1 Add new Paragraph 9.1.5 as follows:

.1 The Contractor shall be responsible for implementing all necessary security measures required to protect the areas of Work under his control and shall be responsible for damage which may arise from the failure of, or the failure to implement such security measures.

1.17 ARTICLE GC10.1 TAXES AND DUTIES

.1 Paragraph G.C. 10.1.1 - Revise as follows:

.1 Delete the words ..."at the time of closing except for Value Added Taxes"...and replace with the words ..."at the time of closing including Value Added Taxes"...

1.18 ARTICLE GC10.2 LAWS, NOTICES, PERMITS, AND FEES

.1 Paragraph G.C. 10.2.2 - Delete "the building permit" and add the new sub-clause 10.2.2.1 as follows:

.1 The Owner shall apply for, obtain and pay for the building permit.

1.19 INSURANCE

.1 Without restricting the generality of GC 12.1 - INDEMNIFICATION, the Contractor shall provide, maintain and pay for the following insurance coverages:

.1 General liability insurance with limits of at least FIVE Million Dollars ($5,000,000.00) in the name of the Contractor and include, or in the case of a single, blanket policy, be endorsed to name, the Owner and the Consultant as insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the Contractor with regard to the Work. General liability insurance shall be maintained from the date of commencement of the Work until one year from the date of Substantial Performance of the Work. Liability coverage shall be provided for completed operations hazards from the date of Substantial Performance of the Work, as set out in the certificate of Substantial Performance of the Work, on an ongoing basis for a period of 6 years following Substantial Performance of the Work.

.2 Automobile Liability Insurance with limits of at least TWO Million Dollars ($2,000,000.00) from the date of commencement of the Work until one year after the date of Substantial Performance of the Work.

.3 Aircraft or Watercraft Liability Insurance with limits of at least FIVE Million Dollars ($5,000,000.00) when owned or non-owned aircraft or watercraft are used directly or indirectly in the performance of the Work. The term Aircraft includes drones and other unmanned aircraft.

.4 Broad Form" property insurance (also known as Builders Risk) 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:

.1 10 calendar days after the date of Substantial Performance of the Work.

.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 metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the Work.

.3 When left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more that 30 consecutive calendar days.

.5 Boiler and machinery insurance in the joint names of the Contractor, the Owner and the Consultant. The policy shall include as insureds all Subcontractors. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of Substantial Performance of the Work. The policies shall include any periods of testing prior to full acceptance of the project as required by this Contract, but including coverage for risks arising out of such part of the Work. Coverage to extend to 36 months after the date of Final Completion of the last component of the project.

.6 The "Broad Form" property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the Owner and the Contractor as their respective interests may appear. In the event of loss or damage:

.1 The Contractor shall act on behalf of the Owner for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the Contractor shall proceed to restore the Work. Loss or damage shall not affect the rights and obligations of either party under the Contract except that the Contractor shall be entitled to such reasonable extension of Contract

Time relative to the extent of the loss or damage as the Consultant may recommend in consultation with the Contractor.

.2 The Contractor shall be entitled to receive from the Owner, in addition to the amount due under the Contract, the amount which the Owner's interest in restoration of the Work has been appraised, such amount to be paid as the restoration of the Work proceeds in accordance with the progress payment provisions. In addition the Contractor shall be entitled to receive from the payments made by the insurer the amount of the Contractor's interest in the restoration of the Work; and to

.3 The Work arising from the work of the Owner, the Owner's own forces or another contractor, the Owner shall, in accordance with the Owner's obligations under the provisions relating to construction by Owner or other contractors, pay the Contractor the cost of restoring the Work as the restoration of the Work proceeds and as in accordance with the progress payment provisions.

.7 The insurer shall acknowledge that the policies are primary and any other insurance policies that may be in effect or any other sources of recovery the including Government of Prince Edward Island's Self Insurance and Risk Management Fund shall not contribute in any way to any judgments, awards, payments, or costs or expenses of any kind whatsoever made as a result of actual or alleged claims.

.2 Prior to commencement of the Work and upon placement, renewal, amendment, or extension of all or any part of the insurance, the Contractor shall promptly provide the Owner with confirmation of coverage in the form of certificates of insurance by an authorized representative of the insurer together with copies of any amending endorsements applicable to the Work.

.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the Contract.

.4 If the Contractor fails to provide or maintain insurance as required by the Contract Documents, then the Owner shall have the right to provide and maintain such insurance and give evidence to the Contractor and the Consultant. The Contractor shall pay the cost thereof to the Owner on demand or the Owner may deduct the cost from the amount which is due or may become due to the Contractor.

.5 All required insurance policies shall be with insurers licenced to underwrite insurance in the jurisdiction of the Place of Work.

.6 Indemnification:

.1 The Contractor shall indemnify and hold harmless the Government of Prince Edward Island, its agents, representatives and employees from and against all claims, demands, losses, costs, damages, actions, suits or proceedings of every nature and kind whatsoever arising out of or resulting from the performance of work (herein called the "claims"), provided that any such claim is caused in whole or in part of any act, error or omission, including but not limited to those of negligence of the Contractor, or anyone directly or indirectly employed by the Contractor anyone for whom the Contractor may be liable.

1.20 ARTICLE GC12.3 WARRANTY

.1 Add new Paragraph 12.3.7 as follows:

.1 When a part of the work is occupied by the Owner, directly or for the use intended prior to Substantial Performance, the warranty for the Work directly related to the construction and normal operation of that part of the Work, shall start on the date of occupancy.

.2 Add new paragraph 12.3.8 as follows:

.1 The Contractor shall ensure that his subcontractors are bound to the requirements of GC12.3 insofar as their work is concerned.

END OF SECTION

1 General

1.1 SCOPE OF WORK

.1 The Contractor is to provide each item, and properly execute all work as specified herein, indicated by drawings, addenda, or change orders issued with respect to this project.

.2 The Contractor shall coordinate, administer, and supervise all work, material acquisition and labour.

.3 The project involves the installation of a wet-pipe sprinkler system for Eliot River Elementary School, with specific conditions as follows:

.1 The Contractor is to complete the works at the school over two (2) summers, 2021 & 2022. The summer periods are generally defined as the time between July 1st and September 1st of each year. During these time periods the Contractor has access to all spaces within the school. Outside of these periods, the Contractor may only complete work within utility spaces as coordinated with the Owner.

.2 This contract is to obtain water service within 1.8m of the foundation wall, the connection is to be made in 2021 with a separate civil works contract. However the line will not be pressurized until 2022.

.3 This contract is to complete the sprinkler distribution works in coordination with parallel and separate interior renovation contracts. It is advised that the Contractor complete works in the renovation zones concurrent with the separate contract.

.4 This contract may complete the facility sprinkler distribution at the rate at which their forces allow. However this division will be responsible for removing and reinstating the existing ceiling grid for area's not yet under renovation. In spaces which have already been renovated during the 2021-2022 period, which have an new ceiling grid, the Contractor will be required to replace the ceiling grid if damaged by their works (and not done in coordination with the fit-up contractor).

.5 The Contractor is to provide a sprinkler head arrangement which is sufficient for the final layout of the building as presented in the drawings, and the works will not be considered complete until the final sprinkler-head distribution is provided.

.6 Substantial completion will not be permitted or provided to the contractor until the system is pressurized from the final municipal source, the distribution is complete, and all alarm devices and equipment is tested and commissioned.

1.2 WORK BY OTHERS

.1 Co-operate and coordinate with other Contractors in carrying out the respective works and carry out instructions from Consultant.

.2 Schedule the Work of this Contract in consultation and cooperation with the Work of other Contractors and/or Owners own forces to produce a coordinated construction schedule.

1.3 COORDINATION

.1 All Trades on site are responsible to co-operate and co-ordinate with each other.

.2 Coordination prior to installation of all building components is mandatory.

.3 Where work must be modified or reinstalled to be properly coordinated, the cost to do so will be paid by the Trades involved. The Owner will not pay for uncoordinated work nor will the Owner pay to resolve uncoordinated work.

.4 If resolution cannot be achieved among the involved Trades, the Consultant will assess Trade involvement and assign costs accordingly.

1.4 DAMAGE

.1 Where damage is done to work in progress or existing areas of the building and is unclaimed by a Trade, the cost to repair the damage will be assessed by the Construction Manager and Consultant and assigned on a pro-rated tender cost basis to all Trades on site at the time the damage occurred.

.2 The Owner will not participate in paying for such damage.

1.5 DEDUCTIONS FOR UNCORRECTED WORK

.1 If, in the opinion of the Consultant, it is not expedient to correct defective work or work not done in accordance with the Contract documents, the Owner may deduct from the Contract price the difference in value between the work as done and that called for by the Contract, the amount of which shall be determined in the final instance by the Consultant.

1.6 CORRECTION AFTER COMPLETION

.1 Subject to any special provisions in the Contract documents, the Contractor shall remedy any defects due to faulty materials or workmanship appearing within a period of one (1) year from the date of substantial completion of the work and shall pay for any damage to other work resulting there from which appears within such period and neither the final certificate nor payment there under shall relieve the Contractor from responsibility hereunder. The Owner shall give notice of observed defects promptly.

1.7 EMERGENCIES

.1 The Consultant has authority in an emergency to stop the progress of the work whenever in his or her opinion, such stoppage may be necessary to ensure the safety of life, or of the structure, or neighbouring property. This includes authority to make such changes and to order, access and award the cost of such work extra to the Contract or otherwise as may in his or her opinion be necessary.

1.8 WORK SEQUENCE

.1 Coordinate Progress Schedule referred to in Section 01 32 16 - Construction Progress Schedule and coordinate with Owner Occupancy during construction.

.2 Maintain fire access/control.

1.9 EXECUTION

.1 Execute work with least possible interference or disturbance to building operations, public and normal use of premises.

1.10 DOCUMENTS

.1 The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all.

.2 Descriptions of materials or work which have well known technical or trade meanings shall be held to refer to such recognized standards.

.3 Should the specifications conflict with the drawings, the specifications shall govern.

.4 In the case of discrepancies between drawings, those of larger scale, or if the scale are the same, those of later date shall govern.

.5 All drawings and specifications shall be interpreted in conformity with the agreement.

1.11 PROTECTION OF WORK AND PROPERTY

.1 The Contractor shall maintain continuously adequate protection of all their work from damage and shall take reasonable precautions to protect the Owner's property from all injury arising in connection with this Contract. The Contractor shall make good any damage or injury to their work and shall make good any damage or injury to the property of the Owner resulting from the lack of reasonable protective precautions. The Contractor shall not be responsible, however, for any damage or injury to their work and

to the property of the Owner which may be directly due to errors in the Contract documents or caused by the Owner, their agents, or employees, or from any work or risk which the Owner has agreed to insure, provided the Contractor has taken reasonable protective precautions. The Contractor shall adequately protect adjacent property as required by law and the Contract documents.

1.12 COMMUNICATION

.1 All submissions and inquiries shall be directed to the Consultant for review.

.2 All direction will be transmitted to the Contractor by the Consultant.

1.13 CODES AND REGULATIONS

.1 Perform work in accordance with National Building Code of Canada (NBC) 2015 and any other code of provincial or local application, provided that in any case of conflict or discrepancy the more stringent requirements shall apply.

.2 Meet or exceed requirements of contract documents and specified standards.

.3 References to standards, including manufacturer's direction for installation shall be the latest edition.

.4 All materials, components and equipment as well as construction methods shall comply with the NBC (2015) and all other applicable Provincial codes or regulations.

.5 The latest edition of the Canadian Electrical Code shall govern all electrical work, whether pre-wired and/or assembled remote from the site or not.

.6 All equipment supplied or installed shall be CSA approved for the intended use.

.7 The latest edition of the PEI Occupational Health and Safety Act and Regulations shall govern safe construction practices.

.8 Provide a copy of all certificates of acceptance issued by Provincial or local authorities.

1.14 WORK SCHEDULE AND PROGRESS REPORTS

.1 The Contractor will prepare and maintain a consolidated schedule in weekly increments showing scheduled work versus actual work. The schedule shall indicate the contract commencement and completion date for the total project.

.2 The Contractor is to develop a detailed schedule identifying specific components of the mechanical, sprinkler, refrigeration and electrical trades. A single line items for each is not acceptable.

.3 Provide updated schedule information from time to time as the progress of the work or Consultant may require.

.4 The Contractor shall furnish monthly progress reports from the date of commencement. These reports shall show the percentage of completion of the various divisions of work and contain comments on the general progress of the project.

1.15 CONTRACTOR'S USE OF SITE

.1 Do not unreasonably encumber site with materials or equipment.

.2 Move stored products or equipment, which interfere with operations of Consultant or other Contractors.

.3 Obtain and pay for use of additional off site storage or work areas needed for operations.

.4 The work related to modifying the site roadways must be carried out so that one half of the roadway is open to vehicle traffic at all times.

1.16 PROJECT MEETINGS

.1 Hold bi-weekly project meetings at the site, in the Contractor's site office and at a time approved by Consultant. In addition hold any additional meetings as the need arises or as directed by the Consultant.

.2 Notify all parties concerned of such meetings.

.3 The Contractor will record minutes of meetings and distribute to all parties within three

(3) days of meeting.

.4 Failure of the Contractor to accurately record minutes or distribute the minutes in a timely manner will result in the Consultant taking over the duties invoicing the owner and deducting an equal amount from the progress claims as compensation.

1.17 OWNER'S SITE INSPECTOR

.1 There will be an Inspector representing the Department of Transportation & Infrastructure, Province of PEI. No work is to be covered without having received approval from the Inspector. The Inspector will have the authority to cause any part of the work to cease, should, in his or her opinion, there be cause to do so.

.2 This work shall be examined by the Department and approval granted to resume when a satisfactory solution has been found out.

.3 The Inspector does not have authority to authorize changes to work. He or she shall confer with the Consultant who, if necessary will authorize any change.

.4 The fact that the Inspector does not reject any work shall not remove the irresponsibility for completing all work as specified from the Contractor.

1.18 SITE INSPECTOR

.1 No work is to be covered without having received approval from the Consultant. The Consultant will have the authority to cause any part of the work to cease, should, in his or her opinion, there be cause to do so.

.2 This work shall be examined by the Consultant and approval granted to resume when a satisfactory solution has been found out.

.3 The fact that the Construction Manager or Consultant does not reject any work shall not remove the responsibility for completing all work as specified from the Contractor.

1.19 SETTING OUT OF WORK

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations.

.2 Provide all equipment, materials and devices needed to lay out and construct work.

.3 Supply such devices as straight edges and templates required to facilitate Consultant's inspection of work.

1.20 CONCEALMENT

.1 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.21 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Consultant of impending installation and obtain his approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

1.22 CUTTING, FITTING AND PATCHING

.1 Execute cutting, core drilling, fitting and patching, required to install and make new work under this contract fit properly.

.1 Includes all cutting and patching in building for connection of new mechanical and electrical services to service lines.

.2 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final

assembly.

1.23 EXISTING SERVICES

.1 Before commencing work, establish the location and extent of service lines and notify Consultant of findings if in conflict with information or intent shown.

.2 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

.3 Contractor shall pay for any or all repairs to existing services that have been damaged due to the Contractor's negligence in the course of his work.

.4 Notify Consultant and utilities of intended interruption of services and obtain permission.

.5 Where Work involves breaking into or connecting to existing services, give Consultant 24 hours notice for necessary interruption. Minimize duration of interruptions. Carry out Work at times as directed by governing authorities or Owner with minimum disturbance.

.6 Provide temporary services when directed by Consultant to maintain critical building and tenant systems.

.7 Provide alternative routes for personnel and vehicular traffic.

.8 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by Authorities Having Jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.24 ADDITIONAL DRAWINGS

.1 The Consultant may furnish as necessary for the execution of the work, additional instructions, by means of drawings or otherwise. All such additional instructions shall be consistent with the contract documents. In giving such additional instructions the Consultant shall have authority to make minor changes in the work, consistent with the Contract.

1.25 RELICS AND ANTIQUITIES

.1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found during the work, shall remain property of the Owner. Protect such articles and request directives from Consultant.

.2 Give immediate notice to Consultant if evidence of archaeological finds are encountered during construction, and await Consultant's written instructions before proceeding with work in this area.

END OF SECTION

1 General

1.1 REFERENCES

.1 Owner/Contractor Agreement.

.2 Canadian Construction Documents Committee (CCDC).

.1 CCDC 2-2008, Stipulated Price Contract.

.3 Section 00 73 00 - Supplementary Conditions.

1.2 APPLICATIONS FOR PROGRESS PAYMENT

.1 Make applications for payment on account as provided in Agreement as Work progresses.

.2 Date applications for payment last day of agreed monthly payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of Work at that date.

.3 Submit to Consultant, at least 14 days before first application for payment, Schedule of Values for parts of Work, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment.

1.3 SCHEDULE OF VALUES

.1 Make schedule of values out in such form and supported by such evidence as Consultant may reasonably direct and when accepted by Consultant, be used as basis for applications for payment.

.2 Include statement based on schedule of values with each application for payment.

.3 Support claims for products delivered to Place of Work but not yet incorporated into Work by such evidence as Consultant may reasonably require to establish value and delivery of products.

.4 Provide, minimum fourteen (14) days before submitting first application for payment, a Schedule of Values, aggregating the Total Contract Price. After approval by the Consultant the Schedule of Values will be used as a basis for the application for progress payments.

.5 Contractor shall submit with the Schedule of Values, an itemized list of all trades and applicable labour rates for each, which will be used as a basis for labour rates in changes to contract Work.

.6 The schedule of values is to indicate separate line items each for mechanical commissioning, electrical commissioning, mechanical operation & maintenance manuals and electrical operations ' maintenance manuals.

1.4 PREPARING SCHEDULE OF UNIT PRICE TABLE ITEMS

.1 Submit separate Schedule of Unit Price items of Work requested in Bid form.

.2 Make form of submittal parallel to Schedule of Values, with each line item identified same as line item in Schedule of Values. Include in unit prices only:

.1 Cost of material.

.2 Delivery and unloading at site.

.3 Sales taxes.

.4 Installation, overhead and profit.

.3 Ensure unit prices multiplied by quantities given equal material cost of that item in Schedule of Values.

1.5 PROGRESS PAYMENT

.1 Consultant will issue to Owner, no later than 10 days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as Consultant determines to be properly due. If Consultant amends application, Consultant

will give notification in writing giving reasons for amendment.

1.6 SUBSTANTIAL PERFORMANCE OF WORK

.1 Refer to Section 00 73 00 - Supplementary Conditions.

.2 Prepare and submit to Consultant comprehensive list of items to be completed or corrected and apply for a review by Consultant to establish Substantial Performance of Work or substantial performance of designated portion of Work when Work is substantially performed if permitted by lien legislation applicable to Place of Work designated portion thereof which Owner agrees to accept separately is substantially performed. Failure to include an item on list does not alter responsibility to complete Contract.

.3 No later than 10 days after receipt of list and application, Consultant will review Work to verify validity of application, and no later than 7 days after completing review, will notify Contractor if Work or designated portion of Work is substantially performed.

.4 Consultant shall state date of Substantial Performance of Work or designated portion of Work in certificate.

.5 Immediately following issuance of certificate of Substantial Performance of Work, in consultation with Consultant, establish reasonable date for finishing Work.

1.7 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF WORK

.1 After issuance of certificate of Substantial Performance of Work:

.1 Submit an application for payment of holdback amount.

.2 Submit sworn statement that all accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of Work and for which Owner might in any way be held responsible have been paid in full, except for amounts properly retained as holdback or as identified amount in dispute.

.2 After receipt of application for payment and sworn statement, Consultant will issue certificate for payment of holdback amount.

.3 Where holdback amount has not been placed in a separate holdback account, Owner shall, 10 days prior to expiry of holdback period stipulated in lien legislation applicable to Place of Work, place holdback amount in bank account in joint names of Owner and Contractor.

.4 Amount authorized by certificate for payment of holdback amount is due and payable on day following expiration of holdback period stipulated in lien legislation applicable to Place of Work. Owner may retain out of holdback amount any sums required by law to satisfy any liens against Work or, if permitted by lien legislation applicable to Place of Work, other third party monetary claims against Contractor which are enforceable against Owner.

1.8 PROGRESSIVE RELEASE OF HOLDBACK

.1 Where legislation permits, if Consultant has certified that Work of subcontractor or supplier has been performed prior to Substantial Performance of Work, Owner shall pay holdback amount retained for such subcontract Work, or products supplied by such supplier, on day following expiration of holdback period for such Work stipulated in lien legislation applicable to Place of Work.

.2 Notwithstanding provisions of preceding paragraph, and notwithstanding wording of such certificates, ensure that such subcontract Work or products is protected pending issuance of final certificate for payment and be responsible for correction of defects or Work not performed regardless of whether or not such was apparent when such certificates were issued.

1.9 FINAL PAYMENT

.1 Submit an application for final payment when Work is completed.

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

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

END OF SECTION

1 General

1.1 APPOINTMENT AND PAYMENT

.1 The Contractor will arrange and pay for the services of an independent Consultant to carry out the following tests:

- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .4 Mill tests and certificates of compliance.
- .5 Tests specified to be carried out by Contractor under the supervision of Consultant.
- .6 Additional tests specified in Article 1.3.7 below.
- .7 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Consultant may require to verify acceptability of corrected work.

1.2 CONTRACTOR'S RESPONSIBILITIES - GENERAL

.1 Provide labour, equipment and facilities to:

- .1 Provide access to Work for inspection and testing.
- .2 Facilitate inspections and tests.
- .3 Make good Work disturbed by inspection and test.
- .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Consultant sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Consultant.

.5 Provide Consultant with two (2) sets of fully documented test reports, submitted immediately following the testing operations.

1.3 CONTRACTOR'S RESPONSIBILITIES - INSPECTION & TESTING REQUIREMENTS

.1 Testing of all soil material types at source, including collection of sample material by testing firm, to verify compliance with material specifications.

.2 Follow up testing of all soil material types delivered to site.

.3 Monitoring placement and verifying compaction densities which have not passed initial testing.

.4 Monitoring of upgrading work.

.5 Verifying the new compaction densities.

.6 Asphalt Paving:

- .1 Review of asphalt mix design submitted by Contractor.
- .2 Monitoring placement and compaction of seal course.
- .3 Testing of asphalt for compliance with material specifications from asphalt core samples taken by testing firm.

.7 All Flooring

- .1 Moisture vapour transmission levels.
  - .1 Moisture tests.
  - .2 PH levels tests.

.3 Bonding tests.

.8 Testing work may occur under various Sections of the Specification.

1.4 OWNERS RESPONSIBILITIES: TESTING REQUIREMENTS

.1 Testing of the following will be paid for by the Owner but coordinated by the Contractor.

.1 Soil compaction tests.

.2 Concrete compression and slump tests.

1.5 FINAL REPORT

.1 Submit to the Owner at completion of job, two (2) bound hard copies and one (1) electronic copy of inspection report. This report to include:

.1 All copies of test results, indexed to correspond with testing requirements of this Section.

.2 Written report from the testing firm carrying out the work of this Contract stating that the work as itemized under Par. 4 of this Section has been performed in strict accordance with the requirements of the Contract documents.

.3 The report will be signed and sealed by a Professional Engineer registered to practice in the Province of Prince Edward Island and practicing in the field of materials testing.

END OF SECTION

1 General

1.1 TIME AND ORDER OF COMPLETION

.1 The Consultant may direct the Contractor in writing as to the time, precedence or order in which any work to be done under the contract shall be performed.

1.2 TIME OF COMMENCEMENT

.1 The Contractor shall commence work within three (3) days after the execution of the Contract, unless specifically indicated or directed otherwise by the Consultant, and shall proceed continuously, diligently and with all reasonable dispatch consistent with the Construction Schedule, and the proper execution of the work, until final completion. The rate of progress made with the work shall be such as to ensure its final completion within the specified time.

1.3 TIME OF COMPLETION

.1 The whole of the work to be done under this contract shall be finally completed in full accordance with all the terms and conditions of this contract on or before the day specified for such completion in the tender which forms part of this contract.

.2 The Contractor will be responsible for all costs incurred for failure to complete the project within the project schedule, plus 20 working days.

.3 Costs for Insurance and bonding extensions, Consultant fees for extended services and Construction Management services and expenses for extended services will all be totaled and charged against the Contractors. Costs will be deducted from Progress Claims.

1.4 EXTENSION OF TIME

.1 An extension of time may be granted in writing by the Consultant in the event of the work being delayed beyond the prescribed time for completion as a result of causes beyond the Contractor's control. Such extensions shall be for such time as the Consultant may prescribe, and the Consultant shall fix the terms on which the said extension may be granted. An application by the Contractor for an extension of time shall be made to the Owner in writing as least fifteen calendar days prior to the date of completion fixed by the contract. Where applicable, all bonds or other surety including Liability Insurance furnished to the Owner by the Contractor shall be amended where necessary at the expense of the Contractor to provide coverage beyond the date of any extension of time granted, and the Contractor shall furnish the Owner with evidence of such amendment of the bonds or other surety and Liability Insurance.

.2 Any extension of time that may be granted to the Contractor shall be so granted and accepted without prejudice to any rights of the Owner whatsoever under the Contract, and all of such rights shall continue in full force and effect after the time limited in the Contract for the completion of the work and whenever in the Contract, power and authority is given to the Consultant or any person to take any action consequent upon the act, default, breach, neglect, delay, non-observance or non-performance by the Contractor in respect of the work or Contract, or any portion thereof, such powers or authorities may be exercised from time to time and not only in the event of the happening of such contingencies before the time limited in the Contract for the completion of the work but also in the event of the same happening after the time so limited in the case of the Contractor being permitted to proceed with the execution of the work under an extension of time granted by the Consultant.

1.5 SUSPENSION OF WORK

.1 The Contractor shall, upon written notice from the Consultant, discontinue or delay any or all of the work when, in the opinion of the Consultant, it is unwise to proceed for any reason whatsoever, and the work shall not be resumed until the Consultant shall in

writing so direct.

1.6 LABOUR DISPUTE

.1 Except to the extent that relief is granted under of the Contract, the Contractor shall bear the risk and responsibility of any loss, damage or expense to the work or to himself or any nature and kind whatsoever arising from strikes or labour disputes other than such loss, damage or expense caused by the failure of the Owner to meet its obligations under the Contract.

1.7 CHARACTER AND EMPLOYMENT OF WORKERS

.1 The Contractor shall employ only orderly, competent and skillful workers to do the work and shall give preference to available residents in the area of the Contract. Whenever the Consultant shall inform the Contractor in writing that any person or persons on the work are, in the opinion of the Consultant, incompetent, unfaithful or disorderly, such person or persons shall be discharged from the work and shall not again be employed on the work without the consent in writing of the Consultant.

1.8 LIMITATIONS OF OPERATIONS

.1 The Consultant may, in writing, require the Contractor to cease or limit operations under the Contract, on any day or days if the operations are of such nature that the Consultant deems it necessary or expedient to do so.

.2 The Contractor shall cooperate with other contractors, utility companies and the Owner and they shall be allowed free access to their work at all times. The Consultant reserves the right to alter the method of operations on this Contract to avoid interference with other work.

.3 The Contractor shall have access to their work to allow the incorporation of a double shift if the Contractor deems it necessary to meet the obligations under the contract.

END OF SECTION

1 General

1.1 DEFINITIONS

.1 Activity: An element of Work performed during course of Project. An activity normally has an expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart). A graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: Original approved plan (for Project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: Number of work periods (not including holidays or other nonworking periods) required to complete an activity or other Project element. Usually expressed as workdays or workweeks.

.6 Master Plan: A summary-level schedule that identifies major activities and key milestones.

.7 Milestone: A significant event in Project, usually completion of major deliverable.

.8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: Overall system operated by Consultant to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 SUBMITTALS

.1 Submit to Consultant within 5 working days of Award of Contract Bar (GANTT) Chart representing the project schedule as Master Plan for planning, monitoring and reporting of project progress.

1.4 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Consultant will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.5 PROJECT SCHEDULE

.1 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

- .1 Award.
- .2 Shop Drawings, Samples.
- .3 Permits.
- .4 Mobilization.
- .5 Excavation.
- .6 Backfill.
- .7 Slab on grade.
- .8 Roofing.
- .9 Interior Architecture (Walls, Floors and Ceiling).
- .10 Millwork.
- .11 Plumbing.
- .12 Lighting.
- .13 Electrical.
- .14 Piping.
- .15 Controls.
- .16 Heating, Ventilating, and Air Conditioning.
- .17 Fire Systems.
- .18 Testing and Commissioning.
- .19 Supplied equipment long delivery items.
- .20 Owner supplied equipment required dates.
- .21 Substantial Completion.
- .22 Deficiency Completion.
- .23 Submittal.
- .24 Total Completion.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

END OF SECTION

1 General

1.1 GENERAL

.1 All submittals are to be delivered within 30 days of award of Contract.

.2 Make specified submittals to the Consultant at commencement of Contract, before beginning work on site (and no later than 10 days after award). Include:

- .1 Contract Security
- .2 Proof of Insurance
- .3 Workers' Compensation clearance letter
- .4 Cost Breakdown
- .5 Permits as required
- .6 Construction schedule for Trade Package activity
- .7 Corporate Safety Plan
- .8 Site specific safety plan
- .9 Shop drawing schedule

.3 During Construction provide:

- .1 Updated trade construction schedule
- .2 Shop drawings as required
- .3 Inspection and test reports
- .4 Request for Information
- .5 Submission required for payment purposes

.4 At completion of Work provide

- .1 Submission at completion of work as specified in Project Close Out, Commissioning, and Operations and Maintenance Data Sections.

1.2 ADMINISTRATIVE

.1 Refer to GC 3.10 Shop Drawings

.2 Submit to Consultant submittals listed for review. Submit 10 working days after award of contract 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 and no claim for extension by reason of such default will be allowed.

.3 Do not proceed with Work affected by submittal until review is complete.

.4 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.5 Where items or information is not produced in SI Metric units converted values are acceptable.

.6 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.

.7 Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.8 Verify field measurements and affected adjacent Work are coordinated.

.9 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.

.10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.

.11 Keep one reviewed copy of each submission on site.

1.3 SUBMITTAL SCHEDULES:

.1 Within 10 days following award of contract, prepare and submit a summary of all

submittals required by the Trade Package.

.2 Submittal schedule shall be formatted as follows:

SECTION NUMBER	ITEM/ EQUIP	SHOP DWG DEL DATE	ORDER DATE	ITEM DEL DATE

.3 The initial submission shall include completion of the first 3 columns of the above table example. Once approved shop drawings are received by the Contractor, the balance of the summary shall be updated and submitted accordingly.

1.4 SHOP DRAWINGS AND PRODUCT DATA

.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.

.2 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.

.3 Allow 10 days for Consultant's review of each submission.

.4 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 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.

.6 Submissions include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name and address of:

.1 Subcontractor.

.2 Supplier.

.3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.7 After Consultant's review, distribute copies.

.8 Submit digital copy of all shop drawings, product data sheets, reports, MSDS sheets and

other traditional paper submissions.

.9 Submit electronic copies of product data sheets or 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.

.10 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant.

.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.

.2 Testing must have been within 3 years of date of contract award for project.

.11 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.12 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.13 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.14 Submit two (2) hard copies of Operation and Maintenance Data for requirements requested in specification Sections, plus one (1) electronic copy and as requested by Consultant.

.15 Delete information not applicable to project.

.16 Supplement standard information to provide details applicable to project.

.17 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, transparency 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.

1.5 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Consultant's business address.

.3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where color, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples 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.

.6 Make changes in samples which Consultant may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Province of Prince Edward Island

.1 Occupational Health and Safety Act, R.S.P.E.I.1988 (including any amendments to and regulations).

.4 CSA C22.1-18 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.

.5 CSA C22.3 No. 7-94 (R2005) - Underground Systems

.6 COSH, Canada Occupational Health and Safety Regulations (SOR/86-304)

.7 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:

.1 FCC No. 301 - June 1982 Standard for Construction Operations.(or latest edition)

.2 FCC No. 302 - June 1982 Standard for Welding and Cutting. (or latest edition)

1.2 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, Occupational Health and Safety Act Regulations PEI (including any amendments to and regulations).

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

.3 Perform lockouts in compliance with:

.1 Canadian Electrical Code

.2 Federal and Provincial Occupational Health and Safety Acts and Regulations.

.3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.

.4 In event of conflict between any provisions of above Authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Consultant will advise on the course of action to be followed.

1.3 CONSTRUCTION SAFETY MEASURES

.1 Observe and enforce construction safety measures required by latest National Building Code, Part 8, Provincial Government, Worker's Compensation Board and municipal statues and authorities.

.2 Provide and maintain first aid equipment appropriate to the work and its location in accordance with the First Aid Regulations. Implement recommendations from Occupational Health and Safety Division specific to the project work site.

.1 Have minimum 2 years site-related working experience specific to activities associated with Construction.

.2 Having working knowledge of occupational health and safety regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

1.4 HEALTH AND SAFETY COORDINATOR

.1 Employ and assign to work, competent and authorized representative as Health and

Safety Coordinator. Health and Safety Coordinator must:

.1 Have minimum 2 years site-related working experience specific to activities associated with Construction.

.2 Having working knowledge of occupational health and safety regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

1.5 SAFETY ASSESSMENT

.1 Perform site specific hazard assessment related to project.

.2 Perform on-going hazard assessments during the progress of Work identifying new or potential health risks and safety hazards not previously known. As a minimum, hazard assessments shall be carried out when:

.1 New subtrade work, new subcontractor(s) or new workers arrive at the site to commence another portion of work.

.2 The scope of work has been changed by Change Order.

.3 Potential hazard or weakness in current health and safety practices are identified by Consultant or by an authorized safety representative.

.3 Each hazard assessment to be made in writing. Keep copies of all assessments on site for duration of Work. Upon request, make available to Consultant for inspection.

1.6 SUBMITTALS

.1 Upon request, submit within seven (7) days to the Consultant, one copy electronically and one hard copy of the site-specific Health and Safety Plan.

.2 Upon request, submit within seven (7) days to the Consultant, one copy electronically and one hard copy of the Contractor's authorized representative's worksite health and safety inspection reports.

.3 Upon request, submit within seven (7) days to the Consultant, one copy electronically and one hard copy of the construction safety tool box meetings and formal contractor safety meetings.

.4 In the event of an incident/accident, immediately submit to the Consultant one copy electronically and one hard copy of the incident/accident report.

1.7 SITE CONTROL AND ACCESS

.1 Control worksite and entry points. Grant and allow entry to only workers and other persons so authorized. Immediately stop non-authorized persons from circulating within construction areas and remove from site.

.2 Prior to gaining access to the site, all contractors, subcontractors and suppliers shall file with the General Contractor their proof of Workers Compensation coverage, proof of required Insurance and proof of contract. Upon request, proof of these documents will be provided to the Owner and Consultant.

.3 Delineate and isolate construction areas from other areas of site by use of appropriate means. Erect barricades, fences, hoarding and temporary lighting as required.

.4 Erect signage at entry points and at other strategic locations around site, clearly identifying construction areas(s) as being "off limits" to non-authorized persons. Signage must be professionally made.

.5 Ensure persons granted access is fitted and wear appropriate personal protective equipment (PPE).

1.8 PROTECTION

.1 Provide temporary facilities for protection and safe passage of building occupants, public

pedestrian and vehicular traffic around and adjacent to work site.

.2 Provide safety barricades, lights and signage within work site as required to provide a safe working environment for workers.

1.9 MEETINGS

.1 Prior to commencement of work hold a Health and Safety meeting. Have Contractor's Site Superintendent in attendance.

.2 Provide site safety orientation session to all workers and all workers new to the site and other authorized persons prior to granting them access to work site. Brief persons on site conditions and on the site safety rules in force at site.

.3 Conduct site specific occupational health and safety meetings during the entire work as follows and submit minutes as requested.

.1 Formal meetings on a minimum monthly basis.

.2 Informal tool box meetings on a regular basis from a predetermined schedule.

.4 Attend Health and Safety meetings as directed by the Contractor.

1.10 HAZARDOUS MATERIALS

.1 Should material resembling hazardous materials (other than those identified within the Contract Documents) be encountered in the course of work, stop work immediately. Do not proceed until written instructions have been received from the Consultant.

.2 Any material which contains asbestos, lead paint or PCB's that is disturbed or removed during construction work shall be removed in accordance with the regulations set out by the Occupational Health and Safety Act.

1.11 WHIMIS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) Regulations regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of Safety Data Sheets.

.2 Have a copy of WHMIS Safety Data Sheets available at the workplace on delivery of hazardous products.

1.12 SITE CLEANING

.1 Except where special permission is obtained, maintain clean access on public sidewalks and roads.

.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.

.3 Remove snow and ice from areas as required to execute the work.

1.13 FIRE SAFETY REQUIREMENTS

.1 Comply with requirements of latest standard for Building Construction Operations issued by the Fire Commissioner of Canada and Fire Safety Regulations of Local Authority. (latest editions)

.2 Implement and follow fire safety measures during Work. Comply with following:

.1 National Fire Code, (latest edition)

.2 Fire Protection Standards FCC 301 and FCC 302, (latest edition).

.3 Federal and Provincial Occupational Health and Safety Acts and Regulations.0

.3 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirements, Consultant will advise on the course of action.

1.14 EMERGENCY MANAGEMENT PLAN

.1 Must include response for medical and fire emergencies.

.2 Know the location of the nearest fire alarm box and telephone (if no cell phone available), including the emergency phone number.

.3 Know where the "Civic Address" of worksite is posted to report to emergency personnel.

.4 Report immediately all fire incidents to the fire department as follows:

.1 Activate nearest fire alarm box.

.2 Telephone 911.

.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.

.4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

.5 Notify the Owner of any emergency.

1.15 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Consultant.

1.16 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by Authority having Jurisdiction or by Consultant.

.2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.

1.17 OPEN EXCAVATIONS

.1 If open foundations or demolition areas are to be left at the end of a work day, a protective barrier must be placed around the entire perimeter of the open excavation or demolition areas to limit access by others. Barrier to be approved by the requirements established in the OH&S Regulations.

END OF SECTION

1 General

1.1 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Province of Prince Edward Island

.1 Occupational Health and Safety Act, R.S.P.E.I. 1988.

.4 CSA C22.1-2002 - Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.

.5 CSA C22.3 No. 1-M87 (R2001) - Overhead Systems.

.6 CSA C22.3 No. 7-94 (R2000) - Underground Systems.

.7 CSA - S269.1 - Falsework for Construction Purposes.

.8 CAN/CSA - S269.2 - Access Scaffolding for Construction Purposes.

.9 COSH, Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

.10 Fire Protection Standards issued by Fire Protection Services of Human Resources Development Canada as follows:

.1 FCC No. 301 - June 1982 Standard for Construction Operations.

.2 FCC No. 302 - June 1982 Standard for Welding and Cutting.

.3 FCC standards, may be viewed at the Regional Fire Protection Services' office (previously known as the Fire Commissioner of Canada) located at 99 Wyse Road, 8th Floor, Dartmouth, NS, Tel: (902) 426-6053.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Part 1:
List of individual health risks and safety hazards identified by hazard assessments.

.2 Part 2:
List specific measures to control or mitigate each hazard and risk identified in part one of Plan. State engineering controls, personal protective equipment and safe work practices to be used for work having identified hazard(s) or risk(s).

.3 Part 3:
Emergency and Communications Measures as follows:

.1 Emergency Procedures: standard operating procedures, evacuation measures and emergency response implemented on site during an accident or incident. State step by step procedures, applicable to each identified hazard.

.2 Emergency Communications: list names and telephone numbers of officials, to be contacted if incident, accident or emergency situation occurs, including:

.1 General Contractor and all Subcontractors.

.2 Provincial Departments and resources from local emergency organizations, based on type of hazard, incident or accident which might occur and as stipulated in applicable laws and regulations.

.3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant.

.4 Submit copies of incident and accident reports.

.5 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures.

.6 Consultant will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within 2 days after receipt of comments from Consultant.

.7 Consultant's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.8 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

.9 Maintain Worker's Compensation Coverage for duration of contract. Submit Letter of Good Standing to Consultant.

1.3 DEFINITIONS

.1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.

.2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment is isolated.

.3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).

.4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.

.5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.

.6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.4 PERMITS

.1 Obtain permits, licenses and compliance certificates, at appropriate times and frequency as stipulated by authorities having jurisdiction.

.2 Post all permits on site. Submit copies to Consultant.

1.5 FILING OF NOTICE

.1 File Notice of Project and other Notices with Provincial authorities prior to commencement of Work.

1.6 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Consultant.

1.7 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.

.2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

1.8 MEETINGS

.1 Preconstruction Conference:

.1 The safety officer shall attend and chair the preconstruction conference and prepare a comprehensive agenda for the conference.

.2 Meeting On Work Procedures:

.1 Meet with Contracting Officer to discuss work procedures and safety precautions. Ensure the participation of the Contractor's superintendent, the quality control, officer and representatives of each subcontractor or trade performing work at the site.

.3 Weekly Safety Meetings:

.1 Hold weekly at the project site. Prepare minutes showing contract title, signatures of attendees, a list of topics discussed and meeting minutes.

.4 Work Phase Meetings:

.1 The appropriate activity hazard analysis shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection.

.5 Prior to commencement of work hold Health and Safety meeting. Have Contractor's Site Superintendent in attendance.

.6 Provide site safety orientation session to all workers, all workers new to the site and other authorized persons prior to granting them access to work site. Brief persons on site conditions and on the minimum site safety rules in force at site. Maintain records of orientation on site.

.7 Conduct site specific occupational health and safety meetings for the duration of the work as follows:

.1 Formal meetings on a minimum monthly basis.

.2 Informal tool box meetings on a regular basis from a predetermined schedule.

.8 Keep workers informed of anticipated hazards, on safety practices and procedures to be followed and of other pertinent safety information related to:

.1 Progress of Work;

.2 New sub-trades arriving on site and;

.3 Changes in site and project conditions.

.9 Record and post minutes of meetings. Make copies available to Consultant upon request.

1.9 SITE SAFETY OFFICER (SSO)

.1 Employ and assign to Work, competent and authorized representative as Site Safety Officer (SSO). The SSO must:

.1 Have minimum 2 years site-related working experience specific to activities associated with Construction.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.2 The selection of the SSO will be subject to the approval of the Consultant, and changes shall be made as requested by the Consultant.

.3 The SSO shall be responsible for ensuring that all provisions of the Health and Safety Plan and relevant legislation are implemented.

.4 The SSO shall ensure that all monitoring and testing, as specified and at the direction of the Consultant, are conducted.

.5 The SSO shall maintain records of all readings that are taken by the Contractor report and any abnormal or dangerous situation to the Consultant and the Municipality, after having implemented emergency measures, as required, work shall not continue or proceed until the situation has been rectified.

.6 The Safety Officer shall be at the work site at all times whenever work or testing is being performed, shall conduct daily safety inspections.

.7 The SSO shall be authorized to act on behalf of the Contractor on all matters related to Health and Safety.

.8 Qualifications of Site Safety Officer:

.1 Ability to manage the on-site Contractor safety program through appropriate management controls.

.2 Ability to identify hazards and have the capability to expend resources necessary to abate the hazards.

.3 Must have worked on similar types of projects that are equal to or exceed the scope of the project assigned with the same responsibilities.

.4 Shall, as a minimum, have attended a recognized training qualification program including at least 40 hours of classroom instruction.

.9 Qualifications of Qualified Person, Confined Space Entry:

.1 The qualified person shall be capable (by educations and specialized training) of anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. This person shall be capable of specifying necessary control and protective action to ensure worker safety.

1.10 RECORD KEEPING

.1 ALL activities associated with Health and Safety shall be recorded daily in a bound notebook. Include as a minimum: activity date, time, location of occurrence, mitigation action taken and results. Records shall be assessed by the Consultant.

1.11 SUSPENSION OF ACTIVITIES

.1 Exposure to contaminants shall be controlled so that no worker is exposed to contaminants at a concentration greater than the Time Weighted Average (TWA) concentration for the contaminant, for up to a 10 hour workday, 40 hour work week.

.2 The Contractor will halt activities immediately during unsafe conditions. All costs relating to suspension of work for Contractor's failure to maintain Health and Safety procedures shall be borne by the Contractor.

.3 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.12 HEALTH AND SAFETY PLAN

.1 Prior to commencement of the work, submit to the Consultant a detailed Health and Safety Plan for review. The Health and Safety Plan shall comply with the provisions of this section, and shall illustrate the Contractor's knowledge and understanding of health and safety aspects of the work, the Contractor's intention to maintain a high level of safety on-site, and shall include, but not be limited to:

.1 Description of Work.

.2 Description of Site-specific Hazards:

.1 Physical

.2 Chemical

.3 Environmental

.3 Protective Equipment:

.1 Respiratory

.2 Contact

.4 Decontamination Procedures:

.1 Personal protective equipment (PPE)

.2 Equipment

.3 Infection Control personal protective equipment required by CSA Z317.13-03.

.5 Medical - Monitoring:

.1 Workers medical profile and suitability to work at the site.

.6 Air - Monitoring Procedures:

.1 Action levels

.2 Site monitoring

.3 Perimeter monitoring

.7 Emergency Procedures:

.1 Emergency Equipment

.2 Contingency Plans:

.1 Spill control

.2 Fire

.3 Ventilation

.4 Medical Emergency

.8 General Safety:

.1 Designation of site-safety officer

.1 Safety log

.2 Trenching, digging, excavations

.3 Storage of flammables, compressed gases

.4 Safety inspections

.9 Site Training:

.1 Initial hazard

.2 Daily safety

.2 All workers shall be trained and be familiar with the Health and Safety Plan and the use of personal protective equipment.

.3 Safety Document Submission:

.1 Ensure Safety Document Submission applies to Work of this specific project and site.

.2 Submit two (2) copies of Safety Document at the Pre-Construction Meeting. Do not commence Work nor deliver material on-site prior to submission.

.3 Included 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:

.1 Ensure the health and safety of persons at or near the Work; including, but not limited to, the Public.

.2 Ensure the measures and procedures of the regulatory agencies specified are carried out.

.3 Ensure every employee, self-employed person and employer performing Work under this contract complies with the regulatory agencies specified.

.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 Minister prior to implementation.

.4 Safety Document Organization:

.1 Organize information in the form of an instructional manual as follows:

.1 Place in binders of commercial quality, 8-1/2" x 11" x 3" maximum ring size.

.2 Cover: Identify binder with typed or printed title "Project Safety Document" and list the title of the project.

.3 Provide tabbed fly leaf for each separate heading, with typed heading on tab.

.4 Where drawings are within the safety document, provide with reinforced punched binder tab. Bind in with text; fold in larger drawings to size text pages.

.5 Arrange content under Safety Document headings specified herein.

.5 Safety Document Headings:

.1 Employee Safety Training:

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

.2 Company Safety Policy

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

1.13 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

.2 Perform on-going hazard assessments during the progress of Work identifying new or potential health risks and safety hazards not previously known. As a minimum hazard assessments shall be carried out when:

.1 New subtrade work, new subcontractor(s) or new workers arrive at the site to commence another portion of work.

.2 The scope of work has been changed by Change Order.

.3 Potential hazard or weakness in current health and safety practices are identified by Consultant or by an authorized safety representative.

.3 Each hazard assessment to be made in writing. Keep copies of all assessments on site for duration of Work. Upon request, make available to Consultant for inspection.

.4 Contractor to conduct a hazard assessment in conjunction with the Owner's maintenance staff as part of the planning process including isolating existing equipment where applicable and identification of hidden services where anchoring is required. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.14 COMPLIANCE REQUIREMENTS

.1 Observe and enforce construction safety measures required by National Building Code, latest edition, National Fire Code, Provincial Building Code Act, Worker's Compensation Act and Municipal Statutes and Authorities.

.2 Comply with Canada Labour Code and Canada Occupational Health and Safety Act.

.3 Latest edition of the Occupational Health & Safety Act Statutes of Prince Edward Island (including any amendments to and regulations).

.4 Fire Prevention Act.

.5 Dangerous Goods Transportation Act.

.6 Industrial Best Practices for Equipment Isolation and Lockout Policy.

.7 In case of conflict or discrepancy the more stringent requirement shall apply.

.8 Maintain clear emergency exit paths.

.9 Ensure that employees working on this specific project have met training requirements as legislated by the Prince Edward Island Occupational Health and Safety Act and its regulations.

.10 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 and workplace.

.11 Provide Consultant with Material Safety Data Sheets (MSDS).

.12 Provide and maintain first aid equipment, supplied and medications appropriate to the work and its location in accordance with the First Aid Regulations. Obtain and implement recommendations from Occupational Health and Safety Division specific to the project work site.

1.15 WHMIS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada and Provincial Department of Labour.

.2 Submit WHMIS data sheets to Consultant in accordance with Section 01 33 00 - Submittal Procedures.

.3 Maintain WHMIS information station and ensure designated personnel are trained in its use.

.4 Submit copies of all Tool Box or Safety Meeting notes.

.5 Submit copies of all Worksite Safety Inspections.

1.16 SMOKING, ALCOHOL & RESTRICTED SUBSTANCES

.1 Worksites are inherently dangerous, including travelling to and from the site.

.2 Alcohol, medical and recreational cannabis are restricted substances governed by Federal and Provincial laws as are other forms of illegal drugs.

.3 The smoking of or use of tobacco products, including e-cigarettes, the use of alcohol and restricted substances including cannabis in any form in the building or on the work site is strictly prohibited.

.4 Where workers have a prescription for medical cannabis, or other prescription drugs that may cause drowsiness, they are to advise their supervisor and discuss with their supervisor safe and appropriate task(s) while under the influence of these prescriptions on the worksite.

.5 Workers who violate this requirement will be removed from the worksite.

1.17 SITE CONTROL AND ACCESS

.1 Control work site and entry points. Grant and allow entry to only workers and other persons so authorized. Immediately stop non-authorized persons from circulating within construction areas and remove from site.

.2 Prior to gaining access to the site, all contractors, subcontractors and suppliers shall file with the General Contractor their proof of Workers Compensation coverage, proof of required Insurance and proof of contract. Upon request, proof of these documents will be provided to the Owner and Consultant.

.3 Delineate and isolate construction areas from other areas of site by use of appropriate means. Erect barricades, fences, hoarding and temporary lighting as required. See Section 01 50 00 - Facilities and Controls for minimum type of barriers acceptable.

.4 Erect signage at entry points and at other strategic locations around site, clearly identifying construction area(s) as being "off limits" to non-authorized persons. Signage must be professionally made.

1.18 PROTECTION

.1 Provide temporary facilities for protection and safe passage of building occupants, public pedestrian and vehicular traffic around and adjacent to work site.

.2 Provide safety barricades, lights and signage on work site as required to provide a safe working environment for workers.

.3 Use personal protection equipment as required by Occupational Health and Safety Act and as required by this site.

.4 Training of workers in the proper use, fitting, inspection and storage of personal protective equipment shall be done prior to use of the equipment.

1.19 UNFORESEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Consultant verbally and in writing.

1.20 TESTING AND MONITORING

.1 Test and monitor for hazardous conditions, as required to demonstrate compliance with provincial regulations.

.2 If multiple locations are being worked simultaneously, provide monitoring at all locations where work is being carried out, including providing additional monitoring instruments.

1.21 ISOLATION OF EXISTING SERVICES

.1 Obtain Consultant's written authorization prior to conducting work on an existing active, energized service or facility required as part of the work and before proceeding with lockout of such services or facility.

.2 To obtain authorization, submit to Consultant following documentation:

.1 Written Request for Isolation of the service or facility and;

.2 Copy of Contractor's Lockout Procedures.

.3 Make a Request for Isolation for each event, unless directed otherwise by Consultant, and as follows:

.1 Fill-out standard forms in current use at the Facility when so directed by Consultant or;

.2 Where no form exist at Facility, make request in writing identifying:

.1 Identification of system or equipment to be isolated, including it's location;

.2 Time duration, indicating Start time & date and Completion time & date when isolation will be in effect.

.3 Voltage of service feed to system or equipment being isolated.

.4 Name of person making the request.

.3 Document to be in typewritten format.

.4 Do not proceed until receipt of written notification from Consultant granting the Isolation Request and authorization to proceed with the isolation of designated equipment or facility. Consultant may designate other individual at the Facility as the person authorized to grant the Isolation Request.

.5 Conduct safe, orderly shut down of equipment or facilities, de-energize and isolate power and other sources of energy and lockout items in accordance with requirement of clause 1.8 below.

.6 Plan and schedule shut down of existing services in consultation with the Consultant and the Facility Manager. Minimize impact and downtime of facility operations.

.7 Determine in advance, as much as possible, in cooperation with the Consultant,

the type and frequency of situations which will require a Request for Isolation. Follow Consultant's directives in this regard.

.8 Conduct hazard assessment as part of the planning process of isolating existing equipment and facilities. Hazard Assessments to conform with requirements of Health and Safety Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.22 LOCKOUTS

.1 Perform lockouts in compliance with:

.1 Canadian Electrical Code

.2 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.3 Regulations and code of practice as applicable to mechanical equipment or other machinery being de-energized.

.4 Procedures specified herein.

.2 Isolate and lockout electrical facilities, mechanical equipment and machinery from all potential energy sources prior to starting work on such items.

.3 Develop and implement lockout procedures to be followed on site as an integral part of the Work.

.4 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.

.5 Use industry standard lockout tags.

.6 Provide appropriate safety grounding and guards as required.

.7 Prepare Lockout Procedures in writing. Describe safe work practices, work functions and sequence of activities to be followed on site to safely isolate all potential energy sources and lockout/tagout facilities and equipment.

.8 Include within procedures a system of worker request and issuance of individual lockout permit by a person, employed by Contractor, designated to be "in-charge" and being responsible for:

.1 Controlling issuance of permits or tags to workers.

.2 Determining permit duration.

.3 Maintaining record of permits and tags issued.

.4 Submitting a Request for Isolation to Consultant when required by Contractors and / or Owners safety plan.

.5 Designating a Safety Watcher, when one is required based on type of work.

.6 Ensuring equipment or facility has been properly isolated, providing a Guarantee of Isolation to worker(s) prior to proceeding with work.

.7 Collecting and safekeeping lockout tags, returned by workers, as a record of the event.

.9 Clearly establish, describe and allocate, within procedures, the responsibilities of:

.1 Workers.

.2 Designated person controlling issuance of lockout tags/permits.

.3 Safety Watcher.

.4 Subcontractors and General Contractor.

.10 Procedures shall meet the requirements of Provincial and Federal Codes and Regulations.

.11 Generic procedures, if used, must be edited, supplemented with pertinent information and tailored to reflect specific project conditions. Clearly label as being the procedures applicable to this contract.

.1 Incorporate site specific rules and procedures established by Facility Manager

and in force at site. Obtain such procedures through Consultant.

.12 Procedures to be in typewritten format.

.13 Submit copy of Lockout Procedures to Consultant, in accordance with submittal requirements, prior to commencement of work.

1.23 CONFORMANCE

.1 Ensure that lockout procedures, as established for project on site, are stringently followed. Enforce use and compliance by all workers.

.2 Brief all persons working on electrical facilities, mechanical and other equipment fed by an energy source on requirements of this section.

.3 Failure to perform lockouts in accordance with regulatory requirements or follow procedures specified herein may result in the issuance of a Non-Compliance Notification at Consultant's discretion with possible disciplinary measures imposed as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.24 FIRE SAFETY REQUIREMENTS

.1 Comply with requirements of latest standard for Building Construction Operations issued by the Fire Commissioner of Canada and Fire Safety Regulations of Local Authority.

.2 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.

.3 Implement and follow fire safety measures during Work. Comply with following:

.1 National Fire Code, 2010.

.2 Fire Protection Standards FCC 301 and FCC 302.

.3 Federal and Provincial Occupational Health and Safety Acts and Regulations as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.4 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Consultant will advise on the course of action.

.5 Advise the 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.

.6 Fire Separations:

.1 Ensure that fire separations are installed to maintain total integrity and that they are not breached by Work following their installation.

.2 Replace fire separations which have suffered a lessening of their required rating during construction.

.7 Ensure nothing subverts the integrity of fire protection provided for the building structure.

.8 Coordinate work of all sections so that they do not encroach on space required for fire protection and its installation. Ensure that fire protection damage during construction is totally replaced.

1.25 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut-off, unless approved by Consultant.

.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than fire fighting.

.3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.26 FIRE SAFETY

.1 The Sub-Contractors are to participate on the Fire Safety Committee under the Joint Health and Safety Committee. The Fire Safety Committee under the direction of the Contractor is responsible for implementation and maintenance of the Construction Fire Safety Plan.

.2 Construction Fire Safety Plan:

- .1 The Construction Fire Safety Plan will include the following:
  - .1 Introduction of plan and purpose
  - .2 Fire Safety Committee
  - .3 Terms of reference.
- .2 Committee composition.
- .3 Emergency Procedures.
- .4 Fire protection equipment.
- .5 Building description.
- .6 Provisions for fire fighting.
- .7 Portable extinguishers.
- .8 Exits.
- .9 Emergency Lighting.
- .10 Reduced drawings.
- .11 Fire safety maintenance schedule:
  - .1 General.
  - .2 Maintenance levels.
  - .3 Skill categories.
  - .4 Frequency.
  - .5 Checklists.
- .12 Other information:
  - .1 Instruction on use of fire extinguishers.
  - .2 Emergency Fire Drill procedures.

.3 Portable Fire Extinguishers:

- .1 During construction, Contractor is to provide and maintain on the site at all times, ULC listed 25 lb ABC dry chemical type portable fire extinguishers.

.4 Blockage of Roadways:

- .1 The Fire Department shall be advised of any work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by the Fire Department, erecting of barricades and the digging of trenches.

.5 Rubbish and Waste Materials:

- .1 Rubbish and waste materials are to be kept to a minimum.
- .2 The burning of rubbish is prohibited.
- .3 Removal:
  - .1 All rubbish shall be removed from the work site at the end of the workday or shift or as directed by Consultant.
- .4 Storage:
  - .1 Extreme care is required where it is necessary to store oily waste in work areas to ensure maximum possible cleanliness and safety.
  - .2 Greasy or oily rags or materials subject to spontaneous ignition shall be

deposited and kept in an approved receptacle and removed as required in 1.7.3.1.

.6 Flammable Liquids:

.1 The handling, storage and use of flammable liquids are to be governed by the current National Fire Code of Canada.

.2 Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 liters 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 liquids exceeding 45 liters for work purposes, requires the permission of the Fire Department.

.3 Transfer of flammable liquids having a flash point below 38ºC is prohibited within buildings.

.4 Transfer of flammable liquids shall not be carried out in the vicinity of open flames or any type of heat-producing devices.

.5 Flammable liquids having a flash point below 38ºC, such as naphtha or gasoline, shall not be used as solvents or cleaning agents.

.6 Flammable waste liquids, for disposal, shall be stored in approved containers located in a safe ventilated area. Quantities are to be kept to minimum and the Fire Department is to be notified when disposal is required.

.7 Fire Inspection:

.1 The Fire Department shall be allowed unrestricted access to the work site.

.2 The Contractor shall cooperate with the Fire Department during routine inspections of the work site.

.3 The Contractor shall immediately remedy all unsafe fire situations observed by the Fire Department.

.8 Reporting Fires:

.1 Know the location of the nearest fire alarm box and telephone, including the emergency phone number.

.2 Report immediately all fire incidents to the fire department as follows:

.1 Activate nearest fire alarm box, or

.2 Telephone 911.

.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.

.4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

1.27 WELDING AND CUTTING

.1 Use noncombustible shields for electric and gas welding or cutting executed within two (2) meters of combustible material or in occupied space.

.2 Place tanks supplying gases as close to work as possible. Fix in upright position, free from exposure to sun or high temperatures.

.3 Locate fire extinguishing equipment near all welding and cutting operations.

1.28 OPEN FLAMES, SPARKS, EXPLOSION PROTECTION

.1 Keep open flames and sparks to minimum. When flame or sparks are required, follow proper procedures to prevent fire or explosion.

1.29 HOT WORK AUTHORIZATION

.1 Hot Work will not be permitted on or within the building structure, tanks, or confined spaces, except as outlined herein.

.2 Obtain Consultant's written "Authorization to Proceed" before conducting any form of Hot

work on site.

.3 To obtain authorization submit to Consultant:

.1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.

.2 Description of the type and frequency of Hot Work required.

.3 Sample Hot Work Permit to be used. Shall be included in the safety documentation submission.

.4 Upon review and confirmation that effective fire safety measures will be implemented during performance of hot work, Consultant will provide authorization to proceed as follows:

.1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;

.2 Separate work, or segregate certain parts of work, into individual entities. Each entity requiring a separately written "Authorization to Proceed" from Consultant. Follow Consultant's directives in this regard.

.5 Requirement for individual authorization based on:

.1 Nature or phasing of work;

.2 Risk to Facility operations;

.3 Quantity of various trades needing to perform hot work on project or;

.4 Other situation deemed necessary by Consultant to ensure fire safety on premises.

.6 Do not perform any Hot Work until receipt of Consultant's written "Authorization to Proceed" for that portion of work.

.7 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Consultant. When directed, perform Hot Work only during non-operative hours of Facility. Follow Consultant's directives in this regard.

1.30 HOT WORK PROCEDURES

.1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.

.2 Procedures to include:

.1 Requirement to perform hazard assessment of site and immediate hot work area for each hot work event in accordance with Hazard Assessment and Safety Plan requirements of Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.2 Use of a Hot Work Permit system for each hot work event.

.3 The step by step process of how to prepare and issue permit.

.4 Permit shall be issued by Contractor's site Superintendent, or other authorized person designated by Contractor, granting permission to worker or subcontractor to proceed with hot work.

.5 Maintain a fire extinguisher in the immediate area where hot work is being undertaken.

.6 Provision of a designated person to carryout a Fire Safety Watch for a minimum of 2 hours immediately upon completion of the hot work.

.7 Compliance with fire safety codes and standards specified herein and Occupational Health and Safety regulations specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Clearly label as being the Hot Work Procedures applicable to this contract.

.4 Hot Work Procedures shall clearly establish worker instructions and allocate responsibilities of:

.1 Worker(s),
.2 Authorized person issuing the Hot Work Permit,
.3 Fire Safety Watcher,
.4 Subcontractors and Contractor.

.5 Brief all workers and Subcontractors on Hot Work Procedures and Permit system established for project. Stringently enforce compliance.
.1 Failure to comply with the established procedures may result in the issuance of a Non-Compliance Notification at Consultant's discretion with possible disciplinary measures imposed as specified in Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

1.31 HOT WORK PERMIT

.1 Hot Work Permit to include, as a minimum, the following data:
.1 Project name and project number;
.2 Building name, address and specific room or area where hot work will be performed;
.3 Date when permit issued
.4 Description of hot work type to be performed;
.5 Special precautions required, including type of fire extinguisher needed;
.6 Name and signature of person authorized to issue the permit.
.7 Name of worker (clearly printed) to which the permit is being issued.
.8 Time Duration that permit is valid (not to exceed 8 hours). Indicate start time & date and completion time & date.
.9 Worker signature with date and time upon hot work termination.
.10 Specified time period requiring safety watch.
.11 Name and signature of designated Fire Safety Watcher, complete with time & date when safety watch terminated, certifying that surrounding area was under his continual surveillance and inspection during the full watch time period specified in Permit and commenced immediately upon completion of Hot Work.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full and signed as follows:
.1 Authorized person issuing Permit before hot work commences;
.2 Worker upon completion of Hot Work;
.3 Fire Safety Watcher upon termination of safety watch;
.4 Returned to Contractor's Site Superintendent for safe keeping.
.5 The permit shall describe compliance with the following procedures. After tank or confined space interiors or building areas have been decontaminated, hot work may be conducted only when the tank or confined space is inverted. Hot work shall not be performed unless monitoring indicates atmospheres within and immediately surrounding are less than eight percent (8%) oxygen inside less than ten percent (10%) of the LFL outside; continuous monitoring shall continue until the hot work is completed. The hot work prohibition includes welding, cutting, grinding, sawing, or other similar operations which could be expected to potentially generate combustion-producing temperatures or sparks, or which could produce potentially hazardous fumes or vapours. An individual at each hot work site shall be designated as a fire watch. This person's sole responsibility shall be to monitor the hot work and have immediate access to at least two (2) twenty (20) pound fire extinguishers located at each hot work site. All extinguishers shall be currently inspection tagged, approved safety pin and tamper resistant seal. A new permit shall be obtained at the start of each work shift during which hot work will be conducted.

1.32 BLASTING

.1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Consultant.

1.33 POWER ACTUATED DEVICES

.1 Use power actuated devices only after receipt of written permission from Consultant.

1.34 HANDLING AND TRANSPORTATION OF DANGEROUS GOODS

.1 Observe and enforce all measures required by the regulatory agencies including but not limited to Environment Canada, Prince Edward Island Department of Environment, and Transport Canada.

.2 Most current regulatory guidelines and Acts will apply to the work.

.3 In case of any conflict, the more stringent requirements will apply.

1.35 OPEN EXCAVATIONS

.1 If open foundations or demolition areas are to be left at the end of a work day, protective fencing must be placed around the entire perimeter to limit access by others. Fencing to be self-supporting, approved by the Department of Labour and the Construction Safety and Industrial Safety Regulations.

1.36 POTENTIAL HAZARDS

.1 Hazards include, but are not limited to, toxic, flammable and explosion hazards associated with cleaning solvents.

.2 The Contractor shall become familiar with all potential hazards associated with the work, and shall take necessary measures to avoid injury or damage of any kind.

1.37 HAZARDOUS MATERIALS

.1 Should material resembling hazardous materials, other than those identified with the Contract Documents, including but not limited to spray or trowel applied asbestos, be encountered in course of work; stop work immediately. Do not proceed until written instructions have been received from Consultant.

.2 Any material which contains asbestos that is disturbed or removed during construction work, shall be removed in accordance with the regulations set out by the Occupational Health and Safety Act. All costs for proper cutting, removal and disposal of all asbestos indentified in this contract shall be included in Tender.

.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 Authority Having Jurisdiction (AHJ).

1.38 ENVIRONMENTAL PROTECTION

.1 Ensure that pollution and environmental control of construction activities are exercised during the Work to requirements of the federal and provincial environmental acts; including, but not limited to, the Prince Edward Island Environmental Protection Act.

1.39 SANITATION / DECONTAMINATION PRACTICES

.1 After each use, all disposable protective equipment shall be collected in a dedicated container for disposal.

.2 All respiratory equipment shall be decontaminated daily after use.

.3 All tools, pumps and equipment used during cleanup should be dedicated to the handling of contaminants and labeled as such and thoroughly decontaminated at the completion of the project.

.4 Contaminated work clothing shall not be worn outside of regulated areas.

.5 Workers shall wash their hands and exposed skin before eating, drinking, smoking or using toilet facilities during work shift, and at the completion of a work shift.

.6 Food, drink and tobacco products shall not be permitted in regulated areas.

1.40 WORK PRACTICES AND ENGINEERING CONTROLS

.1 Access to work areas shall be regulated and limited to authorized persons. A daily roster shall be kept of persons entering such areas.

.2 Handling Contaminants and General Work Practices.

.1 Transportation and handling of contaminants to meet applicable local, provincial and federal regulations.

.2 Emergency respiratory equipment shall be located in readily accessible locations which will remain minimally contaminated with contaminants in an emergency.

.3 Containers and systems shall be handled and opened with care. Approved protective clothing shall be worn by all employees engaged in regulated areas.

.4 All wastes and residues containing contaminants shall be collected in appropriate containers.

.3 Confined or Enclosed Spaces

.1 Entry into confined or enclosed spaces, where there is limited egress, shall be controlled by a permit system. Permits shall be signed by an authorized representative of the employer and shall certify that appropriate measures have been taken to prevent adverse effects on the worker's health as a result of his or her entry into such space.

.2 Confined or enclosed spaces which have contained contaminants shall be thoroughly ventilated to assure an adequate supply of oxygen, tested for contaminants, and inspected for compliance with these requirements prior to each entry. Adequate ventilation shall be maintained while workers are in such spaces. Each individual entering such confined or enclosed space shall be furnished with appropriate personal protective equipment and clothing and be connected by a lifeline harness to standby worker stations outside of the space. The standby worker shall also be equipped for entry with approved personal protective equipment and clothing and have contact with a third person. The standby person shall maintain communication (visual, voice, signal line, telephone, radio, or other suitable means) with the employee inside the confined or enclosed space.

.3 Workers entering confined spaces and standby workers shall be trained at a recognized confined space training program.

1.41 PRE-CONSTRUCTION CONTRACTOR SAFETY CHECKLIST

.1 Use this text as a guideline for completing the following checklist. This checklist is a general, pre-construction review of the Contractor safety program, as well as an information session to identify what the Owner requires of the Contractor. Where the item requires a submission, ensure that it is received. If the item does not apply, enter N/A for not applicable.

.2 The following information will assist in establishing what will be reviewed in each section:

.1 Safety Policy:
Each employer is required by law (in Prince Edward Island) to have a safety policy and program and to implement that policy. The Owner will ask for a copy of that program.

.2 Safety Representative:
Each Contractor is required to advise the Owner who their safety representative is. That representative has duties as described in the Occupational Health and Safety Act.

.3 Emergency Procedure:
Each Contractor must have a site specific layout and emergency plan complete with emergency phone numbers.

.4 Employee Orientation:
Each and every person working for a Contractor, including Sub-Contractors, will be given an orientation to familiarize them with the site safety program. Unless otherwise specified, each Sub-Contractor is responsible for the orientation of their workers.

.5 Safe Work Plan:
Most Contractors are involved in tasks that subject workers to hazards. In order to ensure that these workers are secured from hazard, the Contractor will supply the Owner with a written safe work plan which affords protection against the hazards. This plan must be signed by a company representative and communicated to the workers involved in the task.

.6 Personal Protective Equipment Review:
Advise that all workers require CSA Class "B" hard-hat, CSA "Green Patch" (eight inch) footwear, eye, ear and respiratory protection as required (boots and hats at all times).

.7 Fall Protection:
Fall restraint or fall arrest protection required where a fall of 2.4 meters or more is possible. NO EXCEPTIONS.

.8 Housekeeping:
Advise of daily, or as needed, clean-up requirements.

.9 Tool Box Talks:
Each Contractor is required to conduct weekly safety meetings with their forces and advise the Owner they have been done.

.10 Material Handling / Storage:
Advise Contractor about storage areas and handling of material so as not to endanger their worker or another worker. Stacked material to be banded, chained, blocked or otherwise secured.

.11 Landing Platform:
Advise Contractor about movement of material on or off platforms. All material to be secured. Platform gates or chains to be kept closed at all times workers are on platform. If not possible, worker to be tied off with fall restraint system independent of platform.

.12 WHMIS Training:
Receive verification that all workers are trained and that the Contractor submits their MSDS.

.13 GFCI:
Advise Contractor that all tools are required to have ground fault circuit interrupters (where electricity is supplied by Contractor).

.14 Accident Investigations:
Any injury to any of their workers must be investigated and reported to the Owner.

.15 Verbal, Written, Gone:
Explain Zero Tolerance Program.

.16 Joint / Worker Safety Committee:
Sites of over 20 workers must establish a safety committee; over 50 workers, an additional worker committee. Workers required to attend committee meetings will do so and not be prevented by employers.

.17 Fire Protection:
All trades involved in performing hot work of any kind are required to provide fire protection at the work location.

.18 Guardrails:
Advise Contractor that where temporary removal guardrails required, guardrails must be replaced as soon as possible.

.19 First Aider:
Each Contractor is required to have a first aid kit and trained first aider. Employer must name their first aider.

.20 Visitors:
Advise Contractor that any visitors to site must be suitably protected from hazard. They must wear hard hat, safety vest, and proper safety footwear while on site.

.21 Task Lighting:
Review responsibilities of task specific lighting (who provides it).

.22 Swamper / Rigger Competency:
Where cranes are used, the Contractor must use a swamper / rigger. They shall provide the Owner with a written statement identifying, by name(s) their rigger and that the named person is a competent work as described in the Construction regulation.

.23 Scaffolds:
Review scaffold building requirement:
- Use all braces required by design.
- Access ladder for platform over 1.5 meters.
- Full width platform if height over 3 meters.
  PEI Regulations require double planks.
- Tied in three time base dimension or use of outriggers.
- Engineered over 16 meters in height (standard frame type).

.24 Elevating Work Platforms:
- All boom and scissors lifts required to be CSA approved and have approval on machine.
- Operators manual required on machine at all times.
- Maintenance record on machine at all times.
- Operator must receive training in operation of equipment.
- Fall protection must be used at all times on a boom lift.
- Fall protection required to be used on scissors lift when unit is being moved.

.25 Protruding Rebar:Installers of reinforcing steel must protect the protruding hazard or make arrangements to have it protected. Removal of protective coverings for task purposes only is allowed, however, protective covering must be replaced as soon as possible.

.26 WCB Clearance Certificates:Advise Contractor that the Owner will not release any funds for payment until Workers Compensation Board Clearance Certificate has been received by the Owner.

.3 The following checklist is a general pre-construction review of the Contractor's safety program as required by the Owner.

PROJECT: _____ DATE: _____

CONTRACTOR: _____

WORK BEING PERFORMED: _____

Checkmark means YES / X means NO

.1 ____ Safety Policy Submitted
.2 ____ Safety Representative
.3 ____ Emergency Procedure Review
.4 ____ Employee Orientation
.5 ____ Written Safe Work Plan
.6 ____ Personal Protective Equipment Review
  .1 ____ Hard Hat & Footwear
  .2 ____ Safety Glasses & Hearing
  .3 ____ Dust & Fumes
.7 ____ Fall Protection
.8 ____ Housekeeping
.9 ____ Tool Box Safety Talks (Weekly)
.10 ____ Material Handling / Storage
.11 ____ Landing Platforms
.12 ____ WHMIS Training Verification
.13 ____ GFCI Requirements
.14 ____ Accident / Incident Investigations Notification
.15 ____ Verbal, Written, Gone
.16 ____ Joint / Worker Safety Committee
.17 ____ Fire Protection
.18 ____ Guardrails
.19 ____ First Aider on Staff - Name Supplied
.20 ____ Visitors & Safety Equipment
.21 ____ Task Lighting
.22 ____ Swampers / Riggers Competency (in writing)
.23 ____ Scaffolds
.24 ____ Elevating Work Platforms
.25 ____ Protruding Rebar Protection - MSDS Received
.26 ____ WCB Clearance Certificate.

_____	_____
(Print name and title)	(Print name and title)
_____	_____
Owner Representatives (Signature)	Contractor Representatives (Signature)
_____(Date)	_____(Date)

END OF SECTION

1 General

1.1 FIRES / DISPOSAL OF WASTES

.1 Fires and burning of rubbish on site not permitted.

.2 Do not bury rubbish and waste materials on site.

.3 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.2 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.3 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Consultant.

1.4 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways.

.4 Design and construct temporary crossings to minimize erosion to waterways.

1.5 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.6 SMOKING RESTRICTIONS

.1 Smoking is not permitted inside the building or on the property at any time or at any stage of construction.

1.7 ENVIRONMENTAL PERMIT APPROVAL

.1 Comply with requirements contained in the Transportation and Infrastructure Environmental Management Division environmental approval permit for the project.

.2 Contractor is to remove all protections upon project completion.

END OF SECTION

1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with National Building Code of Canada (NBC) 2015 including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.

.2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Asbestos: Demolition of spray or trowel-applied asbestos is hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of demolition work, immediately stop work and notify Consultant.

.2 Should material suspected of containing PCB's be encountered in the course of demolition work, immediately stop work and notify Consultant.

END OF SECTION

1 General

1.1 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-2008, Stipulated Price Contract.

1.2 INSPECTION

.1 Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.

.3 If 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 inspections or tests satisfactorily completed and make good such Work.

.4 Consultant may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies are to be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Contractor.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of Inspection/Testing Agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency may request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re inspection.

1.4 PROCEDURES

.1 Notify appropriate agency and Consultant in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

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

1.6 REPORTS

.1 Submit 3 copies of inspection and test reports to Consultant.

.2 Provide copies to Subcontractor of work being inspected or tested.

1.7 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.

1.8 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to Consultant.

.3 Prepare mock-ups for Consultant's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups 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.

.5 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when acceptable to Consultant.

.7 Mock-ups may remain as part of Work as directed by Consultant.

1.9 MILL TESTS

.1 Submit mill test certificates as requested.

1.10 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

END OF SECTION

1 General

1.1 SITE ACCESS AND PARKING

.1 The Owner will designate Contractor's access to project site as well as parking facilities for equipment.

.2 A location for parking will be designated for Contractors, Sub-Contractor & workers.

.3 The Contractor will maintain all roads and sidewalks free from mud and debris tracked from construction site, on a daily basis, at no cost to Owner.

.4 The Contractor will provide snow removal within the site fence during period of work as required to maintain access to building, at no cost to the Owner.

.5 The Contractor will provide and maintain signs, barricades and other devices required to indicate construction activities or other temporary and unusual conditions resulting from project work, at no cost.

1.2 SITE SAFETY FENCING

.1 Contractor to provide site safety fencing around entire construction site to separate construction zone from public.

.2 Size of compound to be determined by Contractor, but must contain all construction and construction related activities within the compound, except parking for workers.

.3 Contractor to provide 1800mm high page wire fence supported by steel "T" bars driven into the ground. Space at 2400mm maximum.

.4 Contractor to provide double gates at entrance complete with lock.

.5 Contractor to lock gate after every days activities are completed.

.6 Contractor to post notices for both construction zone and personal protective equipment requirements.

1.3 PARKING

.1 Parking space for workers' vehicles will be restricted to within the limit of contract and security fencing.

.2 Parking for delivery and service vehicles for the supply and removal of construction materials and debris will be restricted to within the limit of contract and security fencing.

1.4 SNOW REMOVAL

.1 General snow removal to the building site inside Limit of Contract by the Contractor.

.2 All snow removal to access Contractor's construction trailers and storage, and to perform own work by the Contractor.

1.5 STORAGE SHEDS

.1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

.2 Provide heat when materials being stored are subject to frost damage.

.3 Under no circumstances will Consultant accept materials damaged due to exposure to weather elements, for incorporation into construction. Consultant will determine what constitutes damaged material.

.4 All storage sheds or trailers must be located within the limits of the contract and/or temporary construction fence.

1.6 LAYOUT

.1 The Contractor will provide a bench mark and control grid.

.2 Contractor shall be responsible for detailed setting out of his work.

1.7 MATERIAL STORAGE

.1 Locate site storage trailers where directed by Consultant. Place in location of least interference with existing facility operations.

.2 Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.

.3 Make arrangements elsewhere in the City as deemed required and pay all costs for storage of materials not ready for incorporation into work.

1.8 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Consultant.

1.9 WASTE REMOVAL

.1 The Contractor will provide bins as required. Contractor responsible for placement and sorting of waste in the collection bins and removal of waste from site.

END OF SECTION

1 General

1.1 INSTALLATION AND REMOVAL

.1 Contractor to provide temporary utilities identified in this Section, in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.2 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

.2 Filter water containing silt through geofabric prior to discharge into municipal storm water system or water course.

1.3 WATER SUPPLY

.1 Water supply is available on site and will be provided for construction usage at no cost. Make arrangements for the use and transportation of such services to work area through the Consultant.

1.4 SANITARY FACILITIES

.1 The Contractor will provide, at no cost to the Owner, sanitary facilities for work force in accordance with governing regulations and ordinances for entire duration of project. Facilities within the existing building are not available to the Contractor's work force.

.2 The Contractor will post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

.3 Sanitary facilities must be located within the limits of the temporary construction fence, provided under the work of this Contract.

1.5 POWER

.1 Power supply is available and will be provided for construction usage at no cost.

- .1 Make arrangements for the use of such services through the Consultant.
- .2 Consultant will designate and approve each location of existing power source to which connections can be made to obtain temporary power service.
- .3 Connect to existing power supply in accordance with Canadian Electrical Code.

.2 Electrical power and lighting systems installed under this Contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage.

1.6 TEMPORARY HEATING AND VENTILATING

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building/hoarding must be vented to outside or be flameless (vent free) type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

- .1 Facilitate progress of Work.
- .2 Protect Work and products against dampness and cold.
- .3 Prevent moisture condensation on surfaces.
- .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
- .5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10 degrees Celsius in areas where construction is in progress.

.5 Ventilating:
- .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
- .2 Ventilate storage spaces containing hazardous or volatile materials.
- .3 Ventilate temporary sanitary facilities.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
- .1 Conform with applicable codes and standards.
- .2 Enforce safe practices.
- .3 Prevent abuse of services.
- .4 Prevent damage to finishes.
- .5 Vent direct-fired combustion units to outside.

.7 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies, authorities having jurisdiction, governing codes, regulations and bylaws.

END OF SECTION

1 General

1.1 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
  .1 CCDC 2-2008, Stipulated Price Contract.
.2 Canadian General Standards Board (CGSB)
  .1 CGSB 1-GP-189M-84, Primer, Alkyd, Wood, Exterior.
  .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
.3 Canadian Standards Association (CSA International)
  .1 CAN3-A23.1-/A23.2-94, Concrete Materials and Methods for Concrete Construction/Method of Test for Concrete.
  .2 CSA-0121-M1978, Douglas Fir Plywood.
  .3 CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment.
  .4 CSA 5269.1-16, Falsework and Formwork.
.4 Fall Protection and Scaffolding Regulations, Province of Prince Edward Island.

1.2 INSTALLATION AND REMOVAL

.1 Provide construction facilities in order to execute work expeditiously.
.2 Remove from site all such work after use.

1.3 OVERLOADING

.1 Ensure no part of work is subjected to a load that will endanger its safety or cause permanent deformation.

1.4 FALSEWORK

.1 Design and construct falsework in accordance with CSA s269.2.

1.5 SCAFFOLDING AND FALL ARREST

.1 Provide and maintain scaffolding.
.2 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CAN/CSA-S269.2.
.3 Erect scaffolding independent of walls. Remove when no longer required.
.4 Comply with the requirements of the Fall Protection and Scaffolding Regulations, Province of Prince Edward Island.
.5 Each user of scaffolding shall examine scaffolding for sufficiency before using it. Make scaffolding secure or notify Consultant.

1.6 HOISTING

.1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
.2 Hoists and cranes shall be operated by qualified operator.
.3 Maintain current inspection certificate.
.4 Qualifications of crane operator must be submitted to Consultant for approval and must be authorized to operate the crane.

1.7 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

.3 Provide adequate weather tight, heat and ventilation appropriate for the use and storage of equipment, tools and materials.

.4 Each user of equipment or tools shall be appropriately trained and be responsible to examine for sufficiency before use. Make equipment and tools safe if necessary, or notify the Contractor in writing that user will not commence work with such tools until it is made safe.

1.9 CONSTRUCTION SIGNAGE

.1 Signs and notices for safety and instruction shall be in English; Graphic symbols shall conform to CAN3-Z321.

.2 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Consultant.

END OF SECTION

1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CGSB 1.189M-84, Primer, Alkyd, Wood, Exterior.
- .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)
- .1 CSA-O121-M1978, Douglas Fir Plywood.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

.3 Temp barrier for 01 50 00.

1.3 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs, and other areas where a change in elevation of greater than 900mm exists.

.2 Provide as required by governing authorities.

1.4 WEATHER ENCLOSURES

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

.3 Design enclosures to withstand wind pressure and snow loading.

1.5 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.6 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.7 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Consultant locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.8 PROTECTION OF LANDSCAPE ELEMENT

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

1 General

1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Within 7 days of written request by Consultant, submit following information for materials and products proposed for supply:

.1 Name and address of manufacturer.

.2 Trade name, model and catalog number.

.3 Performance, descriptive and test data.

.4 Manufacturer's installation or application instructions.

.5 Evidence of arrangements to procure.

.3 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.

1.2 REFERENCE STANDARDS

.1 Conform to reference standards, in whole or in part as specifically requested in specifications.

.2 If there is question as to whether any product or system is in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.

.3 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.3 CONFORMANCE

.1 When material or equipment is specified by standard or performance specifications, upon request of Consultant, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.4 SUBSTITUTION OF MATERIAL

.1 Proposals for substitution may be submitted only after award of Contract. Such requests must include statements of respective costs of items originally specified and proposed substitutions.

.2 Proposals will be considered by Consultant if:

.1 Products selected by tenderer from those specified, are not available, or

.2 Delivery date of products selected from those specified would unduly delay completion of Contract.

.3 Alternative products to those specified, which are brought to attention of, and considered by Consultant as equivalent to those specified and will result in credit to Contract amount.

.4 Should proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on project. Pay for design or drawing changes required as a result of substitution.

.5 Amounts of all credits arising from approval of substitutions will be determined by Consultant and Contract price will be reduced accordingly. No substitutions will be permitted without prior written approval of Consultant.

1.5 QUALITY OF PRODUCTS

.1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected,

regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.6 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.7 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.8 TRANSPORTATION

.1 Pay costs of transportation and handling of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor to unload, handle and store such products.

1.9 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Consultant.

.9 Touch-up damaged factory finished surfaces to Consultant's satisfaction. Use touch-up

materials to match original. Do not paint over name plates.

1.10 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in Contract Price or Contract Time.

1.11 CO-ORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.12 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, color and finish as base metal in which they occur.

.2 Prevent electrolytic action between dissimilar metals.

.3 Use non-corrosive fasteners, anchors and spacers for securing exterior work.

.4 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood plugs not acceptable.

.5 Keep exposed fastenings to minimum, space evenly and lay out neatly.

.6 Fastenings which cause spalling or cracking are not acceptable.

.7 Obtain Consultant's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z166-1975, and observe restrictions in Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.13 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur and resilient washers with stainless steel.

1.14 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Consultant of conflicting installation. Install as directed.

1.15 CONCEALMENT

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.16 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.17 CONSTRUCTION EQUIPMENT AND PLANT

.1 On request, prove to the satisfaction of Consultant that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

.2 Maintain construction equipment and plant in good operating order.

END OF SECTION

1 General

1.1 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.

.2 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.3 Provide on-site containers for collection of waste materials and debris.

.4 Provide and use clearly marked separate bins.

.5 Remove waste and debris from site and deposit in waste container at end of each working day.

.6 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.

.7 Store volatile waste in covered metal containers, and remove from premises at end of each day.

.8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 CLEANING DURING CONSTRUCTION

.1 Maintain work site in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.

.2 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

.3 Immediately clean all dust, dirt, smears, scuffs and soiled surfaces in lobbies, corridors, stairwells and within tenant occupied areas resulting from use by workers.

.1 Perform cleaning, dusting and washing operations, carpet vacuuming (including shampooing if deemed required by Consultant) and floor washing as necessary to thoroughly clean all soiled surfaces.

1.3 FINAL CLEANING

.1 Prior to final review, remove surplus products, tools, construction machinery and equipment.

.2 Remove waste products and debris.

.3 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.4 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls and floors.

.5 Clean lighting reflectors, lenses, and other lighting surfaces.

.6 Vacuum clean and dust building interiors, behind grilles, louvers and screens.

.7 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.8 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.9 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.10 Remove dirt and other disfiguration from exterior surfaces.

.11 Clean and sweep roofs, gutters, area ways, and sunken wells.

.12 Sweep and wash clean paved areas.

.13 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.14 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.15 Remove snow and ice from access to construction.

END OF SECTION

1 General

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection:

.1 Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request Consultant's Inspection.

.2 Consultant's Inspection:

.1 Consultant, Owner and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and are fully operational.

.4 Certificates required by Boiler Inspection Branch have been submitted.

.5 Systems have been commissioned.

.6 Operation of systems have been demonstrated to Owner's personnel.

.7 Work is complete and ready for Final Inspection.

.4 Final Inspection:

.1 When items noted above are completed, request final inspection of Work by Owner and Consultant. If Work is deemed incomplete by Consultant complete outstanding items and request re inspection.

.5 Declaration of Substantial Performance:

.1 When Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article for specifics to application.

.6 Commencement of Lien and Warranty Periods:

.1 Date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment:

.1 When Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2. If Work is deemed incomplete by Owner, complete outstanding items and request re inspection. Cost of re inspection will be deducted from final payment.

.8 Payment of Holdback:

.1 After issuance of Certificate of Substantial Performance of Work, submit an application of payment of holdback amount in accordance with CCDC2.

1.2 CERTIFICATE OF SUBSTANTIAL PERFORMANCE

.1 Upon approval, a Certificate of Substantial Performance will be issued to the Owner by the Consultant with a copy delivered to the Contractor. This Certificate will take the form shown in Section 01 77 00 - Closeout Procedures.

.2 The Certificate of Substantial Performance will establish the date of the Consultant's inspection as the date of Substantial Performance of the Contract, and will commence

the required 60-day period before release of the lien holdback amount.

.3 During the 60-day period, Contractor shall continue to complete the work.

.4 The Contractor shall immediately deliver to the Consultant specified submissions upon receipt of the Certificate of Substantial Performance.

1.3 ESTABLISHMENT OF WARRANTIES

.1 Warranties shall commence at date of Substantial Performance of the Work.

1.4 CERTIFICATE FOR PAYMENT OF LIEN HOLDBACK AMOUNT

.1 The Contractor shall submit statement and supporting documents for application of Release of Lien Holdback amount. These documents include those listed in Paragraph 2.2.2 and 2.2.3 and the Statutory Declaration Form CCDC 9A.

.2 Within five working days of receipt of application for Release of Lien Holdback amount and if approved, the Consultant will prepare a Certificate for Payment of the Lien Holdback amount. This Certificate dated on the day following termination of the 60 day period will be issued to the Owner with a copy delivered to the Contractor.

.3 The Owner will before the date of this Certificate ensure that no liens related to the Contract are registered and that no notice of liens has been received at the end of the 60-day period.

.4 Should no liens exist, the Lien Holdback will be due and payable one day after termination of the 60-day period in the amount indicated on the approved application for Certificate of Substantial Performance.

.5 The Owner will review jointly with the Contractor's Insurance related to the Contract before the 60-day period is terminated to ensure that all parties are adequately covered.

1.5 TOTAL PERFORMANCE

.1 The Contractor shall inspect the work to establish its completion in accordance with the Contract Documents and when satisfied of this completion request of the Consultant a final inspection.

.2 The Consultant will compile a final deficiency list at this inspection and issue it to the Contractor and Owner.

.3 The Contractor shall correct final deficiencies before a date agreed upon by the Contractor and Consultant.

.4 When the Contractor has satisfied himself that these corrections have been completed in a satisfactory manner by his inspection, he shall schedule a re-inspection by the Consultant, and the Owner's representatives if required, within five working days of the Contractor's request.

.5 When the Consultant is satisfied that all deficiencies have been rectified and the work is complete, the Contractor shall submit an application for the final progress payment.

.6 When "seasonal deficiencies", as determined by the Owner and/or Consultant exist, a sum of money will be withheld in accordance with the requirements of CCDC2-GC5.8.

1.6 WARRANTY PERIOD

.1 The Owner will advise the Consultant of defects observed during Warranty periods.

.2 The Consultant will notify the Contractor of these defects and request him to remedy the defects in accordance with the Contract Documents.

.3 Thirty days before expiration of Warranties the Owner's representatives, the Consultant and the Contractor will review the work as arranged by the Contractor noting defects of products and workmanship.

.4 The Contractor shall immediately remedy such noted defects.

1.7 CERTIFICATE

.1 CONTRACTOR: _____

PROJECT: _____

DATE OF SUBSTANTIAL PERFORMANCE: _____

.1 Substantial Performance Inspection for above described work was carried out _____ (date) by:

.1 For Owner _____
.2 For Consultant _____
.3 For Contractor _____

.2 The items which are not in accordance with the Plans and Specifications and require correction under the Conditions of the Contract Agreement are listed as an attachment to this Document.

CONTRACTOR'S CERTIFICATION
I hereby Certify that the work has been executed in accordance with the Plans and Specifications with the exception of deficiencies listed herewith. The undersigned hereby agrees that notwithstanding the generality of the foregoing, the acceptance of the works shall not prejudice any rights of the Owner or affect any liabilities of the undersigned Contractor pursuant to the provisions of the Contract.

_____
Contractor Date

OWNER'S ACCEPTANCE
I hereby accept the work on behalf of the Owner providing that the deficiencies listed herewith are completed. This acceptance is not to be construed as relieving the Contractor from the responsibility to correct other defects in the work, whether latent or patent, as may become apparent within the guarantee/ warranty period. This acceptance is made without prejudice to the rights of the Owner or to the liabilities of the Contractor which may arise and/or continue after acceptance of the work.

_____
Owner Date

CONSULTANT'S DECLARATION
Based on periodic visits to the job site and general familiarity with the progress of the work, I declare that, to the best of my knowledge, information and belief, construction is proceeding in accordance with the intent of the design and in general compliance with the plans and specifications, with the exception of the deficiencies listed herewith.

_____
Consultant Date

1.8 DEFICIENCIES

.1 The following is a list of deficiencies to be corrected. This acceptance is not to be construed as relieving the Contractor from the responsibility of correcting other defects in the work as may become apparent during the Guarantee/Warranty Period.

.1 _____
.2 _____
.3 _____

END OF SECTION

1 General

1.1 SECTION INCLUDES

.1 Project Record Documents as follows:
- .1 As-Built drawings;
- .2 As-Built specifications;
- .3 Reviewed shop drawings.

.2 Operations and Maintenance data as follows:
- .1 Operations and Maintenance Manual;
- .2 Maintenance Materials;
- .3 Spare Parts;
- .4 Special Tools.

1.2 PROJECT RECORD DOCUMENTS

.1 Consultant will provide two white print sets of contract drawings and two copies of Specifications Manual specifically for "as-built" purposes.

.2 Maintain at site one set of the contract drawings and specifications to record actual as-built site conditions.

.3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Consultant at any time during construction.

.4 As-Built Drawings:
- .1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of project and prior to interim inspection, neatly transfer notations to second set (also by use of red ink). Submit both sets to Consultant. All drawings of both sets shall be stamped "As-Built Drawings" and be signed and dated by Contractor.
- .2 Show all modifications, substitutions and deviations from what is shown on the contract drawings or in specifications.
- .3 Record following information:
  - .1 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;
  - .2 Field changes of dimension and detail;
  - .3 Location of all capped or terminated services and utilities.
  - .4 Chases for mechanical, electrical and other services;
  - .5 Ceiling and floor elevations;
  - .6 Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;
  - .7 Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;
  - .8 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;
  - .9 Any details produced in the course of the contract by the Consultant to supplement or to change existing design drawings must also be marked-up and dimensioned to reflect final as-built conditions and appended to the as-built drawing document;
  - .10 All change orders issued over the course of the contract must be documented on the finished as-built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.5 As-built Specifications: legibly mark in red each item to record actual construction,

including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.

.2 Changes made by Addenda and Change Orders.

.3 Mark up both copies of specifications; stamp "as-built", sign and date similarly to drawings as per above clause.

.6 Maintain As-built documents current as the contract progresses. Consultant will conduct reviews and inspections of the documents on a regular basis. Frequency of reviews will be subject to Consultant's discretion. Failure to maintain as-builts current and complete to satisfaction of the Consultant shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

1.3 REVIEWED SHOP DRAWINGS

.1 Compile full set of shop drawings and product data reviewed on project and incorporate into Operations and Maintenance Manual. Supply number of shop drawing sets equal to the required number of final Operations and Maintenance manuals.

.2 Submit shop drawing sets at same time and as part of the contents of the Operation and Maintenance manuals specified in this section.

1.4 OPERATIONS AND MAINTENANCE MANUALS

.1 Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.

.2 Manual Language: final manuals to be in English language.

.3 Number of copies required:

.1 Submit two (2) draft copies of the manual for review and inspection by Consultant. Make revisions and additions as directed and resubmit.

.2 Upon review and acceptance by Consultant, submit two (2) final chard copies, and one (1) electronic copy. Initial copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.

.4 Submission Date: submit complete operation and maintenance manual to Consultant 3 weeks prior to application for Interim Certificate of Completion of project.

.5 Manual Binding & Format:

.1 Organize data in the form of an instructional manual.

.2 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.

.3 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine and face pockets.

.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Where multiple binders are needed, correlate data into related consistent groupings. Identify contents of each binder on spine.

.6 Organize and divide data into sections the same as the Masterformat Divisions numerical order of contract specifications and thereafter subdivided into various equipment or building systems, under Section numbers and sequence of Table of Contents.

.7 Material: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each separate product or system within each section and with typed description of product and major component parts of equipment.

.8 Text: Manufacturer's printed data, or typewritten data. Do not hand write.

.9 Drawings, diagrams and manufacturers' literature must be legible, determined solely by the Consultant. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.6 Manual Contents:

.1 Cover sheet containing:

.1 Date submitted.

.2 Project title, location and project number.

.3 Names and addresses of Contractor, and all Sub-contractors.

.2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.

.3 List of maintenance materials.

.4 List of spare parts.

.5 List of special tools.

.6 Original or certified copy of Warranties and Guarantees.

.7 Copies of approvals, and certificates issued by Inspection Authorities.

.8 Copies of reports and results from tests designated as Contractor's responsibilities.

.9 Product Information Data on all materials, equipment and systems as specified in individual sections of the specifications to include:

.1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.

.2 Nameplate information including equipment number, make, size, capacity, model number and serial number.

.3 Parts list.

.4 Installation details.

.5 Operating instructions.

.6 Maintenance instructions for equipment.

.7 Maintenance instructions for finishes.

.7 Shop drawings:

.1 Bind one complete set of reviewed shop drawings into each copy of operations and maintenance manual.

.2 Bind the shop drawings in a manner such that they correspond with the specification section they relate to.

.3 Where large quantity of data is supplied due to size of project, fold and bind professionally into separate correctly sized binder.

.8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:

.1 Description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed color coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include seasonal and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment,

adjusting, balancing, and checking instructions.

.6 Servicing and lubrication schedule, and list of lubricants required.

.7 Manufacturer's printed operation and maintenance instructions.

.8 Sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's coordination drawings, with installed color coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports.

.15 Additional requirements as specified in individual specification sections.

.9 Materials and Finishes Maintenance Data:

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and color and texture designations.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.5 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

.1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.

.2 Tag all items with associated function or equipment.

.3 Provide items of same manufacture and quality as items in Work.

.4 Deliver to site in well packaged condition. Store in location as directed by Consultant.

.5 Clearly mark as to contents indicating:

.1 Part number.

.2 Identification of equipment or system for which parts are applicable.

.3 Installation instructions or intended use as applicable.

.4 Name, address and telephone number of nearest supplier.

.6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

.7 Turnover to Facility Manager and obtain signature. Include receipt with Maintenance Manual.

1.6 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to site; place and store.

.4 Receive and catalog all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Turnover to Facility Manager and obtain signature. Include receipt with Maintenance Manual.

1.7 SUBMISSION

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned after final inspection, with Consultant's comments.

.3 Revise content of documents as required prior to final submittal.

.4 Two (2) weeks prior to Substantial Performance of the Work, submit to the Consultant, two (2) final hard copies and one (1) electronic final copy of operating and maintenance manuals in English.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

.9 Failure to deliver maintenance materials, spare parts, special tools and as-builts will delay progress payments.

1.8 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

.1 date of submission; names,

.2 addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;

.3 schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control and Section 01 77 00 - Closeout Procedures.

.6 Training: Refer to Section 01 91 13 - General Commissioning Requirements.

1.9 AS-BUILTS - RECORDING ACTUAL SITE CONDITIONS

.1 Record information on 2 sets of white print, opaque drawings, and in copy of Project Manual.

.2 Provide felt tip marking pens, maintaining separate colors for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.
.7 References to related shop drawings and modifications.

.5 Specifications: legibly mark each item to record actual construction, including:
.1 Manufacturer, trade name, and catalog number of each product actually installed, particularly optional items and substitute items.
.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, required by individual specifications sections.

1.10 STORAGE, HANDLING AND PROTECTION

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

1.11 WARRANTIES AND BONDS

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
.2 List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
.3 Obtain warranties and bonds, executed in duplicate by Subcontractors, suppliers, and manufacturers where specifically requested by individual specification sections, within ten days after completion of the applicable item of work.
.4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
.5 Verify that documents are in proper form, contain full information, and are notarized.
.6 Co-execute submittals when required.
.7 Retain warranties and bonds until time specified for submittal.

END OF SECTION

1 General

1.1 COMMISSIONING OBJECTIVE

.1 Perform commissioning activities in order to achieve the following objectives:

.1 Collect data on equipment and systems supplied; and to document their installation;

.2 Conduct checks and tests on fully installed building component, equipment, systems and integrated systems to:

.1 Verify whether they operate in accordance with requirements of Contract Documents;

.2 Verify performance against design criteria and user requirements and measure peak capacities;

.3 Prepare a Building Management Manual (BMM) which contains operations and maintenance data, as-built record documents, commissioning reports, training data and other critical information for future use by Facility operational staff;

.4 Ensure transfer of knowledge on the operations, maintenance and management of the Facility to Owner and Operational personnel by means of appropriate training.

.2 Commissioning activities conducted by Owner and/or Consultant does not replace checks, tests, adjustments, balancing and other performance verification responsibilities to be performed by General and all Sub-Contractors as part of the work and as specified in other sections of the Specifications.

1.2 DEFINITIONS

.1 For the purpose of this contract, the following terms, used in this section, as they relate directly or indirectly to the commissioning process, shall be deemed to have the meaning as defined hereafter.

.2 Commissioning Process: a planned program of tasks, activities and procedures carried out systematically during the Construction and Occupancy Stages in accordance with the commissioning objectives, specified in clause 1.2 above, to:

.1 Verify whether the fully installed equipment, systems and integrated systems operate in accordance with Contract Documents, design criteria, manufacturers' recommendations and;

.2 Ensure that appropriate documentation is compiled to effectively train Operation and Maintenance staff and prepare a comprehensive Building Management Manual (BMM).

.3 Commission (ie: to commission a building component or system): tests and checks conducted on all systems and integrated systems of Facility; carried out only after they are fully installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.

.1 Contractor provides assistance during this process by operating equipment and systems, by troubleshooting and making adjustments as may be required.

.2 Systems are run under their full operation and under various modes to determine if they function correctly, consistently, at peak efficiency and interactively with each other as intended in accordance with Contract Documents, design criteria and manufacturers' recommendations.

.3 During these checks, adjustments may be made enhancing performance to meet environmental or user requirements.

.4 Contractor: means the Contractor, however it also refers to any personnel from Subcontractors, including the controls subcontractors, suppliers and certified manufacturer techncians with whom the Contractor contracts or obtains services for the performance of work and designated commissioning duties.

.5 Consultant: persons from the civil, architectural, mechanical and electrical design disciplines of the consultant firm(s) engaged by Owner to prepare the final design and contract documents.

.6 Design Criteria: All those factors included in the design of a Facility prescribed by the tenant needs or as determined by Consultant as necessary in order to meet all Facility functional and user operational requirements.

.7 Installation/Start-up Checks:(sometimes referred to as pre-functional checks). Checks and inspections to be performed by Contractor during the pre-start-up and start-up of a particular equipment or system component.

.1 Checklist sheets are to be produced, which include but are not limited to the following data:

.1 Product manufacturer's installation instructions and recommended checks and;

.2 Special procedures as specified in relevant sections of Specifications;

.3 Other items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.2 Standard Installation/Start-up Checklist sheets prepared by equipment manufacturer are acceptable for use. Supplement with additional data representative of specific project conditions as deemed required by Consultant.

.3 Use Checklist sheets for all equipment installation. Document in writing on checklist the various checks made, deficiencies noted and corrective action taken.

.4 Installing Sub-Contractor and/or certified manufacturers technicians, to sign Checklist sheets upon completion, certifying that stated checks and inspections have been performed.

.8 Performance Verification: (sometimes referred to Functional Testing) checks, running dynamic tests and adjustments carried out by Contractor on equipment and systems, upon their installation, to ensure they operate correctly, efficiently and function independently and interactively with other systems as intended in accordance with contract documents and manufacturer's recommendations.

.1 Performance Verification shall not be considered part of the commissioning process. It is however considered an essential and integral part of Contractor's responsibilities in the equipment installation process which must be stringently conducted, successfully completed and approved by Owner before a piece of equipment or system is considered fully installed and functional.

.2 Facility components and systems will not be commissioned until performance verification has been completed and approved.

.9 Product Information (PI Data): a compilation of data gathered on a particular piece of equipment, typically produced by manufacturer, which includes nameplate information, installation/startup instructions, parts list, operating instructions, maintenance guidelines and other pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of such equipment. This documentation is included in the Building Management Manual (BMM).

1.3 CONTRACTOR'S COMMISSIONING RESPONSIBILITIES

.1 General:

.1 Coordinate the participation of the various subcontractors, their specialists and manufacturer's certified technicians in providing the commissioning activities described below.

.2 Workers and manufacturer's certified technicians are to be knowledgeable and qualified to interpret system functions and intended design criteria.

.3 Develop a commissioning schedule.

.4 Notify Consultant in writing when entire system is ready to be commissioned. Give fourteen (14) calendar day notice.

.5 Commissioning of Facility and designated systems will only commence once that required documentation has been received and all installed equipment and systems have undergone successful performance verification.

.6 Be aware that inspection certificate will only be issued by Consultant when:

.1 All commissioning documentation has been received, reviewed for suitability and approved by Consultant;

.2 Designated facility components and systems have been commissioned and;

.3 Training has been completed and signed off on.

.7 Non-Conformance of Performance Verification Requirements:

.1 Should incorrectly installed or malfunctioning equipment, system components or associated controls be found while Facility is being commissioned, Contractor shall be required to re-verify 100% of all equipment and components within the non-functional system, including other related system as deemed required by Consultant, to correct deficiencies and ensure effective performance of the fully functional system as designed.

.2 Costs to correct work and any additional tests or inspections, as deemed required by Consultant, to determine acceptability and proper performance of such items to be paid for by Contractor.

.1 Above costs held against Contractor will be as financial penalties in the form of progress payment reductions or holdback assessments.

.2 Prior to Facility being Commissioned:

.1 Submit commissioning documentation as specified in Clause 1.8 for use during commissioning.

.2 Carryout pre-start-up and start-up of equipment.

.3 Conduct performance verification on all installed equipment and systems. Ensure they are fully functional.

.4 Address deficiencies in Work identified during performance verification of equipment and systems. Conduct additional performance verification checks and tests to ensure acceptability of Work.

.5 Arrange for special tools, devices and services, identified at commissioning meeting(s), as deemed required to assist with commissioning.

.6 Provide access ladders, two way radios and other equipment required by Commissioning Agents to facilitate commissioning.

.3 When Facility is being Commissioned:

.1 Provide qualified tradespersons to be present at site to assist commissioning activity.

.2 Assist in commissioning architectural and structural building component, and mechanical, electrical and civil systems specified and as follows:

.1 Operate designated building component, mechanical/electrical equipment and system under all modes of operation and conduct checks and tests as directed by Consultant.

.2 Check and verify that building component, equipment, systems and integrated systems, including their controls, are functioning and responding correctly and interactively with each other.

.3 Test systems independently and then in unison with other related systems.

.4 Conduct all Commissioning checks and tests in presence of and

witnessed by Consultant.

.3 Specific procedures used to commission Facility may be provided by Consultant which includes:

.1 Sequential order of building component and system to be tested.

.2 Running systems under various anticipated modes and demands (example: high and low cooling or heating loads, duplicating outside temperature conditions, fire alarm and power failure conditions etc...).

.3 Running building controls through all sequences of operation to verify and confirm that equipment and systems are responding as designed and intended.

.4 Operating designated equipment at peak capacities, recording output data against design criteria.

.4 Run component or systems as long as necessary to effectively commission all items as deemed required by Consultant.

.5 Monitor equipment and system responses.

.6 Record test results, measurements and other data.

.7 Assist in analyzing results. Identify system deficiencies and components not responding as intended.

.8 Correct deficiencies and system non-conformance issues. Adjust, calibrate or fine tune system components as required. Debug system software as may be required.

.9 Retest systems when directed to confirm compliance.

.4 Upon completion of Facility Commissioning:

.1 Provide training to Maintenance & Operational personnel as specified in clause 1.7 below.

.2 Turn over any filled-in checks sheets, reports or signed and dated certificates resulting from commissioning.

.5 During Warranty period at Occupancy Stage:

.1 Fine tune components, systems and integrated systems and continue system debugging to optimize Facility performance.

.2 Rectify warranty issues.

.3 Submit written report to Consultant.

.1 Indicate results noted and corrective action taken.

.2 Note improvements made to operating parameters and control settings.

.3 Recommend modifications deemed advisable to improve performance, environmental conditions, energy consumptions and other issues.

.4 Consultant to be present during such work.

1.4 COMMISSIONING MEETINGS

.1 Convene commissioning meetings following project meetings: as required through the project to coordinate commissioning requirements.

.2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to commissioning .

.3 Continue commissioning meetings on regular basis until commissioning deliverables have been addressed.

.4 At 60% construction completion stage. Contractor to call a separate commissioning scope meeting to review progress including Consultant, discuss schedule of equipment start-up activities and prepare for commissioning . Issues at meeting to include:

.1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.

.2 Determine the degree of involvement of trades and manufacturer's

representatives in the commissioning process.

.5 Thereafter commissioning meetings to be held until project completion and as required during equipment start-up and functional testing period.

.6 Meeting will be chaired by Contractor, who will record and distribute minutes within 3 business days.

.7 Ensure Subcontractors and relevant manufacturer representatives are present at subsequent commissioning meetings and as required.

1.5 COMMISSIONING SCHEDULE

.1 Address commissioning activities within the construction work schedule. Clearly identify allocated time period for commissioning and training activities.

.2 Provide a commissioning schedule at the 60% construction stage in order that specific issues and individual details of commissioning can be reviewed, discussed and dealt with from that period onward to project completion. Submit updates thereafter,

.3 Indicate allocated time period and anticipated dates for:

.1 Submission of commissioning documentation, including O&M Manuals and Verification Reports

.2 Equipment and system start-up and performance verification, making them ready to be commissioned.

.3 Allocated period to commission designated building components and systems.

.4 Training period.

.5 Work during Warranty period.

.4 Submit schedule to Consultant for review.

.5 Day-to-day operations are to be maintained throughout the facility during the work and activities which may be potentially disruptive are to be included in the schedule. After hours and / or overtime work may be required to facilitate day-to-day operations throughout the facility and should be included in the schedule.

1.6 INSTRUCTORS

.1 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:

.1 Start-Up, operation, shut-down of equipment, components and systems.

.2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.

.3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.

.2 Contractor and equipment manufacturer to provide instruction on:

.1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

1.7 TRAINING OBJECTIVES

.1 Training to be detailed and duration to ensure:

.1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.

.2 Effective on-going inspection, measurements of system performance.

.3 Proper preventive maintenance, diagnosis and trouble-shooting.

.4 Ability to update documentation.

.2 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.8 TRAINING MATERIALS

.1 Contractor to be responsible for content and quality.

.2 Training materials to include:
  .1 "As-Built" Contract Documents.
  .2 Operating Manual.
  .3 Maintenance Manual.
  .4 Management Manual.
  .5 Testing, Adjusting and Balancing, Performance Verification Reports and Certificates.
.3 Training materials to be in a format that permits future training procedures to same degree of detail.
.4 Supplement training materials:
  .1 Multimedia presentations or other supplemental digital information.
  .2 Manufacturer's training videos.
.5 Equipment models.

1.9 RESPONSIBILITIES

.1 Be responsible for:
  .1 Implementation of training activities,
  .2 Coordination among instructors,
  .3 Quality of training, training materials,
.2 Consultant will evaluate training and materials.
.3 Upon completion of training, provide written report, signed by Instructors, witnessed by Consultant.
  .1 Report to include a list of all attendees.

1.10 TRAINING CONTENT

.1 Training to include demonstrations by Instructors using the installed equipment and systems.
.2 Content includes:
  .1 Review of facility and occupancy profile.
  .2 Functional requirements.
  .3 System philosophy, limitations of systems and emergency procedures.
  .4 Review of system layout, equipment, components and controls.
  .5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
  .6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
  .7 Maintenance and servicing.
  .8 Trouble-shooting diagnosis.
  .9 Inter-Action among systems during integrated operation.
  .10 Review of O&M documentation.
.3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

1.11 VIDEO-BASED TRAINING

.1 Manufacturer's videos to be used as training tool with Consultant's review and written approval 3 months prior to commencement of scheduled training.
.2 On-Site training videos:
  .1 Record training sessions for use during future training.
  .2 To be performed after systems are fully commissioned.
  .3 Organize into several short modules to permit incorporation of changes.

.3 Production methods to be professional grade with good audio and video quality.

.4 Video to be recorded digitally and submitted on CD or EEProm Drive, in accordance with Section 01 33 00 - Submittal Procedures.

1.12 TRAINING

.1 Commence process of familiarizing O&M personnel in the early stages of work on purpose and operation of various equipment and systems. Continue process throughout the entire construction duration.

.1 Provide informal briefings during occasional site visits, at planned commissioning meetings and during the final commissioning site activities.

.2 Conduct formal demonstration and training sessions only after all identified systems have been commissioned and Consultant has given approval to proceed with the training process.

.3 Provide training and demonstration on equipment, sub-systems, systems and integrated systems.

.4 Carryout training in accordance with requirements of Section 01 91 13 - General Commissioning Requirements.

.5 Submit written agenda of training session(s) 4 weeks before hand for review by Consultant.

.6 Submit training manuals for review 2 weeks prior to actual training.

.7 Ensure required tools and O&M Manuals are on site for training and system demonstration.

.8 As a minimum, the training sessions to cover the following information:

.1 Introduction.

.2 Description of the system with factory personnel being involved at appropriate times.

.3 Instructions on start-up procedures including seasonal procedures, system check-lists and emergency procedures.

.4 Operational procedures, including occupancy considerations, seasonal change-over, manual and automatic operations and emergency modes.

.5 Instruction on system shutdowns, including checklists.

.6 Instructions on all aspects of system maintenance, including routine servicing, lubrication, overhaul and factory servicing.

.7 Information concerning the scope of warranties and their use.

.8 A description of spare parts in stock and their service.

.9 A description of normal tools required for servicing the systems/equipment.

.9 Submit typewritten record of training sessions given and list of attendees. Use forms of format approved by Consultant.

1.13 DESCRIPTION

.1 Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of final inspection.

.2 Owner will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

1.14 QUALITY CONTROL

.1 When specified in individual Sections require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

.2 Obtain signature from attendees and provide a copy in the Building Maintenance Manual.

1.15 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Consultant's approval.

.3 Submit reports and certificates within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Record signatures of all attendees.

.5 Give time and date of each demonstration, with list of persons present.

1.16 CONDITIONS FOR DEMONSTRATIONS

.1 Equipment has been inspected and put into operation in accordance with respective applicable Sections.

.2 Testing, adjusting, and balancing has been performed and equipment and systems are fully operational.

.3 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.17 PREPARATIONS

.1 Verify that conditions for demonstration and instructions comply with requirements.

.2 Verify that designated personnel are present.

1.18 DEMONSTRATION AND INSTRUCTIONS

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, sequencing, winter/summer operating, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location.

.2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.

.3 Review contents of manual in detail to explain aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

1.19 COMMISSIONING DOCUMENTATION

.1 Submit the following documentation for use during commissioning and for incorporation thereafter into a Building Management Manual (BMM).

.2 Operations and Maintenance Manuals, Project Record Documents and other data as specified in Section 01 78 00 - Closeout Submittals. Data to include:

.1 Equipment Product Information (PI Data) complete with:

.1 Nameplate info,

.2 Installation instructions,

.3 Operating procedures and

.4 Maintenance guidelines.

.5 Reviewed shop drawings,

.6 As-built record drawings and Specifications.

.2 Completed Installation/Start-up Checklist sheets used.

.3 Copy of any static and dynamic test and reports conducted.

.4 Reports as specified in various trade sections.

.3 Documentation to include detailed information and number of copies as specified for maintenance manuals of Section 01 78 00 - Closeout Submittals.

END OF SECTION

1 General

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings; submit drawings stamped and signed by Contractor as reviewed.

.3 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.4 Shop drawings and product data 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 current model production.
- .5 Certification of compliance to applicable codes.

.5 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

.6 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Electronic copies of Operation and maintenance manual approved by, and final copies deposited with, Consultant before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data to 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.
- .5 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
- .6 Approvals:
  - .1 Submit electronic copy of draft Operation and Maintenance Manual to Consultant for approval four (4) weeks prior to Substantial Completion. Submission of individual data will not be accepted unless directed by Consultant.
  - .2 Make changes as required and re-submit as directed by Consultant.
- .7 Additional data:
  - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations

and instructions.

.8 Site records:

.1 Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of testing, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm (1/2 inch) high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).

.3 Submit to Consultant for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing using as-built drawings.

.5 Submit completed electronic and reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.3 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:

.1 One glass for each gauge glass.

.2 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.

.3 One trap per 10 trap used each size.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

.3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse in accordance with Section 01 74 00 - Cleaning & Waste Management.

1.5 DEFICIENCY LIST

.1 Lists of work deficiencies will be issued at any time. Rectify immediately work to satisfaction of Consultant.

.2 Submit requests for takeover inspection in writing.

1.6 SITE SERVICES

.1 Known Services:
  .1 Drawings indicate known existing facilities.
  .2 Locate all known services prior to initiating work.
  .3 Consult with and follow Engineer's written instructions before commencing work.
  .4 Once location has been set out, assume responsibility for all damage during installation. Bear cost of repairs and replacements made necessary.
.2 Unknown Services:
  .1 Locate all services whose exact location is not known.
  .2 Avoid damaging or displacing existing services where exact position is not known. Should any damage occur, advise Engineer in writing for remedial instructions.

1.7 CO-ORDINATION

.1 Contractors are to note that space is limited and close coordination of the Work of all Trades is required. Before fabrication or installation begins, the Contractor must do the following:
  .1 The General Contractor is responsible for leading the interference coordination meeting. The Division 23 Ventilation Contractor is to provide an individual with sufficient experience to manage the coordination of work with all other Trades.
  .2 The Division 23 Contractor is responsible for coordinating with all other Mechanical and Electrical Trade Contractors, to minimize conflicts and poor placement of installed equipment and material; and is responsible for providing active input and coordination with all other Trades.
  .3 Extra costs associated with having to redo or relocate services due to non-participation in or non-conformance with "Interdisciplinary Coordination" process by Division 23 Ventilation Contractor, shall be by Division 23 Ventilation Contractor.
  .4 The interdisciplinary coordination process is to be collectively managed by the General Contractor and all the Mechanical and Electrical Contractors with only limited technical support by the Consultant. The Consultant's role will be limited to answering Requests for Information (RFI) and providing review of any coordination sketches prepared by the Mechanical and Electrical Contractors. Additionally the General Contractor's role will be that of providing review, overview and direction.
  .5 The Mechanical and Electrical systems are to be coordinated and work with the available space above the ceiling plane.
.2 The order of precedence in congested area's shall be:
  .1 Drainage piping;
  .2 Trunk ducts;
  .3 Sprinkler mains;
  .4 Heating mains;
  .5 Main conduits;
  .6 Water piping mains;
  .7 Branch ducts, piping and conduits.
.3 The location of equipment / outlets shall be in accordance with the Architects reflected ceiling plan. If an outlet is not shown there or is in conflict with work of another Trade, obtain direction from the Consultant before proceeding.
.4 Relocation of branch ducts, pipes or outlets within 3m of location shown on drawings to facilitate coordination with other Trades, shall not be considered extra work.
.5 Locate distribution systems, equipment and materials to provide minimum interference and maximum usable space.
.6 Where interference occurs, Consultant shall approve location of equipment and

materials regardless of installation sequence.

1.8 REGULATIONS

.1 Comply with most stringent requirements of NBC, Provincial and Municipal regulations and by-laws, specified standards, codes and these specifications and plans. Practices contained in these standards or standards suggested or recommended by referenced organizations, are to be taken as minimum requirements.

.2 Furnish certificates confirming work installed conforms to requirements of authorities having jurisdiction.

1.9 DRAWINGS

.1 Drawings:

.1 Are not intended to show structural details or architectural features.

.2 Are not to be scaled.

.3 Except where dimensioned, the drawings indicate general mechanical layouts only.

.2 Provide field drawings to indicate relative position of various services when required by Consultant. Obtain Consultant's approval before commencing work.

.3 As-Built (Record) Drawings:

.1 Maintain as specified in Section 01 78 00 - Closeout Submittals.

1.10 ENERGY CONSUMPTION

.1 Consultant may reject equipment submitted for approval on basis of performance or energy consumed or demanded.

1.11 APPROVAL OF EQUIPMENT

.1 When equipment list has been reviewed by Consultant, conform to Section 01 33 00 - Submittal Procedures for items shown on equipment list and all other materials and equipment necessary to complete requirements of mechanical systems. This includes equipment named under Standard of Acceptance.

1.12 BREAKDOWN OF COSTS

.1 Price will be broken down at tender time as required by depository instructions.

.2 Immediately upon notice of contract award, further break down tender price to the following minimum requirements:

.1 Sprinkler;

.2 Controls;

.3 Underground Plumbing;

.4 Aboveground Plumbing;

.5 Plumbing Equipment;

.6 Heating;

.7 Heating Equipment;

.8 Ventilation;

.9 Ventilation Equipment.

1.13 APPROVED EQUALS

.1 Submission for an Approved Equal is to contain literature and descriptive information with full specification data. Where the requested item is contained on a printed document with other items, it is to be clearly identified.

.2 The Consultant will not search catalogs, e-mails or websites or contact suppliers to obtain the necessary information for proper evaluation.

.3 Submission by Bidders for evaluation of products requested to be considered as equal

must be submitted to Consultant no less than 5 working days prior to closing of tenders. No consideration will be given to approving equals after the close of tenders, except when the specified product is found to have been discontinued by the manufacturer.

.4 The consideration of a product(s) for Approved Equal status and the acceptance of individual products as approved equals is entirely at the discretion of the Consultant.

.5 When products are given Approved Equal status these products may, at the discretion of bidders, be carried in their tender price, provided that ALL costs related to changes to the contract work required to incorporate the Approved Equal product are included in the tender price.

.6 The acceptance of a product by the Consultant as an "Approved Equal," even where not specifically indicated on the Approved Equals listing in the Addendum, is to be understood as being contingent upon the provision of the particular series, model and/or type, complete with all options to meet the specified requirements of the Acceptable Material product.

.7 Products given approved status that are found, during construction period, to not have all specified options available, or do not fit in the the available space, or to have discontinued production of same, or to have made other design changes since the time of approval, will not be accepted for use on this project, except when financial compensation has been mutually agreed upon between the Contractor and the Owner and deemed acceptable by the Consultant. Compensation will not be paid to the Contractor for products acknowledged by the Consultant to be superior to the specified products.

.8 The Contractor is cautioned that all layouts on the Mechanical drawings are based on the specified equipment. Any changes necessary, using acceptable materials will be done at the Contractor's expense. Furthermore, if it is found that the provisions made regarding space conditions are not met, the right is reserved by the Consultant to require installation of the equipment used on the layout.

1.14 PACKAGED EQUIPMENT

.1 The Contractor shall note that whenever package equipment is specified, it is intended that this equipment shall be a complete package with all necessary accessories to allow for fail safe automatic operation.

.2 These accessories shall include all necessary starters, disconnects, relays, transformers, pressure switches, sensors, timers, etc. Where subject to the weather, the device shall be enclosed in a "weatherproof" enclosure.

.3 The Contractor shall be responsible for checking with the supplier of the equipment to ensure that the package equipment is complete with all necessary accessories. The Contractor shall also determine which accessories are factory mounted and which ones are shipped loose with the equipment. The Contractor shall include in his tender an amount for all necessary wiring and piping etc., required to incorporate loose pieces of equipment into the job at no additional cost to the Owner.

.4 The Contractor shall note that the above refers to all package equipment, including boilers, chillers, heat reclaim units, pump sets, condensing units, humidifiers, etc. It shall be his responsibility to ensure the supply and installation of any accessories necessary for the operation of this equipment.

1.15 AS INDICATED

.1 Means that the item or items specified are shown or noted on the drawings.

1.16 EQUIPMENT REQUIREMENTS & INSTALLATION

.1 Permit equipment maintenance and disassembly by use of unions or flanges to minimize disturbance to connecting piping without interference from building structure or other equipment.

.2 Space for servicing, disassembly and removal of equipment and components to be

provided as recommended by Manufacturer or as indicated.

.3 Equipment drains to be piped to hub or funnel floor drain.

.4 Provide accessible means for lubricating equipment including permanent lubricated "lifetime" bearings.

.5 Mount base mounted equipment on chamfered edge housekeeping pads a minimum of 100mm (1") high and 50mm (2") larger than equipment dimension all around. Pads provided by this Contractor. Co-ordinate sizes with equipment provider.

.6 Pipe drain lines to drains in a manner to avoid disruption of surrounding space.

.7 Line-up equipment, rectangular cleanouts and similar items parallel or perpendicular to building walls wherever possible.

.8 Contractor to provide metal caps and counter flashing for all roof penetrations provided under this section. Installation by this Contractor. This Contractor responsible for all membrane flashing.

1.17 RESPONSIBILITY FOR TEMPORARY TRIAL USAGE

.1 Protect work against damage or loss until accepted by the Consultant.

.2 Obtain written permission to start and test permanent equipment and systems prior to acceptance by Consultant.

.3 Consultant may use equipment and systems for test purposes prior to acceptance. Supply labour, material and instruments required for testing.

.4 See Division 01 - General Requirements for temporary usage. Guarantee period and commencement date shall not be affected.

.5 Clean and renew equipment and system used prior to acceptance. Restore to original, new and full working condition.

1.18 ANCHOR BOLTS & TEMPLATES

.1 Supplied and installed by Division 21, 22, 23 and 25, as indicated and recommended by the Manufacturer.

1.19 PROTECTION OF OPENINGS

.1 Protect equipment, system openings including rough-in plumbing from dirt, dust and other foreign materials with materials compatible to the system.

1.20 ELECTRICAL

.1 Electrical work to conform to Division 26 - Electrical, including the following:

.1 Supplier and installer responsibility is indicated in the motor, controls and equipment supply schedules on the Electrical drawings and related Mechanical responsibility is indicated on Mechanical Equipment Schedule on the Mechanical drawings.

.2 Controls wiring and conduit is specified by Division 26 - Electrical, except for conduit, wiring and connections below 50V which are related to Controls systems specified in Division 25 - Integrated Automation. Refer to Division 26 - Electrical for quality of materials and workmanship.

1.21 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Electric equipment shall bear CSA label.

.2 Conform to requirements of Canadian Electrical Code, Local Provincial and Municipal Authorities and specified standards.

.3 Division 21, 22, 23 and 25 responsible for their respective conduit, wiring and connections below 50 V which are related to control systems specified in Divisions 21, 22, 21 and 25 and shown on mechanical drawings. Refer to Electrical section for quality of materials and workmanship for wiring and conduit.

.4 Motors.

.1 Provide motors for mechanical equipment.

.2 If delivery of specified motor will delay delivery or installation of any equipment, install a motor for temporary use. Final acceptance of equipment will not occur until specified motor is installed.

.5 Motors under 372 W: Speed as indicated, continuous duty, built-in overload protection, resilient mount, single phase, 115V or 208V, unless otherwise specified.

.6 Motors 372 W and larger: EEMAC Class B, squirrel cage induction, continuous duty, drip proof, ball bearing, maximum temperature rise 40EC, three phase, 208V in building, unless otherwise specified.

.7 Provide motors, low voltage 50 V and less, wiring from transformers, and temperature pressure, humidity control devices.

.8 Furnish composite wiring diagrams with remote interlocks for control systems, including performance and sequence of operation description of mechanical systems. Submit for approval by Consultant.

.9 Where motors may be subjected to high moisture levels, such as in boiler room, in the air stream after the cooling coil, in areas subjected to washdown or exposed outdoors, the motors are to be splash-proof or totally enclosed fan cooled.

.10 All equipment shall be supplied complete with a disconnect switch. Where exposed to the weather, "weatherproof" disconnects shall be provided. Disconnect switches serving explosion proof motors, shall be explosion proof.

1.22 GUARDS

.1 Provide guards for unprotected drives.

.2 Guards for belt drives:

.1 Expanded metal screen welded to steel frame.

.2 Minimum 1.2mm thick sheet metal top and bottoms.

.3 38mm diameter holes on both shaft centers for insertion of tachometer.

.4 Removable for servicing.

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

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

.5 Guard for flexible coupling:

.1 "U" shaped, minimum 1.6mm thick galvanized mild steel.

.2 Securely fastened in place.

.3 Removable for servicing.

.6 Unprotected fan inlets or outlets.

.1 Wire or expanded metal screen, galvanized 19mm mesh.

.2 Net free are of guard: not less than 80% of fan openings.

.3 Securely fasten in place.

.4 Removable for servicing.

1.23 SLEEVES

.1 Provide pipe sleeves at points where pipes pass through masonry or concrete walls or floors.

.2 Provide acoustical pipe penetration seals where pipes pass through equipment room walls or floors.

.1 Seals to consist of two bolted pipe halves with minimum 19mm neoprene sponge bonded to inner face.

.2 Seal shall be tightened around the pipe to eliminate clearance between the inner sponge face and the piping.

.3 Use cast iron or steel pipe sleeves with annular fin continuously welded at midpoint:

.1 Through foundation walls.
.2 Where sleeve extends above finished floor.

.4 Sizes:
.1 Provide 6mm (1/4") clearance all around, between sleeve and pipes or between sleeve and insulation.
.2 Where piping passes below footings, provide minimum clearance of 50mm (2") between sleeve and pipe. Backfill up to underside of footing with concrete of same strength as footing.

.5 Terminate sleeves flush with surface of concrete and masonry and 50mm above floors in mechanical or fan rooms or rooms susceptible to leaks. Not applicable to concrete floors on grade.

.6 Unless otherwise indicated for pipes passing through roofs, use Thaler Industries model MEF-34 or MEF-44 aluminum mechanical flashings, height 300mm (12"). Anchor flashings in roof construction. Install in accordance with manufacturer's instructions. Make water tight durable joint.

.7 Fill voids around pipes. Remove plastic sleeves.
.1 Caulk between sleeve and pipe in foundation walls and below grade floors with waterproof pre-retardant non-hardening mastic or manufactured seals equal to "link-seal".
.2 Where sleeves pass through walls or floors, caulk space between insulation and sleeve or between pipe and sleeve with waterproof fire retardant non-hardening mastic. Seal space at each end of sleeve with non-shrinking pipe sealing mastic.
.3 Ensure no contact between copper tube or pipe and ferrous sleeve.
.4 Fill future-use sleeves with lime plaster.
.5 Coat exposed exterior surfaces of ferrous sleeves with heavy application of zinc rich paint to CGSB 1-GP-181M.
.6 Installation to be continuous through walls and floors.

.8 Temporarily plug all openings during construction.

1.24 ESCUTCHEONS AND PLATES

.1 Provide on pipes and ductwork passing through finished walls, partitions, floors and ceilings.

.2 Use chrome or nickel plated brass, solid type, with set screws for ceiling or wall mounting. Use cast iron type in equipment room. Where split escutcheons are used, they shall be installed to provide continuous appearance.

.3 Inside diameter shall fit around finished pipe. Outside diameter shall cover opening or sleeve.

.4 Where sleeve extends above finished floor, escutcheons or plates shall clear sleeve extension.

.5 Secure to pipe or finished surface but not insulation.

1.25 TESTS

.1 Provide the following supplementary requirements to tests specified:
.1 Give written 24 hours notice of date when tests will be made.
.2 Do not insulate or conceal work until tested and approved. Follow construction schedule and arrange for tests.
.3 Conduct tests in presence of Engineer.
.4 Bear costs including retesting and making good.
.5 Pipe pressure:
.1 Hydraulically test all water supply and steam supply systems at 1 1/2 times system operating pressure or minimum 860 kPa.

.2 Maintain test pressures without loss for 4 hours unless otherwise specified.

.3 Test drainage, waste and vent piping to code.

.4 Prior to test isolate all equipment or other parts which are incomplete or not designed to withstand test pressures.

.5 All piping of the drainage and venting systems shall be tested by means of filling the system with water after all outlets have been plugged. All joints shall be checked and the water level must hold without dropping for a period of one hour before the work is to be backfilled or otherwise built-in. Sections of the system may be tested separately provided they are at least 3000mm (120") high and include at least 1500mm (60") of the section below, where applicable. Any leaks observed must be corrected by additional caulking of joints or if necessary by removal of any section of pipe required.

.6 Testing shall be done before pipe covering is installed. Leaks must be located, corrected and test reapplied before acceptance of building.

.7 Provide test certification for all tests signed by Engineer or designated representative.

1.26 PAINTING

.1 Apply at least one (1) coat of corrosion resistant primer and two (2) coats of suitable industrial corrosion resistant paint to un-insulated piping, hangers, stands, supports, and equipment fabricated from ferrous metals.

.2 Prime and touch up marred finished paintwork to match original.

1.27 ACCESS DOORS

.1 This section to supply access doors for furred ceilings or spaces for servicing equipment and accessories or for inspection of safety, operating or fire devices for installation under section erecting the walls or ceilings. Provide ULC rated doors in fire rated construction. Installation by General Contractor.

.2 Access doors shall be flush mounted with integral drywall bead, sized 600 x 600 mm (24" x 24") for body entry 300 x 300 mm (12" x 12") for hand entry, or as noted on the drawings. Doors shall open 180 degrees have rounded safety corners, concealed hinges, screwdriver latches and anchor straps. Steel shall be prime coated. Doors shall be of approved manufacturer with published literature.

.3 Provide stainless steel access doors for tiled, marble or terrazzo surfaces or special surfaces, including all surfaces in the pool area.

.4 Provide cam type locking device with hand or key lock when located in public corridors and washrooms complete with master keys.

.5 Acceptable material: Williams #WB-DW, Acudor #DW-5040, MIFAB #MDW.

1.28 DIELECTRIC COUPLINGS

.1 Provide wherever pipes of dissimilar metals are jointed.

.2 Provide insulating unions for pipe sizes NPS 2 and under and insulating flanges for pipe sizes over NPS 2 (DN 50).

.3 Cast brass adapters may be used where approved by Engineer.

.4 Provide felt or rubber gaskets to prevent dissimilar metals contact.

1.29 DRAIN VALVES

.1 Minimum NPS 19mm (3/4") unless otherwise specified: straight pattern bronze with hose end male thread and complete with cap and chain.

.2 Locate at all low points and section isolating valves unless otherwise specified.

.3 Acceptable material: Dahl.

1.30 INSTRUCTION OF OPERATING STAFF

.1 Provide certified personnel to instruct operating staff on operation of mechanical equipment. Provide maintenance specialist personnel to instruct operating staff on maintenance and adjustment of mechanical equipment and any changes or modification in equipment made under terms of guarantee.

.2 Provide instruction during regular work hours prior to acceptance and turn-over to operating staff for regular operation.

.3 Use operation and maintenance data manual for instruction purposes. On completion of instruction, turn one manual over to Owner and the balance to Engineer.

.4 This Contractor to ensure mechanical systems are complete and fully operational as per the requirements of these documents and the applicable codes. Premature failure of any mechanical system(s) and/or related accessories deemed to be the result of poor workmanship shall be the financial responsibility of the Contractor responsible.

1.31 CLEANING AND FINAL ADJUSTMENT

.1 Clean interior and exterior of all systems including strainers.

.2 Clean and refurbish all equipment and leave in first class operating condition including replacement of all filters in all piping systems.

.3 Balance and adjust all systems and each piece of equipment to operate efficiently.

1.32 EXCAVATION, TRENCHING AND BACKFILLING

.1 All excavation, trenching, granular base or bedding and backfilling, both inside and outside the building, required for the work of Division 22 shall be the financial responsibility of, and carried out by the General Contractor under the direction of the Division 21, 22, 23 or 26 Sub-contractor.

.1 This work includes the breaking out of existing concrete where new lines are installed below existing concrete floors.

.2 This work includes housekeeping pads and concrete curbs.

1.33 CUTTING & PATCHING

.1 All cutting and patching required to properly accommodate the work of this Division shall be the financial responsibility of respective Division 21, 22 or 23 and carried out by trades to the applicable Specifications provided in this document.

1.34 FIRESTOPPING AND SMOKE SEALS

.1 All firestopping and smoke seals required to properly accommodate the work of this Division shall be the financial responsibility of the respective Division 21, 22 or 23 and carried out by trades to the applicable Specifications provided in this document.

.2 Work must be performed by a company with experience in the application of firestopping and smoke seals to ULC requirements.

.3 Material shall provide a fire rate equal to that of the separation which has been separated.

.4 Refer to the Architectural drawings for the location and rating of all fire walls.

.5 Submit material shop drawings and all ULC listed installation details for all penetrations applicable to project.

.6 Acceptable material:

.1 Dow Corning Fire Stop System.

.2 3M Fire Barrier Penetration.

.3 Sealing System.

.4 Bio-Fire Biotherm or Bio-K10 (supplied by Wormald).

.5 Hilti.

1.35 CONCRETE

.1 All concrete work, both inside and outside the building, required specifically for the work of this Division shall be the financial responsibility of and carried out by the General Contractor under the direction of the Division 21, 22, 23 or 25 Sub-Contractor(s).

.1 This work includes all housekeeping pads and concrete curbs.

1.36 WASTE MANAGEMENT AND DISPOSAL

.1 Collect and separate waste material and place in on site bin in accordance with Waste Management Plan.

2 Products

2.1 NOT APPLICABLE

.1 Not applicable.

3 Execution

3.1 REPAIRS/ RESTORATION

.1 To Section 09 91 00 - Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged extensively for priming and touch-up.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.

.1 Pressure test.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

.1 Consultant will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 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.

.3 Where specified elsewhere in Division 21, 22, 23 or 25 manufacturers to provide demonstrations and instructions.

.4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.5 Instruction duration time requirements as specified in appropriate sections.

.6 Consultant will record these demonstrations on video tape for future reference.

3.5 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 21 05 01 - Common Work Results.
.2 Section 23 05 01 - Installation of Pipe Work
.3 Section 23 05 21 - Thermometer and Pressure Gauges Piping Systems
.4 Section 28 31 00 - Fire Detection and Alarm
.5 Section 33 11 16 - Incoming Site Water Utility Distribution Piping

1.2 REFERENCE STANDARDS

.1 Conform to the following except where specified elsewhere:
  .1 National Building Code of Canada.
.2 NFPA 13 - Installation of Sprinkler Systems.
.3 NFPA 24 - Installation of Private Fire Services Mains and their Appurtenances
.4 NFPA 25 - Inspection, Testing and Maintenance of Water Based Fire Protection Systems.
.5 NFPA 14 - Installation of Standpipe and Hose Systems.

1.3 SHOP DRAWINGS

.1 Submit shop drawings & calculations in accordance with Section 01 33 00 - Submittal Procedures, working plans on computerized CADD file using AutoCAD and design requirements. Drawing standards to be the same as project drawings.
.2 Shop drawings to be submitted for preliminary review prior to submitting to approving authorities.
.3 Submit the following for hydraulically designed systems:
  .1 Ceiling construction.
  .2 Full height cross section of building.
  .3 Location of fire walls/separations.
  .4 Location and size of blind spaces and closets and any questionable small enclosure in which sprinklers are to be installed.
  .5 Make, type, description, and orifice size of sprinklers.
  .6 Temperature rating and location of high temperature sprinklers.
  .7 Number of sprinklers on each riser and on each system by floors and total area protected by each system on each floor.
  .8 Cutting lengths of pipe or centre to centre dimensions.
  .9 Crosses, riser nipples, and sizes.
  .10 Type of hangers, inserts, and sleeves.
  .11 All control and check valves, drain and test pipes, pressure, supervisory and flow switches.
  .12 Provision for flushing connections.
  .13 Name and address of contractor.
  .14 Make, type, model, and size of wet alarm check valve, excess pressure pump.
  .15 Type and location of alarm bells.
  .16 When plans include underground pipe: weight or class, size and material of pipe; type of valves, and valve pits; depth to top of pipe from grade.
  .17 Hydraulic reference points designated by letters or numbers to correspond to the comparable reference points shown in the hydraulic calculation sheets.
  .18 System design criteria, i.e., minimum rate of water application density, design area of water application.
  .19 Actual calculated requirements, i.e., total quantity of water and pressure required

at a common reference point for each system.

.20 Elevation data, relative elevation of sprinkler junction points and supply or reference points.

.21 Hydraulic calculations to be submitted on computer printout, including summary sheet, detailed work sheets and graph sheet.

.4 Summary sheet to contain:

.1 Date.

.2 Location.

.3 Name of department or agency.

.4 Building number or other identification.

.5 Description of hazard.

.6 Name and address of contractor or designer.

.7 Name of approving agency/ authority.

.8 System design requirements, including design area of water application, minimum rate of water application density and area per sprinkler.

.9 Total water requirements.

.5 Computer printout sheets to contain:

.1 Sheet number.

.2 Sprinkler description and discharge constant K.

.3 Hydraulic reference points.

.4 Flow in L/S.

.5 Pipe size.

.6 Pipe lengths, centre to centre of fittings.

.7 Equivalent pipe lengths for fittings and devices.

.8 Friction loss in kPa per 30 metre of pipe.

.9 Total friction loss between reference points.

.10 Total friction loss between reference points.

.11 Required pressure in kPa at each reference point.

.12 Velocity pressure and normal pressure if included in calculations.

.13 Notes to indicate starting points, reference to other sheets, or to clarify data shown.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit sample of each type of head proposed for use on this project.

1.5 GENERAL REQUIREMENTS

.1 Work covered by this Section to include installation of new wet sprinkler system, all materials, labour, equipment, working plans, field testing for building and services necessary for or incidental to the design supply installation and completion of wet pipe automatic sprinkler system. Work to be coordinated with construction schedule.

.2 Quality Assurances: Execute work of this Section by skilled tradesmen only, employed by qualified Fire Protection Contractor in the province regularly engaged in the installation of automatic sprinkler systems and other fire protection equipment.

.3 Systems to include:

.1 Complete installation of wet Sprinkler System.

.2 Auxiliary drain connections as required.

.3 Sprinkler types as noted.

.4 Water supply connections complete as indicated on drawings.

.5 Main drain valve and piping connections to sanitary drainage system and as indicated on drawings.

.6 Inspector's test, connection and ancillary equipment, etc., as required and indicated on drawings.

.4 Prior to submitting shop drawings to Consultant for preliminary review, Contractor shall point out any discrepancies between Engineer's working drawings and architectural reflected ceiling plans as to ceiling elevations, bulkheads, etc., so that these discrepancies can be addressed and rectified prior to commencing any work and to avoid unnecessary conflicts on-site.

1.6 ENGINEERING DESIGN CRITERIA

.1 Design automatic wet pipe fire suppression sprinkler systems in accordance with required and advisory provisions of NFPA 13, by hydraulic calculations for uniform distribution of water over design area. Occupancy hazard shall be as required by NFPA 13.

.2 Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use.

.3 Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed shop drawings.

.4 Locate sprinkler heads in consistent pattern with ceiling grid, lights, and air supply diffusers.

.5 Devices and equipment for fire protection service: ULC approved for use in wet pipe sprinkler systems.

.6 Location of Sprinkler Heads:

.1 Locate heads in relation to ceiling and spacing of sprinkler heads not to exceed that permitted by NFPA 13.

.2 Uniformly space sprinklers on branch.

.7 Water Distribution:

.1 Make distribution uniform throughout the area in which sprinkler heads will open.

.2 Discharge from individual heads in hydraulically most remote area to be 100% of specified density required in NFPA 13.

.8 Density of Application of Water:

.1 Size pipe to provide specified density when system is discharging specified total maximum required flow.

.2 Application to horizontal surfaces below sprinklers shall be as required for NFPA 13.

.9 Sprinkler Discharge Area:

.1 Area: hydraulically most remote m² area as defined in NFPA 13.

.10 Outside Hose Allowances:

.1 Include allowance in hydraulic calculations of outside hose streams per NFPA.

.11 Friction Losses:

.1 Calculate losses in piping in accordance with Hazen-Williams formula with 'C' value of 120 for steel piping, 150 for copper tubing, and 140 for cement-lined ductile-iron piping.

.12 Water Supply:

.1 Conduct flow and pressure test of water supply in vicinity of project to obtain criteria for basis of design in accordance with ANSI/NFPA 13.

.13 Show the following in the drawings submitted to the Owner's Representative for approval.

.1 Show the layout and size of all piping and equipment from the point of connection to the water supply, to the sprinkler cross mains. The contract drawings must include a detailed sprinkler riser diagram. Water velocity in the piping should not exceed 6 m/s (20 ft/s).

.2 Show location and size of service mains, interior feed mains, control valves, sprinkler risers, drain lines, sectional valves and inspector's test valves and switches on the drawings.

.3 Specify waterflow data including hydrant flow results, including location where the hydrant flow test was conducted, the location and size of existing mains and new water supply lines that will serve the sprinkler system (including all supervisory valves), and the location and size of all risers.

.4 Highlight or clearly indicate the area(s) to be protected by sprinklers on the drawings.

.5 Specify waterflow requirements including the design density, design area, the hose stream demand (including location of the hose stream demand), the duration of supply, and sprinkler spacing and area of coverage in this section.

.6 Show the location of the backflow preventer (including provisions for a drain and access for maintenance) where the potable water supply system is at risk of contamination by the sprinkler system on the drawings.

.7 Show all provisions necessary for forward flow testing of the backflow preventer at system demand, as required by NFPA 13 on the drawings. Indicate location of all components and required items, including test ports, for pressure measurements both upstream and downstream of the backflow preventer, a drain to the building exterior, and appropriate permanent means of disposing of the large quantity of water that will be involved in the initial test and subsequent annual test.

.8 Highlight all concealed spaces on the drawings that require sprinkler protection, such as spaces above suspended ceilings, attics, etc. that are built of combustible material or that can contain combustible materials, such as storage, and communication cabling that is not fire-rated.

.9 Provide details on the drawings of pipe restraints for underground piping. This includes details of pipe clamps, tie rods, mechanical retainer glands, and thrust blocks.

1.7 OPERATIONS

.1 For Systems: indicate on building central fire alarm system panel.

1.8 DESCRIPTION OF SYSTEM(S)

.1 Wet pipe system to include:

.1 Wet alarm check valve c/w trim package.

.2 OS&Y controlling gate or butterfly valves.

.3 Water motor gong and steel piping and fittings.

.4 Water pressure gauges as required and indicated on drawings.

.5 Pipe and fittings.

.6 Shut-off valves and drain connections.

.7 Hangers.

.8 Floor and ceiling chrome escutcheon plates.

.9 Water flow, pressure, and supervisory switches.

.10 Floor zone sectional control assemblies as indicated and detailed on drawings.

.11 Inspector's test connections and valves as indicated on drawings for systems.

.12 100 mm (4") interior electric bell operated by systems.

.13 All wiring to building central fire alarm system panel by Division 26. All devices by this contractor.

.14 Sprinkler coverage shall be provided to all areas of the building. Contractor shall make their own assessment of requirements for all areas shown or not shown with sprinkler coverage and shall provide coverage to NFPA-13 or the tender

documents, whichever is more stringent. All costs to be included in the contract price.

1.9 CERTIFICATES

.1 Provide written certificate that components are compatible, and where applicable, certified for intended use in accordance with requirements of approving authorities.

1.10 MAINTENANCE DATA

.1 Provide maintenance data in English and French for sprinkler equipment for incorporation into operation and maintenance manual specified in Section 01 78 00 - Closeout Submittals.

1.11 MAINTENANCE MATERIALS

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide spare sprinklers in accordance with NFPA 13 latest edition and these specifications.

2 Products

2.1 PIPE AND FITTINGS

.1 Steel Pipe: to NFPA 13, Schedule 10; screwed, welded, flanged roll Schedule 10 or Schedule 40 groove couplings.

.2 Fittings: 1206 kPa (175 osi)minimum working pressure, to conform to the following:

.1 Cast Iron: screwed to ANSI B16.4, flanged to ANSI B16.1, Class 125 and 250.

.2 Malleable Iron: screwed to ANSI B16.3, Class 150 and 300.

.3 Mechanical groove - malleable iron to ASTM A-47, ductile iron to ASTM A-536.

.1 Coatings - rust inhibiting lead-free paint (standard colour orange).

.2 Gaskets - elastomeric to ASTM D-2000.

.3 Bolts and nuts - carbon steel to ASTM A-183 minimum 68.95 Mpa (10,000 psi) tensile strength.

.4 Acceptable Material:

.1 Anvil Star

.2 Victaulic Firelock

.4 Wrought light steel factory-made, butt weld fittings to ANSI B16.9.

.1 Butt welding ends for pipe, valves, flanges and fittings to ANSI B16.25.

.2 Steel pipe flanges and flange fittings to ANSI B16.5.

.3 Flange bolts: square or hex head bolts with heavy hex nuts to ASTM A307 Class B.

.4 Flange gaskets: 1.6mm (1/16") thick plain or cloth inserted red rubber to ASTM B16.20 or B16.21.

.5 Forged steel fittings, socket welded and threaded to ANSI B16.11.

.6 Wrought copper and bronze solder joint pressure fittings to ANSI B16.22.

.7 Cast bronze solder joint pressure fittings and ANSI B16.18.

.5 Wrought light steel factory-made, butt weld fittings to ANSI B16.9.

.1 Butt welding ends for pipe, valves, flanges, and fittings to ANSI B16.25.

.2 Steel pipe flanges and flange fittings to ANSI B16.5.

.3 Flange Bolts: square or hex head bolts with heavy hex nuts to ASTM A307 Class B.

.4 Flange Gaskets: 1.6mm thick plain or cloth inserted red rubber to ASTM B16.20 or B16.21.

.3 Reducers: One piece fittings, hex face bushings acceptable only where one piece standard reducing fittings of required size are not available.

2.2 VALVES

.1 Valves shall be ULC listed and FM approved, designed for 1205 kPa (175 psi) minimum working pressure (water) and of one manufacturer wherever possible throughout this section.

.1 Rising stems, to be repackable under pressure and with malleable iron wheel handles.

.2 Sprinkler valves where required and indicated on drawings, to be equipped with contacts and devices necessary for operation of supervisory system specified under Division 28.

.2 Gate Valves:

.1 NPS 2 (DN 50) and under: Screwed bronze body and trim to ASTM B61 solid wedge, rising stem. Ball valves are acceptable as alternate.

.2 NPS 2 (DN 50) and over: Iron body, bronze mounted, OS&Y solid wedge, flanged or roll grooved ends or butterfly gear operated (up to NPS 6).

.3 Globe Valves:

.1 NPS 2 (DN 50) and under: Bronze body and trim to ASTM B61 (screwed), replaceable composition disc. Ball valves are acceptable as alternate.

.4 Check Valves:

.1 NPS 2 (DN 50) and under: Bronze swing type to ASTM B61, composition disc (screwed).

.2 NPS 2 (DN 50) and over: Iron body, bronze mounted, regrind/renew bronze disc and seat ring, flanged or roll grooved. Wafer check type are acceptable alternate.

.5 Drain Valves:

.1 Angle or globe for 1206 kPa (175 psi) cold water or 362 kPa (52.5 psi) saturated steam.

.6 Wet Alarm Check Valve:

.1 Flanged/grooved or flanged/ flanged valve, c/w trim package; water motor gong, excess pressure pump and pressure alarm switch.

2.3 SUPERVISORY AND ALARM SWITCHES

.1 Supervisory Switches:

.1 ULC listed and FM approved, cast aluminum housing with red enamel finish, tamper proof.

.2 Cord type plug in supervisory devices are not acceptable.

.3 Acceptable Materials:

.1 For gate valves:

.1 Potter OSYSU-2

.2 System Sensor OSY2

.2 For butterfly valves:

.1 Potter PCVS-2

.2 System Sensor PIBU2

.2 Alarm Switches:

.1 ULC listed and FM approved, cast aluminum housing with red enamel finish, tamper proof.

.2 Acceptable Materials:

.1 For water flow:

.1 Potter Model VSR-F Series (NPS 2 to NPS 8 pipe / DN 50 to DN

200)
.2 System Sensor WFD Series
.3 Potter Model VSR-SF (NPS 1 to NPS 1-1/2 pipe / DN 25 to DN 40)
.4 System Sensor WFDTA

.2 For pressure:
.1 Potter Model PS Series
.2 System Sensor EPS Series

2.4 PIPE HANGERS

.1 Pipe hangers to be ULC listed for fire protection service, in accordance with NFPA 13 and Section 21 05 01.

2.5 SPRINKLER HEADS

.1 General: to NFPA 13, ULC listed and FM approved for fire service.
.2 Sprinkler heads shall be Quick response frangible bulb type.
.3 Temperature ratings of sprinkler heads to be as per NFPA 13.

2.6 SIGNS

.1 Signs for control drain and test valves to NFPA 13.

2.7 SLEEVES AND ESCUTCHEON PLATES

.1 Provide sleeves and escutcheon plates for sprinkler piping systems.

2.8 SPARE PARTS

.1 Provide metal red enameled sheet steel cabinet with locking device containing six (6) spare sprinklers of each type and melting point temperature; 4 keys for emergency repair work; sprinkler wrench.
.2 Install cabinet in mechanical room near alarm valve.

2.9 FINISHES

.1 Finished Areas: Chromeplated valves and fittings.
.2 All piping, fittings, etc. in areas where there is no suspended ceiling to be painted by Division 09.

2.10 FIRE DEPARTMENT CONNECTION

.1 Provide connection approximately 1.5m (60") above finished grade, location as indicated.
.2 To ANSI/NFPA 13 and ULC 5543 listed, siamese type.
.3 Polished bronze chrome plated recessed or exposed of approved two way type with plug, chain and identifying fire department connection escutcheon plate.
.4 Thread Specifications: Compatible with local fire department.

2.11 ESCUTCHEON PLATES

.1 Provide on piece or split hinge type metal plates for piping passing through walls, floors, and ceilings in exposed spaces.
.2 Provide polished stainless steel plates chromium-plated finish on copper alloy plates in finished spaces.
.3 Provide paint finish on metal plates in unfinished spaces.

2.12 INSPECTOR'S TEST CONNECTION

.1 Locate inspector's test connection at hydraulically most remote part of each system, provide test connections approximately 3 m (120 feet) above floor for each sprinkler

system or portion of each sprinkler system equipped with alarm device.

.2 Provide test connection piping to location where discharge will be readily visible and where water may be discharged without property damage.

.3 Provide discharge orifice of same size as corresponding sprinkler orifice.

2.13 SIGNS

.1 Attach properly lettered English and approved metal signs to each valve and alarm device to ANSI/NFPA 13.

.2 Permanently fix hydraulic design data nameplates to riser of each system.

2.14 SPARE PARTS CABINET

.1 Provide metal cabinet with extra sprinkler heads and sprinkler head wrench adjacent to each alarm valve. Number and types of extra sprinkler heads as specified in NFPA 13.

3 Execution

3.1 INSPECTION

.1 Piping, accessories, etc., not to be recessed, painted, or concealed before it has been inspected and approved.

3.2 INSTALLATION

.1 Install horizontal valves with stems in vertical upright position where spaces allow.

.2 Provide additional pipe hangers to allow for expansion and contraction in sprinkler system.

.3 In areas with suspended ceilings, allow ample clearance between sprinkler piping in ceiling spaces and top of light fixtures for relocation of fixtures under future renovations.

.4 Where applicable, sprinkler heads installed in suspended tile ceilings to be centered in tiles where possible, or a minimum of 150mm (6") from any edge of tile. This section shall be responsible for coordinating the location and layout of the sprinkler system and sprinkler heads with Division 26 and other related sections of Division 22, 23 or 25.

.5 Provide chromeplated valves, nozzles, fittings, except in unfinished areas where satin brass finish is acceptable.

.6 Provide pressure gauges at each water supply connection and at highest point of sprinkler riser, complete with 6mm (1/4") gauge connection and gauge cock.

.7 Exposed piping passing through floors, ceilings and walls shall be supplied with chromeplated escutcheon plates, unless otherwise approved by Consultant.

.8 Coordinate locations of all holes required for pipes and otherwise meet specified requirements of Section 21 05 01 Common Work Results - Mechanical for sleeves and pipes.

.9 Allow for extra sprinkler heads in Mechanical Rooms, for air handling equipment and large ducts, and in areas where large ducts may be located exposed under ceilings, to maintain adequate coverage.

.10 Provide OS & Y gate or butterfly control valve at base of each combined sprinkler/ standpipe riser, complete with electrical supervisory switch.

.11 Provide NPS 2 (DN 50) nominal drain valve at base of each riser, arranged to drain to safe location.

.12 All pendent sprinklers shall be installed on return bends

.13 Provide gate valve in piping, protecting elevator hoistways, machine rooms, and machinery space.

.14 Provide ball or butterfly valves for zone control.

.15 Contractor shall penetrate beams where required. Reinforce beam penetrations with Schedule 40 steel pipe sleeve, sized to accommodate sprinkler pipe. Fully weld sleeve

to beam. Submit detail locations to project Structural Engineer for approval prior to execution.

.16 Listed flexible sprinkler hose fittings are permitted.

3.3 PROTECTION OF COMPLETED WORK

.1 Paint exposed steel pipe and fittings, except special finishes.

.2 Provide red plastic coated wire baskets around sprinkler heads in mechanical, electrical, storage, elevator machine and telephone rooms, around ventilation equipment, under stair landings, in service areas, and other areas that may be requested by authorities having jurisdiction, to protect against possible mechanical damage.

3.4 IDENTIFICATION

.1 Place enamelled steel signs in locations as per NFPA 13 and 14 latest edition.

.2 For outdoor signs secure with stainless steel bolts.

3.5 TESTING

.1 Site Test, Inspection:

.1 Perform test to determine compliance with specified requirements in presence of Owner's Representative.

.2 Test, inspect, and approve piping before covering or concealing.

.3 Preliminary Tests:

.1 Hydrostatically test each system at 1400 kPa (203 psi) for a 2 hour period with no leakage or reduction in pressure.

.2 Flush piping with portable water in accordance with NFPA 13.

.3 Piping above suspended ceilings: tested, inspected, and approved before installation of ceilings.

.4 Test alarms and other devices.

.5 Test water flow alarms by flowing water through inspector's test connection. When tests have been completed and corrections made, submit signed and dated certificate in accordance with NFPA 13.

.4 Formal Tests and Inspections:

.1 Do not submit request for formal test and inspection until preliminary test and connections are completed and approved.

.2 Submit written request for formal inspection at least fifteen (15) working days prior to inspection date.

.3 Repeat required test as directed.

.4 Correct defects and make additional tests until systems comply with contract requirements.

.5 Furnish appliances, equipment, instruments, connecting devices, and personnel for tests.

.6 Authority of Jurisdiction, will witness formal test and approve systems before they are accepted.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review work, as directed in PART 1 - QUALITY ASSURANCE.

.3 Site Tests:

.1 Field test each fire pump, driver and controllers in accordance with ANSI/NFPA 20. Testing shall include:

.1 Verification of proper installation, system initiation, adjustment and fine tuning.

.2 Verification of the sequence of operations and alarm systems.

.2 Testing to be witnessed by authority having jurisdiction.

.3 Develop, with Owner's Representative assistance, detailed instruction for O & M of this installation.

3.6 SYSTEM(S) FLUSHING

.1 Where applicable ensure that sprinkler system and pressure tanks have been flushed thoroughly before making final connections and putting system into operation.

END OF SECTION

1 General

1.1 REFERENCES

.1 NFPA 10, Portable Fire Extinguishers - 2018 Edition.

.2 CAN/ULC-S508-2018, Rating and Fire Testing of Fire Extinguishers.

1.2 SHOP DRAWINGS

.1 Submit shop drawings according to Section 01 33 00 - Submittal Procedures.

2 Products

2.1 EXTINGUISHER

.1 FE-1:
10 lb. Type ABC dry chemical (ammonium phosphate powder) extinguisher with heavy duty mounting bracket.

.1 Acceptable material: Extinguisher

.1 Flag ABC -10G min. ULC rating 4-A, 60-B,C (Light & Ordinary hazard)

.2 Flag ABC -10H min. ULC rating 6-A, 80-B,C (Extra hazard)

.2 FE-2:
10 lb. (4.5 kg) Type ABC dry chemical (ammonium phosphate powder) extinguisher with recessed prime coated 16 ga. steel cabinet.

.1 Acceptable material: Extinguisher

.1 Flag ABC -10G min. ULC rating 4-A, 60-B,C (Light & ordinary hazard)

.2 Flag ABC -10H min. ULC rating 6-A, 80-B,C (Extra hazard)

.2 Acceptable material: Cabinet

.1 C.F.H. Industries Model CE-950-1

.2 Wilson Cousins Model 1E-10C

3 Execution

3.1 INSTALLATION

.1 Install extinguishers securely mounted to walls in locations indicated on drawings.

.2 Fire extinguishers to be installed so that maximum travel distance does not exceed 22 m (72 feet).

.3 Fire extinguishers to be installed 900mm (36") above finished floor.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 21 13 13 - Sprinkler System.
.2 Section 21 13 16 - Dry Pipe Sprinkler System.
.3 Section 23 05 21 - Thermometers and Pressure Gauges - Piping Systems.

1.2 REFERENCES

.1 American National Standards Institute/National Fire Protection Association (ANSI/NFPA)
  .1 ANSI/NFPA 20, Standard for the Installation of Stationary Fire Protection.
.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).

1.3 SYSTEM DESCRIPTION

.1 Design Requirements:
  .1 Select fire pump to satisfy fire protection system requirements and ANSI/NFPA 20.
  .2 Water supply:
    .1 Conduct flow and pressure test of water supply in vicinity of project to obtain criteria for basis of design including NPSH available, and in accordance with ANSI/NFPA 20.

1.4 SUBMITTALS

.1 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
    .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.
.2 Shop Drawings:
  .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
    .1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Provinces of Prince Edward Island, Canada.
    .2 Indicate:
      .1 Materials.
      .2 Finishes.
      .3 Method of anchorage
      .4 Number of anchors.
      .5 Supports.
      .6 Reinforcement.
      .7 Assembly details.
      .8 Accessories.
      .9 Indicate hydraulic and electrical characteristics including Net Positive Suction Head (NPSH) required, make and model number.
      .10 Piping and fittings
      .11 Valves
      .12 Pressure gauges
      .13 Switches

.14 Fire pump
.15 Jockey pump
.16 Fire pump controller
.17 Jockey pump controller
.18 Certified pump curve
.3 Provide power and control diagrams.

.3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
.1 Test reports:
.1 Submit certified test reports for packaged fire pumps from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
.2 Test each pump/driver package at factory to provide detailed performance data and to demonstrate compliance with ANSI/NFPA and specification. Submit certified test curves for approval of Consultant.
.3 Test hydrostatically to meet requirements of fire protection system to which it will be connected.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.3 Instructions: submit manufacturer's installation instructions.
.4 Manufacturer's Field Reports: manufacturer's field reports specified.

.4 Closeout Submittals:
.1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.

1.5 QUALITY ASSURANCE

.1 Qualifications:
.1 Installer: company or person specializing in packaged fire pump installations with documented experience.

.2 Health and Safety:
.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.6 MAINTENANCE

.1 Extra Materials:
.1 Furnish spare parts for each pump in accordance with Section 01 78 00 - Closeout Submittals and as follows:
.1 One set of packing.
.2 One casing joint gasket.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:
.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:
.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse in accordance with Section 01 74 00 - Cleaning & Waste Management.

2 Products

2.1 GENERAL

.1 Fire pump systems shall be in accordance with NFPA 20.

2.2 PIPING AND FITTINGS

.1 General:

.1 Piping and fittings for the fire pump systems shall be in accordance with NFPA 20.

.2 Piping:

.1 Piping sizes 2 1/2 inches (65mm) through 6 inches (150 mm) shall be black steel schedule 40 piping. Steel pipe shall be joined by means of flanges welded to the pipe or mechanical grooved joints only.

.3 Fittings:

.1 Fittings, mechanical couplings, and rubber gaskets shall be of the same manufacturer.

2.3 VALVES

.1 General:

.1 Valves shall be in accordance with NFPA 20.

.2 Control valves:

.1 Outside screw and yoke valves (OS&Y)

.1 The OS&Y valve shall be of cast iron construction.

.2 Butterfly valve:

.1 Butterfly valves shall not be installed in any location on the suction side of the fire pump.

.2 The butterfly valve shall be of cast iron construction.

.3 The valve tamper switch is permitted to be integral to the butterfly valve.

.3 Automatic Air-Relief Valve:

.1 The automatic air-relief valve shall be listed or approved.

.4 Circulation Relief Valve:

.1 The circulation relief valve shall be of brass construction and be spring loaded.

.2 The circulation relief valve shall be adjustable.

.3 The circulation relief valve shall discharge to the atmosphere and not be re-circulated to the suction side of the fire pump.

.5 Relief Valve:

.1 Relief valves shall only be provided where required by NFPA 20.

.2 The relief valve shall be of bronze construction and be spring loaded.

.3 The relief valve shall discharge to the atmosphere and not be re-circulated to the suction side of the fire pump. Provide site cone if relief valve discharge is not visible from the immediate area of the fire pump room.

.6 Check Valve:

.1 Shall be of the swing type with a flanged cast iron body and flanged inspection plate.

.7 Automatic Ball Drips:

.1 Cast brass 3/4 inch (19 mm) in-line automatic ball drip with both ends threaded with iron pipe threads.

2.4 ELECTRIC MOTOR DRIVEN FIRE PUMP-CONTROLLER

.1 Main combined manual and automatic controller for squirrel cage induction motor-driven fire pump, full voltage or reduced voltage, auto-transformer, closed transition or soft

start/stop. Starting, accommodated in drip-proof CSA enclosure 3, completely wired and tested by manufacturer before shipment from factory, for pumps over 25 hp use reduced voltage or soft start/stop.

.2 To NFPA No. 20, and ULC listed for fire pump control.

.3 Rating: Horsepower as indicated 600 V, 3 phase, 60 Hz.

.4 Controller microprocessor based capable of being energized automatically through pressure switch or manually by externally operable handle. Pressure switch set to cut in and out as determined on site. Minimum running period timer set to keep motor in operation when started automatically, for minimum period of 1 minute for each 10 hp of motor rating, but not to exceed 7 min., automatic weekly test.

.5 Pilot lamp to indicate circuit breaker closed and power available.

.6 Individual alarm contacts relay to energize audible and visible alarm through independent source of power to indicate circuit breaker open, power failure and phase reversal.

.7 Alarm and signal devices in controller and in remote location to indicate trouble on controller and pumping unit.

.8 Ammeter test link and voltmeter test studs.

.9 Manual selector station, two positions, marked "Automatic" and "Non-Automatic".

.10 Means on controller to operate alarm signal continuously while pump is running.

.11 Mark "FIRE PUMP CONTROLLER".

.12 Where multiple pumps are provided, indicate area or zone served by each pump controller.

.13 Digital Display for:

- .1 System frequency.
- .2 Line-to-line voltages.
- .3 Line-to-line amperages.
- .4 Elapsed run time.
- .5 Pressure system settings.
- .6 Pump starting failure.
- .7 Over current problem.
- .8 Under current problem.
- .9 Pressure transmitter problem.

.14 Annunciator for:

- .1 Power available.
- .2 System trouble.
- .3 Phase reversal.
- .4 Low system pressure.

2.5 PRESSURE SENSING LINE

.1 The fire pump controller shall be provided with pressure sensing lines in accordance with NFPA 20.

2.6 TEST HEADER

.1 The body of the test header shall be a surface type and be constructed of brass or ductile iron.

.2 The finish of the test header finish plate shall be chrome plated.

.3 The number of valves shall be in accordance with NFPA 20.

.4 Provide a cap and chain for each valve.

.5 The test header shall be piped directly to the exterior through a straight-type header.

.6 An automatic ball drip valve shall be provided at the low point of the test header between the header and check valve.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Install in accordance with ULC listing, ANSI/NFPA 20, manufacturer's instructions and approved shop drawings.

.2 Align pump and motor shafts to within manufacturer's recommended clearances prior to start-up.

.3 Wiring to perform in accordance with manufacturer's instructions and applicable codes.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

- .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

.2 Site Tests:

- .1 Field test each fire pump, driver and controllers in accordance with ANSI/NFPA 20. Testing shall include:
  - .1 Verification of proper installation.
  - .2 Verification of the sequence of operations.
- .2 Testing to be witnessed by authority having jurisdiction.
- .3 Develop, with Consultant assistance, detailed instructions for O & M of this installation.

3.4 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.
.2 Section 01 74 19 - Construction Waste Management Disposal.
.3 Section 01 78 00 - Closeout Submittals.
.4 Section 21 05 01 - Common Work Results - Mechanical.

1.2 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
.2 Shop drawings; submit drawings stamped and signed by a Contractor as reviewed.
.3 Shop drawings to show:
  .1 Mounting arrangements.
  .2 Operating and maintenance clearances.
.4 Shop drawings and product data 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 current model production.
  .5 Certification of compliance to applicable codes.
.5 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
.6 Closeout Submittals:
  .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
  .2 Operation and maintenance manual approved by, and final copies deposited with, consultant before final inspection.
  .3 Operation data to include:
    .1 Control schematics for systems including environmental controls.
    .2 Description of systems and their controls.
    .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
    .4 Operation instruction for systems and component.
    .5 Description of actions to be taken in event of equipment failure.
    .6 Valves schedule and flow diagram.
    .7 Colour coding chart.
  .4 Maintenance data to 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.
  .5 Performance data to include:
    .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
    .2 Equipment performance verification test results.
    .3 Special performance data as specified.
    .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
  .6 Approvals:

.1 Submit electronic copies of draft Operation and Maintenance Manual to Owner's Representative for approval 4 weeks prior to Substantial Completion. Submission of individual data will not be accepted unless directed by Consultant.

.2 Make changes as required and re-submit as directed by Consultant.

.7 Additional data:

.1 becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour water proof ink for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Owner's Representative for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.4 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:

.1 One set of packing for each pump.

.2 One casing joint gasket for each size pump.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction Waste Management Disposal.

2 Products

2.1 MATERIALS

.1 All materials used on this project shall be new and CSA approved unless noted otherwise.

3 Execution

3.1 PAINTING, REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 00 - Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.

.1 Perform tests as specified in other sections of this specification.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

.1 Owner's Representative will use equipment and systems for test purposes prior to acceptance. Contractor to supply labour, material, and instruments required for testing.

.2 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.

.3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.4 Instruction duration time requirements as specified in appropriate sections.

.5 Owner's Representative may record these demonstrations on video tape for future reference.

3.5 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system

END OF SECTION

1 General

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings; submit drawings stamped and signed for review by Owner's representative.

.3 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.4 Shop drawings and product data 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 current model production.
- .5 Certification of compliance to applicable codes.

.5 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

.6 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance manual approved by, and final copies deposited with, Consultant before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data to 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.
- .5 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
  - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .6 Approvals:
  - .1 Submit electronic copies of draft Operation and Maintenance Manual to Consultant for approval. Submission of individual data will not be accepted unless directed by Consultant.
  - .2 Make changes as required and re-submit as directed by Consultant.
- .7 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Consultant for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.3 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:

.1 One set of packing for each pump.

.2 One casing joint gasket for each size pump.

.3 One head gasket set for each heat exchanger.

.4 One glass for each gauge glass.

.5 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.

.2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

.3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse in accordance with Section 01 74 00 - Cleaning and Waste Management.

2 Products

2.1 MATERIALS

.1 All materials used on this project shall be new and CSA approved unless noted otherwise.

3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 00 - Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units. Protect open ends of ducts, diffusers, grilles and registers during construction to prevent ingress of dust and dirt into interior of ducts.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.

.1 Submit tests as specified in other sections of this specification.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

.1 Consultant will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 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.

.3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.4 Instruction duration time requirements as specified in appropriate sections.

.5 Consultant will record these demonstrations on video tape for future reference.

3.5 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning & Waste Management.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

2 Products

2.1 NOT USED

.1 Not Used.

3 Execution

3.1 CONNECTIONS TO EQUIPMENT

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

.2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

.1 Unions are not required in installations using grooved mechanical couplings (the coupling shall serve as the union).

.3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement.

.4 The flexible ground joint couplings may be used in lieu of a flexible connector at equipment connections for vibration attenuation and stress relief, coupling shall be placed in close proximity to the source of vibration.

3.2 CLEARANCES

.1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.

.2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, components.

3.3 DRAINS

.1 Install piping with grade in direction of flow except as indicated.

.2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.

.3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.

.4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

3.4 AIR VENTS

.1 Install automatic air vents at high points in piping systems.
.2 Install isolating valve at each automatic air valve.
.3 Install drain piping to approved location and terminate where discharge is visible.

3.5 DIELECTRIC COUPLINGS

.1 General: Compatible with system, to suit pressure rating of system.
.2 Locations: Where dissimilar metals are joined.
.3 NPS 2 and under: isolating unions or bronze valves.
  .1 Waterway fittings shall be complete with thermoplastic liner.
.4 Over NPS 2: Isolating flanges.
  .1 Waterway fittings shall be complete with thermoplastic liner.

3.6 PIPEWORK INSTALLATION

.1 Installed by certified journey person.
.2 Screwed fittings jointed with Teflon tape.
.3 Protect openings against entry of foreign material.
.4 Grooved joint couplings and fittings shall be installed in accordance with the manufacturer's written installation instructions.
  .1 Gaskets shall be verified as suitable for the intended service prior to installation. Gaskets shall be molded and produced by the coupling manufacturer.
  .2 The grooved coupling manufacturer's factory trained representative shall provide , Contractor shall remove and replace any joints deemed improperly installed.
.5 Push-to-connect piping: Prepare copper tube and install in strict accordance with installation instructions. Pipe ends shall be cleaned, free from indentations, projections, burrs and foreign matter. Use a tube preparation tool as supplied by the manufacturer to clean and make installation mark. Push copper tube into fittings to installation depth mark, per installation instructions. Keep fittings free of dirt and oil.
.6 Saddle type branch fittings may be used on mains if branch line is no larger than half the size of main.
  .1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.
.7 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.
.8 Install concealed pipework to minimize furring space, maximize headroom, conserve space.
.9 Slope piping, except where indicated, in direction of flow for positive drainage and venting.
.10 Install, except where indicated, to permit separate thermal insulation of each pipe.
.11 Group piping wherever possible and as indicated.
.12 Ream pipes, remove scale and other foreign material before assembly.
.13 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.
.14 Provide for thermal expansion as indicated.
.15 Valves:
  .1 Install in accessible locations.
  .2 Remove interior parts before soldering.
  .3 Install with stems above horizontal position unless otherwise indicated.
  .4 Valves accessible for maintenance without removing adjacent piping.
  .5 Install globe valves in bypass around control valves.
  .6 Use ball or butterfly valves at branch take-offs for isolating purposes except

where otherwise specified.

.7 Install only ball or butterfly valves on chilled water and related condenser water systems only.

.8 Install butterfly valves between weld neck flanges to ensure full compression of liner.

.9 Install ball valves for glycol service.

.10 Use chain operators on valves NPS 2-1/2 and larger where installed more than 2400 mm above floor in Mechanical Rooms.

.16 Check Valves:

.1 Install silent check valves on discharge of pumps and in vertical pipes with downward flow and elsewhere as indicated.

.2 Install swing check valves in horizontal lines on discharge of pumps and elsewhere as indicated.

.17 Three way Control Valves:

.1 Provide for three (3) way control valve on last three coils on hot water hydronic piping loop to prevent pump from dead head.

3.7 SLEEVES

.1 General: Install where pipes pass through masonry, concrete structures, fire rated assemblies, and elsewhere as indicated.

.2 Material: Schedule 40 black steel pipe.

.3 Construction: Foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.

.4 Sizes:

.1 Provide 12mm clearance, all around, between sleeve and pipes or between sleeve and insulation.

.2 Through footings use sleeves large enough to accommodate hub of CI soil pipe.

.3 Where piping passes below footings, provide minimum all-round clearance of 50mm between piping and sleeves. Backfill upto underside of footing with concrete of same strength as footing.

.4 Unless otherwise specified, terminate sleeves flush with walls.

.5 Sleeves shall be sized to accommodate the insulated pipe diameter.

.5 Installation:

.1 Concrete, masonry walls, concrete floors on grade: Terminate flush with finished surface.

.2 Other floors: Terminate 25 mm above finished floor.

.3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.

.6 Sealing:

.1 Foundation walls and below grade floors: Fire retardant, oakum and waterproof non-hardening mastic or manufactured seals equal to "link seal".

.2 Elsewhere: Provide space for firestopping. Maintain fire rating integrity.

.3 Sleeves installed for future use: Fill with lime plaster or other easily removable filler.

.4 Ensure no contact between copper pipe or tube and sleeve.

.7 Unless otherwise indicated for pipes passing through roofs, use Thaler Industries Model MEF-3A or MEF-4A aluminum mechanical flashings, height 300mm. anchor flashings in roof construction. Install in accordance with manufacturers recommendations. Make watertight durable joint.

3.8 ESCUTCHEONS

.1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.
.2 Construction: One piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.
.3 Sizes: Outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

3.9 PREPARATION FOR FIRESTOPPING

.1 Material and installation within annular space between pipes, ducts, insulation and adjacent fire separation to Section 07 84 00 - Firestopping.
.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 movement without damaging firestopping material or installation.
.4 Insulated pipes and ducts: Ensure integrity of insulation and vapour barriers.

3.10 FLUSHING OUT OF PIPING SYSTEMS

.1 In accordance with Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.
.2 Before start-up, clean interior of piping systems in accordance with requirements of Section 01 74 00 - Cleaning and Waste Management, supplemented as specified in relevant sections of Division 23.
.3 Preparatory to acceptance, clean and refurbish equipment and leave in operating condition, including replacement of filters in piping systems.

3.11 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK

.1 Advise Consultant 48 hours minimum prior to performance of pressure tests.
.2 Pipework: Test as specified in relevant sections of Division 23.
.3 Maintain specified test pressure without loss for 4 hours minimum unless specified for longer period of time in relevant sections of Division 23.
.4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.
.5 Conduct tests in presence of Consultant. Work to be carried out in off hours after 5 p.m., weekends or holidays.
.6 Pay costs for repairs or replacement, retesting, and making good. Consultant to determine whether repair or replacement is appropriate.
.7 Insulate or conceal work only after approval and certification of tests by Consultant.

3.12 EXISTING SYSTEMS

.1 Connect into existing piping systems at times approved by Consultant. Work to be carried out in off hours after 5 p.m., weekends or holidays.
.2 Request written approval 10 days minimum, prior to commencement of work.
.3 Be responsible for damage to existing plant by this work.
.4 Ensure daily clean-up of existing areas.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 20 00 - Concrete Reinforcing.
.2 Section 03 30 00 - Cast-in-Place Concrete.
.3 Section 03 05 10 - Cast-in-Place - Short Form.
.4 Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.
.5 Section 23 08 01 - Performance Verification Mechanical Piping Systems.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
  .1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  .2 ASTM A105/A105M, Standard Specification for Carbon Steel Forgings, for Piping Applications.

1.3 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit product data and indicate for items as applicable:
  .1 Manufacturer, model number, line contents, pressure and temperature rating.
  .2 Movement handled, axial, lateral, angular and the amounts of each.
  .3 Nominal size and dimensions including details of construction and assembly.
.3 Submit maintenance data in accordance with Section 01 78 00 - Closeout Submittals.
.4 Data to include:
  .1 Servicing requirements, including special requirements, stuffing box packing, lubrication and recommended procedures.

1.4 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse in accordance with Section 01 74 00 - Cleaning and Waste Management.
.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
.3 Collect, separate and place in designated containers for reuse packaging Steel in accordance with Waste Management Plan.
.4 Unused sealant materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
.5 Fold up metal banding, flatten and place in designated area for recycling.

2 Products

2.1 FLEXIBLE CONNECTION

.1 Application: to suit motion as indicated.
.2 Minimum length in accordance with manufacturer's recommendations to suit offset.
.3 Inner hose: bronze or stainless steel corrugated.
.4 Braided wire mesh bronze or stainless steel outer jacket.
.5 Diameter and type of end connection: threaded or flanged same as pipe joint for the pipe size.
.6 Operating conditions:

.1 Working pressure: 1034 kPa.
.2 Working temperature: To match system requirements.

2.2 ANCHORS AND GUIDES

.1 Anchors:
.1 Provide as indicated.
.2 Alignment guides:
.1 Provide as indicated
.2 Concrete: to Section 03 30 00 - Cast in Place Concrete.
.3 Reinforced: to Section 03 20 00 - Concrete Reinforcing.

3 Execution

3.1 INSTALLATION

.1 Install expansion joints with cold setting. Make record of cold settings.
.2 Install expansion joints and flexible connections in accordance with manufacturer's instructions.
.3 Install pipe anchors and guides as indicated. Anchors to withstand 150 % of axial thrust.

3.2 CLEANING AND START-UP

.1 In accordance with Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.

3.3 PERFORMANCE VERIFICATION

.1 In accordance with Section 23 08 01 - Performance Verification Mechanical Piping Systems: Mechanical Piping Systems.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 23 05 54 - Mechanical Identification.

1.2 REFERENCES

.1 American Society of Mechanical Engineers (ASME).
- .1 ASME B40.100, Pressure Gauges and Gauge Attachments.
- .2 ASME B40.200, Thermometers, Direct Reading and Remote Reading.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-14.4, Thermometers, Liquid-in-Glass, Self Indicating, Commercial/ Industrial Type.
- .2 CAN/CGSB-14.5, Thermometers, Bimetallic, Self-Indicating, Commercial/ Industrial Type.

1.3 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit manufacturer's product data for following items:
- .1 Thermometers.
- .2 Pressure gauges.
- .3 Stop cocks.
- .4 Syphons.
- .5 Wells.

.3 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 00 - Cleaning & Waste Management.

.2 Collect, separate and place in designated containers for reuse and recycling, paper, plastic, polystyrene, corrugated cardboard packaging, steel, metal, in accordance with Waste Management Plan.

.3 Fold up metal banding, flatten and place in designated area for recycling.

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

.5 Ensure emptied containers are sealed, labelled and stored safely for disposal away from children.

2 Products

2.1 GENERAL

.1 Design point to be at mid point of scale or range.

.2 Ranges: as indicated.

2.2 DIRECT READING THERMOMETERS

.1 Industrial, variable angle type, liquid filled, accuracy +/- scale division 225 mm scale length: to CAN/CGSB14.4 or ASME B 40, 200.
- .1 Acceptable material: Trerice, Ashcroft, Wika, Winters, Marsh.

2.3 THERMOMETER WELLS

.1 Copper pipe: copper or bronze.
.2 Steel pipe: brass.

2.4 REMOTE READING THERMOMETERS

.1 100mm diameter liquid filled or vapor activated dial type: to CAN/CG SB - 14.4 or ASME B40-200, accuracy within one scale division. Brass movement, stainless steel capillary, stainless steel spiral armour, stainless steel bulb, and polished brass or stainless steel case for wall mounting.
  .1 Acceptable material: Trerice, Ashcroft, Wika, Winters, Marsh.

2.5 PRESSURE GAUGES

.1 Dial type 112 mm, dial type: to ASME B40.100, Grade 2A, stainless steel or phosphor bronze bourdon tube having 0.5% accuracy full scale, 1% accuracy for liquid filled.
  .1 Acceptable material: Trerice, Ashcroft, Wika, Winters, Marsh.
.2 Provide bronze stop cock and :
  .1 Siphon for steam service.
  .2 Snubber for pulsating operation.
  .3 Diaphragm assembly for corrosive service.
  .4 Gasketed pressure relief back with solid front.
  .5 Oil filled for high vibration applications such as pumps.
  .6 Bronze ball valve to Section 23 05 22 - Valves - Bronze.

3 Execution

3.1 GENERAL

.1 Install so they can be easily read from floor or platform. If this cannot be accomplished, install remote reading units.
.2 Install between equipment and first fitting or valve.

3.2 THERMOMETERS

.1 Install in wells on piping arrange so that at least 25mm (1") of the stem of the thermometer is immersed in flowing fluid. Provide heat conductive material inside well.
.2 Install on inlet and outlet of equipment:
  .1 Heat exchangers.
  .2 Heating and cooling coils.
  .3 Boilers.
  .4 Chillers.
  .5 Cooling towers, closed circuit coolers and evaporative condensers
  .6 DHW tanks.
.3 Install wells in other locations as indicated.
.4 Use extensions where thermometers are installed through insulation.

3.3 PRESSURE GAUGES

.1 Install in following locations:
  .1 Suction and discharge of pumps (liquid filled).
  .2 Upstream and downstream of PRV's.
  .3 Upstream and downstream of control valves.
  .4 Inlet and outlet of coils.
  .5 Inlet and outlet of heat exchanger.
  .6 Outlet of boilers.
  .7 In other locations as indicated.

.2 Install ball valves to Section 23 05 22 - Valves - Bronze.

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

3.4 NAMEPLATES

.1 Install engraved lamicoid nameplates as specified in Section 23 05 54 - Mechanical Identification, identifying medium.

END OF SECTION

1 General

1.1 SUMMARY

.1 Section Includes:

.1 Bronze - valves.

1.2 RELATED SECTIONS

.1 Section 23 05 01 - Installation of Pipework.

1.3 REFERENCES

.1 American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME).

.1 ANSI/ASME B1.20.1 (R2001), Pipe Threads, General Purpose (Inch).

.2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

.3 ANSI/ASME B16-22 Wrought Copper and Copper Alloy Soldier Joint Pressure Fittings.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM A276, Specification for Stainless Steel Bars and Shapes.

.2 ASTM A536, Specifications for Ductile Iron Castings.

.3 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.

.4 ASTM B16 Specifications for Free Cutting Brass Rod Bar and Shapes for use in Screw Machines.

.5 ASTM B283, Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).

.6 ASTM B505/B505M, Specification for Copper-Base Alloy Continuous Castings.

.3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).

.1 MSS-SP-25, Standard Marking System for Valves, Fittings, Flanges and Unions.

.2 MSS-SP-80, Bronze Gate Globe, Angle and Check Valves.

.3 MSS-SP-110, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

.4 Canadian Standards Association (CSA)

.1 CSA B242, Groove and Solder type mechanical pipe couplings.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets.

.1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit data for valves specified in this section.

.3 Groove joint couplings and fittings to be indicated on product submittals and to be specifically identified with applicable style or series designation.

.3 Closeout Submittals:

.1 Submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.6 DELIVERY STORAGE AND DISPOSAL

.1 Waste Management and Disposal:
  .1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning & Waste Management.
  .2 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.7 MAINTENANCE

.1 Extra Materials:
.2 Furnish following spare parts:
  .1 Valves: One (1) for every 10 valves of each size & type, minimum 1.
  .2 Gaskets for flanges: one for every 10 flanged joints.
  .3 Grooved Couplings: IPS and copper tube dimensions, one for every 10 (ten) ground joints.

2 Products

2.1 MATERIALS

.1 Valves:
  .1 Except for specialty valves, to be single manufacturer.
.2 End Connections:
  .1 Connection into adjacent piping/tubing:
    .1 Steel pipe systems: Screwed ends to ANSI/ASME B1.20.1.
    .2 Copper tube systems:
      .1 Solder ends to ANSI/ASME B16.18.
      .2 Grooved ends to copper tube dimension and CSMB242
      .3 Push-to-connect ends to ANSI/ASME B16.22 and manufacturers standards.
.3 Lockshield Keys:
  .1 Where lockshield valves are specified, provide 10 keys of each size: malleable iron

2.2 CHECK VALVES

.1 Requirements common to check valves, unless specified otherwise:
  .1 Standard specification: MSS SP-80.
  .2 Connections: screwed with hexagonal shoulders.
    .1 Class 125, WP = 860 kPa (125 psi) 1.4 MPa (200psi) WOG
    .2 Class 150, WP = 1.03 MPa
    .3 200 6WP, WP = 1.4 MPa (200psi) Water.
.2 NPS 2 and under, non-rising stem, solid wedge disc, Class 125
  .1 Body: Y-pattern with integral seat at 45 degrees, screw-in cap with hex head.
  .2 Disc and seat: renewable rotating disc, two-piece hinge disc construction; seat: regrindable.
.3 NPS 2 and under, swing type, bronze disc:
  .1 Body: Y-pattern with integral seat at 45 degrees, screw-in cap with hex head.
  .2 Disc and seat: renewable rotating disc, two-piece hinge disc construction; seat: regrindable.
.4 NPS 2 and under, swing type, composition disc, 200 CWP:
  .1 Body: Y-pattern with integral seat at 45 degrees, screw-in cap with hex head.
  .2 Disc: renewable rotating disc of number 6 composition to suit service conditions, bronze two-piece hinge disc construction.

.5 NPS 2 and under, horizontal lift type, composition disc, Class 150:
- .1 Body: with integral seat, union bonnet ring with hex shoulders, cap.
- .2 Disc: renewable PTFE for steam, #6 composition rotating disc for water, oil, or gas service in disc holder having guides top and bottom, of bronze to ASTM B62.

.6 NPS 2 and under, vertical lift type, bronze disc, Class 125:
- .1 Disc: rotating disc having guides top and bottom, disc guides, retaining rings.

.7 NPS 2 and under vertical on horizontal lift type 1380kPa CWP:
- .1 Disc type 301 stainless steel, center guided.

2.3 SILENT CHECK VALVES

.1 NPS 2 and under:
- .1 Body: cast high tensile bronze to ASTM B16 or ASTM B62 with integral seat.
- .2 Pressure rating: Class 125, MPa Steam.
- .3 Connections: screwed ends to ANSI B1.20.1 and with hex. shoulders.
- .4 Disc and seat: renewable rotating disc.
- .5 Stainless steel spring, heavy duty.
- .6 Seat: regrindable.

2.4 BALL VALVES

.1 NPS 2 and under:
- .1 Body and cap: cast high tensile bronze to ASTM B62.
- .2 Pressure rating: Class125, 860 kPa steam.
- .3 Connections: Screwed ends to ANSI B1.20.1 and with hexagonal shoulders, push to connect press fit ends.
- .4 Stem: tamperproof ball drive.
- .5 Stem packing nut: external to body.
- .6 Ball and seat: replaceable stainless steel solid ball of hand chrome plated brass solid ball and teflon seats.
- .7 Stem seal: TFE EPDM, Nitrile, Flooroelustomer with external packing nut.
- .8 Operator: removable lever handle.
- .9 Cup and drain for service.
- .10 Acceptable material: Jenkins Fig 201J or equal.

2.5 BUTTERFLY VALVES

.1 NPS 2-1/2 through NPS 6.
- .1 Body: cast bronze per CDA-836 (85-5-5-5).
- .2 Pressure rating: 2065-kPa CWP.
- .3 Connections: copper tube dimensioned grooved ends.
- .4 Disc: ductile iron per ASTM A536 with elastomer coating.
- .5 Stem: integrally cast with disc.
- .6 Stem Nuts: nickel plated 416 stainless steel.
- .7 Operator: gear operator, NPS and over.

2.6 GATE VALVES

.1 Requirements common to all gate valves, unless specified otherwise:
- .1 Standard specification: MSS SP-80.
- .2 Bonnet: with hex. shoulders.
- .3 Connections: with hex. shoulders.
- .4 Inspection and pressure testing: to MSS SP-80. Tests to be hydrostatic.
- .5 Packing: high grade non-asbestos packing.

.6 Handwheel: non-ferrous.
.7 Handwheel Nut: bronze to ASTM B62.
.8 Class 125, WP = 860 kPa steam, 1.4 mPa WOG.
.9 Class 150 WP = 1.03 mPa steam, 2.07 mPa WOG.

.2 NPS 2 and under, non-rising stem, solid wedge disc, Class 125:
.1 Body: with long disc guides, screwed bonnet with stem retaining nut.
.2 Operator: Handwheel.

.3 NPS 2 and under, non-rising stem, solid wedge disc, Class 150:
.1 Body: with long disc guides, screwed bonnet with stem retaining nut.
.2 Operator: Handwheel.

.4 NPS 2 and under, rising stem, split wedge disc, Class 125:
.1 Body: with long disc guides, screwed bonnet.
.2 Disc: split wedge, bronze to ASTM B283, loosely secured to stem.
.3 Operator: Handwheel

.5 NPS 2 and under, rising stem, solid wedge disc, Class 125:
.1 Body: with long disc guides, screwed bonnet.
.2 Operator: Handwheel.

.6 NPS 2 and under, rising stem, solid wedge disc, Class 150:
.1 Body: with long disc guides, screwed bonnet.
.2 Operator: Handwheel.

2.7 GLOBE VALVES

.1 Requirements common to all globe valves, unless specified otherwise:
.1 Standard specification: MSS SP-80.
.2 Bonnet: union with hex. shoulders.
.3 Connections: screwed with hex. shoulders.
.4 Inspection and pressure testing: to MSS SP-80. Tests to be hydrostatic.
.5 Packing: non-asbestos.
.6 Handwheel: non-ferrous.
.7 Handwheel Nut: bronze to ASTM B62.
.8 Class 125, WP = 860 kPa steam, 1.4 MPa WOG.
.9 Class 150 WP = 1.03 mPa steam, 2.07 MPa WOG.

.2 NPS 2 and under, composition disc, Class 125:
.1 Body and bonnet: screwed bonnet.
.2 Disc and seat: renewable rotating PTFE disc regrindable bronze seat, loosely secured to bronze stem to ASTM B505.
.3 Operator: Handwheel.

.3 NPS 2 and under, composition disc, Class 150:
.1 Body and bonnet: union bonnet.
.2 Disc and seat: renewable rotating PTFE disc in easily removable disc holder, regrindable bronze seat, loosely secured to bronze stem to ASTM B505.
.3 Operator: Handwheel.
.4 Acceptable material: Jenkins Figure 106BJ or equal.

.4 NPS 2 and under, plug disc, Class 150, screwed ends:
.1 Body and bonnet.
.2 Disc and seat ring: tapered plug type with disc stem ring of stainless steel to ASTM A276, loosely secured of stem.
.3 Operator: Handwheel.
.4 Acceptable material: Jenkins Figure 2032J or equal

.5 Angle valve, NPS 2 and under, composition disc, Class 150:
- .1 Body and bonnet: union bonnet.
- .2 Disc and seat: renewable rotating PTFE disc in slip-on easily removable disc holder having integral guides, regrindable bronze seat, loosely secured to stem.
- .3 Operator: Handwheel.
- .4 Acceptable material: Jenkins Figure 108BJ or equal.

2.8 ACCEPTABLE MATERIAL

.1 Jenkins, Crane, Watts, Newman Hattersley, Milwaukee, Conbraco, Kitz, Red White, M.A. Stewart, Nibco, Victaulic, Boshart.

3 Execution

3.1 INSTALLATION

.1 Install rising stem valves in upright position with stem above horizontal.

.2 Remove internal parts before soldering.

.3 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance, and equipment removal.
- .1 Unions are not required in Installations using ground mechanical couplings. The couplings shall serve as unions.

.4 Add joining tube, couplings and fittings with grooved joint valves shall be copper tube dimensioned. Tlaring tube or fitting ends to accommodate IPS sized valves is not permitted.

3.2 COMMISSIONING

.1 As part of commissioning activities, develop a schedule and valves and record there on there as identifier, location, services, purchase order number and date, manufacturer, identification data specified above.

END OF SECTION

1 General

1.1 SUMMARY

.1 Related Sections:
- .1 Section 23 05 01 - Installation of Pipework.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME).
- .1 ANSI/ASME B16.1-, Cast Iron Pipe Flanges and Flanged Fittings.

.2 American Society for Testing and Materials International (ASTM).
- .1 ASTM A49-, Specification for Heat-Treated Carbon Steel Joint Bars.
- .2 ASTM A126-, Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- .3 ASTM B61-, Specification for Steam or Valve Bronze Castings.
- .4 ASTM B62-, Specification for Composition Bronze or Ounce Metal Castings.
- .5 ASTM B85-, Specification for Aluminum-Alloy Die Castings.
- .6 ASTM B209-, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
- .1 MSS SP-67 Butterfly Valves.
- .2 MSS SP-70-, Cast Iron Gate Valves, Flanged and Threaded Ends.
- .3 MSS SP-71-, Grey Iron Swing Check Valves, Flanged and Threaded Ends.
- .4 MSS SP-82-, Valve Pressure Testing Methods.
- .5 MSS SP-85-, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.3 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets.
- .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit data for valves specified in this section.

.3 Closeout Submittals:
- .1 Submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 QUALITY ASSURANCE

.1 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.5 DELIVERY STORAGE AND DISPOSAL

.1 Waste Management and Disposal:
- .1 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning & Waste Management.
- .2 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.6 MAINTENANCE

.1 Extra Materials:

.2 Furnish following spare parts:
- .1 Valves: one (1) for every 10 valves of each size and type, minimum 1.

.2 Gaskets for flanges: one for every 10 flanged joints.

2 Products

2.1 MATERIAL

.1 Valves:
- .1 Except for specialty valves, to be of single manufacturer.

.2 Standard specifications:
- .1 Gate valves: MSS SP-70.
- .2 Globe valves: MSS SP-85.
- .3 Check valves: MSS SP-71.

.3 Requirements common to valves, unless specified otherwise:
- .1 Body, bonnet: cast iron to ASTM B209 Class B.
- .2 Connections: flanged ends plain face to ANSI B16.1.
- .3 Inspection and pressure testing: to MSS SP-82.
- .4 Bonnet gasket: non-asbestos.
- .5 Stem: to have precision-machined Acme or 60 degrees V threads, top screwed for handwheel nut.
- .6 Stuffing box: non-galling two-piece ball-jointed packing gland, gland bolts and nuts.
- .7 Gland packing: non-asbestos.
- .8 Handwheel: Die-cast aluminum alloy to ASTM B85 or malleable iron to ASTM A49. Nut of bronze to ASTM B62.
- .9 Identification tag: with catalogue number, size, other pertinent data.

.4 All products to have CRN registration numbers.

.5 Bronze trim for steam, water, air or glycol services. Iron trim for oil, gas or gasoline.

.6 Acceptable material: Crane, Jenkins, Milwaukee, Newman Hattersley, Kite, M.A. Stewart, NIBCO.

2.2 GATE VALVES

.1 NPS 2 1/2 - 8, non rising stem, inside screw, bronze or iron trim, solid wedge disc:
- .1 Body and multiple-bolted bonnet: with bosses in body and bonnet for taps and drains, full length disc guides designed to ensure correct re-assembly. Class 125.
- .2 Bronze trim.
  - .1 Disc: solid offset taper wedge, bronze to ASTM B62.
  - .2 Seat rings: renewable bronze to ASTM B62, screwed into body.
  - .3 Stem: bronze to ASTM B62.
    - .1 Disc: solid offset taper wedge, cast iron to ASTM A126 Class B, secured to wrought steel stem.
    - .2 Seat: Integral with body.
    - .3 Stem: wrought steel.
    - .4 Operator: Handwheel.

.2 NPS 2 1/2-8, outside screw and yoke (OS&Y), bronze trim, solid wedge disc:
- .1 Body and multiple-bolted bonnet: with bosses in body and bonnet for taps and drains, full length disc guides designed to ensure correct re-assembly, yoke, yoke hub, yoke sleeve and nut. Class 125.
- .2 Bronze trim.
  - .1 Disc: solid offset taper wedge, bronze to ASTM B62 up to NPS 3, cast iron with bronze disc rings on other sizes, secured to stem through

integral forged T-head disc-stem connection.
.2 Seat rings: renewable bronze screwed into body.
.3 Stem: manganese bronze.
.3 Iron trim.
.1 Disc: solid offset taper all-cast iron, secured to stem through integral forged T-head disc-stem connection.
.2 Seat rings: integral with body.
.3 Stem: nickel-plated steel.
.4 Pressure-lubricated operating mechanism.
.5 Operator: Handwheel.

2.3 UNDERWRITERS APPROVED GATE VALVE

.1 NPS 2 1/2 - 14, OS&Y:
.1 Approvals: UL and FM approved for fire service.
.2 UL and FM Label: on valve yoke.
.3 Body, Bonnet: cast iron to ASTM A126 Class B. Wall thicknesses to ANSI B16.1 and ULC 262 (B).
.4 Bonnet bushing, yoke sleeve: bronze, to FM requirements.
.5 Packing gland: bronze.
.6 Stem: manganese bronze. Diameter to ULC C-262 (B).
.7 Stuffing box dimensions, gland bolt diameter: to ULC C-262 (B).
.8 Bosses for bypass valve, drain: on NPS 4 and over.
.9 Disc: solid taper wedge. Up to NPS 3: bronze. NPS 4 and over: cast iron with bronze disc rings.
.10 Disc seat ring: self-aligning, Milwood undercut on NPS 3 - 12.
.11 Pressure rating:
.1 NPS 2-1/2 - 12: 1.7 Mpa CWP.
.2 NPS 14-1.2: 1.2 MPa CWP.
.12 Operator: handwheel.

2.4 GLOBE VALVES

.1 NPS 2 1/2 - 10, OSY:
.1 Body: with multiple-bolted bonnet.
.2 WP: 860 kPa steam, 1.4 MPa CWP.
.3 Bonnet-yoke gasket: non-asbestos.
.4 Disc: bronze to ASTM B62, fully guided from bottom, securely yet freely connected to stem for swivel action and accurate engagement with disc.
.5 Seat ring: renewable, regrindable, screwed into body.
.6 Stem: bronze to ASTM B62.
.7 Operator: Handwheel.

2.5 BYPASSES FOR GATE AND GLOBE VALVES

.1 Locations: on valves as indicated.
.2 Position of bypass valve on main valves: spindle uprights or parallel position.
.3 Size of bypass valve:
.1 Main valve up to NPS 8: NPS 3/4.
.2 Main valve NPS 10 and over: NPS 1.
.4 Type of bypass valves:
.1 On gate valve: globe, with composition disc, bronze trim, to Section 23 05 22 - Valves - Bronze. Pressure rating to match main valve.

.2 On globe valve: globe, with composition disc, bronze trim, to Section 23 05 22 - Valves - Bronze. Pressure rating to match main valve.

2.6 VALVE OPERATORS

.1 Install valve operators as follows:

.1 Handwheel: on valves except as specified.

.2 Handwheel with chain operators: on valves installed more than 2400 mm above floor in boiler rooms and mechanical equipment rooms.

2.7 CHECK VALVES

.1 Swing check valves, Class 125:

.1 Body and bolted cover: with tapped and plugged opening on each side for hinge pin. Flanged ends: plain faced with smooth finish.

.1 Up to NPS 16: cast iron to ASTM A126 Class B.

.2 Ratings:

.1 NPS 2 1/2 - 12: 860 kPa steam; 1.4 MPa CWP.

.3 Bronze trim.

.1 Disc: rotating for extended life.

.1 Up to NPS 6: bronze to ASTM B 62.

.2 Seat rings: renewable bronze to ASTM B62 screwed into body.

.3 Hinge pin, bushings: renewable bronze to ASTM B62.

.4 Iron trim.

.1 Disc: A126 Class B, secured to stem, rotating for extended life.

.2 Seat: cast iron, integral with body.

.3 Hinge pin: exelloy; bushings: malleable iron.

.5 Identification tag: fastened to cover.

.6 Hinge: galvanized malleable iron.

.2 Swing check valves, NPS 2 1/2 - 8 Class 250:

.1 Body and bolted cover: cast iron to ASTM A126 Class B with tapped and plugged opening on each side for hinge pin.

.2 Flanged ends: 2 mm raised face with serrated finish.

.3 Rating: 250 psi steam; 500 psi CWP.

.4 Disc: rotating for extended life.

.1 Up to NPS 3: bronze to ASTM B61.

.2 NPS 4 - 8: Iron faced with ASTM B61 bronze.

.5 Seat rings: renewable bronze to ASTM B61, screwed into body.

.6 Hinge pin, bushings: renewable, bronze to ASTM B61.

.7 Hinge: galvanized malleable iron.

.8 Identification tag: fastened to cover.

2.8 SILENT CHECK VALVES

.1 Construction:

.1 Body: malleable or ductile iron with integral seat.

.2 Pressure rating: class 125, WP = 860 kPa.

.3 Connections: grooved ends or flanged ends.

.4 Disc: bronze or stainless steel renewable rotating disc.

.5 Seat: renewable, EPDM.

.6 Stainless steel spring, heavy duty.

.7 Grooved end check valves.

2.9 GROOVED END BUTTERFLY VALVES

.1 Butterfly valves: to MSS-SP-67. Application: Isolating coils or section of multiple component equipment (eg multi-section coils, multi-cell

.1 NPS 2 cooling towers and over: grooved ends.

.2 2068 kPa WOG and bath bi-directional and dead end service capable to fall rated pressure, ductile iron body with blow-out proof stainless steel stems and nickel coated ductile iron disc. Seat shall be "EPDM" and have a full 360 degree continuous contract with the seating surface.

.3 Valve operations: level, gear operator NPS 6 and over.

2.10 ACCEPTABLE MATERIAL

.1 Jenkins, Crane, Wath, Newman, Hatersley, Milwaukee, Conbraco, Kitz, Red Wine, M.A. Stewart, Nibco, Victaulic.

.2 Grooved end valves to be supplied by the same manufacturer as the grooved fittings.

.3 Grooved end valves to be installed in accordance with the manufacturer's written installation instructions. Grooved ends to be clean and free from indentations and projections. Gaskets to be verified as suitable for the intended service prior to installation. Gaskets to be molded and produced by the coupling manufacturer. Contractor to remove and replace any joints deemed improperly installed.

3 Execution

3.1 INSTALLATION

.1 Install rising stem valves in upright position with stem above horizontal.

3.2 COMMISSIONING

.1 As part of commissioning activities, develop schedule of valves and record thereon identifier, location, service, purchase order number and date and manufacturer.

END OF SECTION

1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME).
- .1 ANSI/ASME B1.20.1-, Pipe Threads, General Purpose (Inch).
- .2 ANSI/ASME B16.1-, Cast Iron Pipe Flanges and Flanged Fittings.
- .3 ANSI/ASME B16.5-, Pipe Flanges and Flanged Fittings.
- .4 ANSI/ASME B16.11-, Forged Fittings, Socket-Welding and Threaded.
- .5 ANSI/ASME B16.25-, Buttwelding Ends.
- .6 ANSI/ASME B16.34-, Valves - Flanged, Threaded and Welding Ends.

.2 American National Standards Institute (ANSI)/American Petroleum Institute (API).
- .1 ANSI/API 609-, Lug- and Water-Type Butterfly Valves.

.3 American Society for Testing and Materials International, (ASTM).
- .1 ASTM A126-, Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- .2 ASTM B62-, Specification for Composition Bronze or Ounce Metal Castings.
- .3 ASTM B209M-, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.4 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
- .1 MSS SP-67-, Butterfly Valves.

1.2 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets.
- .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Submit data for valves specified this section.

.3 Closeout Submittals:
- .1 Submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 QUALITY ASSURANCE

.1 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.4 DELIVERY STORAGE AND DISPOSAL

.1 Waste Management and Disposal:

.2 Separate and recycle waste materials in accordance with Section 01 74 00 - Cleaning & Waste Management.

.3 Collect and separate for disposal paper packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

1.5 MAINTENANCE

.1 Extra Materials:
- .1 Valves: one for every 10 valves of each size and type, minimum 1.Furnish following spare parts:
- .2 Gaskets for flanges: one for every 10 flanged joints.

2 Products

2.1 BUTTERFLY VALVES - RESILIENT SEAT - 200 PSIG

.1 Except to specialty valves, to be of single manufacturer.
.2 To be suitable for dead-end service.
.3 CRN registration number required for products.
.4 Sizes: Wafer or lug type.
.5 Pressure rating for tight shut-off at temperatures up to maximum for seat material.
  .1 NPS 2 - 12: 200 psig.
.6 Minimum seat temperature ratings to 135 degrees C.
.7 Application: on-off operation.
.8 Full lug body (threaded).
.9 Operators:
  .1 NPS 2 - 6: Handles capable of locking in any of ten (10) positions - 0 degrees to 90 degrees. Handle and release trigger - ductile iron. Return spring and hinge pin: carbon steel. Latch plate and mounting hardware: cadmium plated carbon steel. Standard coating: black laquer.
.10 Designed to comply with MSS SP-67 and API 609.
.11 Compatible with ANSI Class 125/Class 150 flanges.
.12 Construction:
  .1 Body ductile iron.
  .2 Disc: aluminum bronze.
  .3 Seat: EPDM.
  .4 Shaft: 416 stainless steel.
  .5 Taper pin: 316 SS.
  .6 Key: carbon steel or stainless.
  .7 O-Ring: Buna-N.
  .8 Bushings: Luberized bronze teflon.

2.2 BUTTERFLY VALVES - RESILIENT SEAT - 285 PSIG

.1 Sizes: Lug type.
.2 Pressure rating: 285 psig at 135 degrees C.
.3 Lug body: 150 ANSI bolt pattern.
.4 Full lug body (threaded).
.5 Application: for on-off service.
.6 Operators:
  .1 NPS 2 - 6: Handles capable of locking in any of ten (10) positions - 0 degrees to 90 degrees. Handle and release trigger - ductile iron. Return spring and hinge pin: carbon steel. Latch plate and mounting hardware: cadmium plated carbon steel.
  .2 Install parallel or perpendicular to pipeline.
.7 Designed to comply with MSS SP-67 and API 609.
.8 Compatible with ANSI B16.1 Class 125 (iron) and ANSI B16.5 Class 150 (steel) flanges.
.9 Construction:
  .1 Body: ductile iron.
  .2 Disc: aluminum bronze.
  .3 Seat: EPDM.
  .4 Refer to manufacturer's literature for additional materials.
  .5 Shaft: NPS 2 - 12: 416 stainless steel.

.6 Taper pin: 316 SS.
.7 Blowout proof stem.
.8 O-Ring: Buna-N.
.9 Bushings: teflon.
.10 Disc shall not be pinned to shaft.
.11 Bubble tight shutoff with downstream flanges removed, class 6 shutoff.

2.3 MOUNTING FLANGES

.1 Class 125 cast iron to ANSI B16.1 or Class 150 steel to B16.5 pipe flanges.

2.4 BUTTERFLY VALVES - 300 PSIG

.1 Sizes: Grooved ends: NPS 2 to 12.
.2 Pressure rating: 300 psig WOG.
.3 Body: Ductile iron to ASTM A-536 with polypropylene coating.
.4 Disc: Ductile iron to ASTM A-536.
.5 Disc coating: EPDM.
.6 Body coating: Polyphenylene sulfide blend.
.7 Drive hub adapter and Operation Bracket: hot rolled steel, enamel coated.
.8 Upper bearing/lower trunnion seals: EPDM
.9 Upper bearing/lower trunnion: Navel brass or Bronze alloy.
.10 Bolts and washers: Cold rolled steel, zinc plated.
.11 Operator:
  .1 NPS 2 to 3: two position manual handle
  .2 NPS 4 to 6: Manual lever lock
  .3 Handwheel with chain operator on valves installed more than 2400 mm above floor in boiler rooms and mechanical equipment rooms.

2.5 ELECTRIC ACTUATORS

.1 Operation: designed to provide precise quarter turn electric operation.
  .1 Torque range: up to 1.130 N-m and speed ranges from 10 seconds to 30 seconds to move from fully open to fully closed.
  .2 Gear train within actuator to provide smooth continuous rotary power stroke for accurate automatic valve positioning. Factory-set, field adjustable cam-actuated travel limit switches to provide precise control of shaft rotation.
.2 Construction:
  .1 Castings: heavy duty industrial grade for rugged use.
  .2 Actuators: continuous duty with high efficiency single phase reversing capacitor motor with thermal overload protection.
  .3 Gears and pinions constructed from hardened steel.
  .4 Gear train to be permanently lubricated.
  .5 Mechanical brake to ensure that gear is locked in precise position.
.3 Electrical:
  .1 Standard voltage: 120 VAC. 60 Hz.
  .2 Control options: 4-20 Ma DC or 0-10 VDC.
  .3 CSA approved.
  .4 Electrical rating: NEMA IV.

3 Execution

3.1 PREPARATION

.1 Valve and mating flange preparation.
  .1 Inspect adjacent pipeline, remove rust, scale, welding slag, other foreign material.
  .2 Ensure that valve seats and pipe flange faces are free of dirt or surface irregularities which may disrupt flange seating and cause external leakage.
  .3 Install butterfly valves with disc in almost closed position.
  .4 Inspect valve disc seating surfaces and waterway and eliminate dirt or foreign material.

3.2 INSTALLATION OF VALVES

.1 Install in accordance with manufacturer's instructions.
.2 Do not use gaskets between pipe flanges and valves unless instructed otherwise by valve manufacturer.
.3 Verify suitability of valve for application by inspection of identification tag.
.4 Mount actuator on to valve prior to installation.
.5 Handle valve with care so as to prevent damage to disc and seat faces.
.6 Valves in horizontal pipe lines should be installed with stem in horizontal position to minimize liner and seal wear.
.7 Ensure that valves are centered between bolts before bolts are tightened and then opened and closed to ensure unobstructed disc movement. If interference occurs due, for example to pipe wall thickness, taper bore adjacent piping to remove interference.

3.3 ACTUATOR INSTALLATION

.1 Air hoses or electrical connections to be made by actuator manufacturer.
.2 Cycle valve operation from fully closed to fully open then back to fully closed.
.3 At same time, check travel stop settings for proper disc alignment.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast in Place Concrete.
.2 Section 05 12 23 - Structural Steel for Buildings.
.3 Section 05 50 00 - Metal Fabrication.

1.2 REFERENCES

.1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
  .1 ANSI/ASME B31.1, Power Piping.
.2 American Society for Testing and Materials International (ASTM)
  .1 ASTM A125, Specification for Steel Springs, Helical, Heat-Treated.
  .2 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  .3 ASTM A563, Specification for Carbon and Alloy Steel Nuts.
.3 Factory Mutual (FM)
.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).
.5 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
  .1 MSS SP58, Pipe Hangers and Supports - Materials, Design and Manufacture.
  .2 ANSI/MSS SP69, Pipe Hangers and Supports - Selection and Application.
  .3 MSS SP89, Pipe Hangers and Supports - Fabrication and Installation Practices.
.6 Underwriter's Laboratories of Canada (ULC)

1.3 SYSTEM DESCRIPTION

.1 Design Requirements:
  .1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
  .2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1 or MSS SP58.
  .3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.
  .4 Design hangers and supports to support systems under conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
  .5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP58.
.2 Performance Requirements:
  .1 Design supports, platforms, cat walks, hangers, to withstand seismic events for locations as per the national building code.

1.4 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
.2 Shop drawings: submit drawings stamped and signed for approval by Owner's representative.
.3 Submit shop drawings and product data for following items:
  .1 Bases, hangers and supports.
  .2 Connections to equipment and structure.
  .3 Structural assemblies.
  .4 Quality Assurance Submittals: submit following in accordance with Section 01 33

00 - Submittal Procedures.

.1 Certification by manufacturer: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturers installation instruction.

.1 Consultant will make available one (1) copy of systems suppliers installation instructions.

.4 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

2 Products

2.1 GENERAL

.1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS SP58 and MSS SP59.

.2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2 PIPE HANGERS

.1 Finishes:

.1 Pipe hangers and supports: galvanized, painted with zinc-rich paint after manufacture.

.2 Use electro-plating galvanizing process or hot dipped galvanized process.

.3 Ensure steel hangers in contact with copper piping are copper plated or epoxy coated.

.2 Upper attachment structural: suspension from lower flange of I-Beam:

.1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.

.1 Rod: 9 mm UL listed, 13 mm FM approved.

.2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron beam clamp, eye rod, jaws and extension with carbon steel retaining clip, tie rod, nuts and washers, UL listed FM approved where required to MSS-SP58 and MSS-SP69.

.3 Upper attachment structural: suspension from upper flange of I-Beam:

.1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed. FM approved where required to MSS SP69.

.2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nut UL listed, FM approved where required.

.4 Upper attachment to concrete:

.1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm minimum greater than rod diameter.

.2 Concrete inserts: wedge shaped body with knockout protector plate, UL listed to FM approved where required to MSS SP69.

.5 Shop and field-fabricated assemblies:

.1 Trapeze hanger assemblies: MSS SP89.
.2 Steel brackets: MSS SP89.
.3 Sway braces for seismic restraint system: to MSS SP89.0

.6 Hanger rods: threaded rod material to MSS SP58:
.1 Ensure that hanger rods are subject to tensile loading only.
.2 Provide linkages where lateral or axial movement of pipework is anticipated.
.3 Do not use 22 mm or 28 mm rod.

.7 Pipe attachments: material to MSS SP58:
.1 Attachments for steel piping: carbon steel galvanized.
.2 Attachments for copper piping: copper plated black steel.
.3 Use insulation shields for hot pipework.
.4 Oversize pipe hangers and supports for insulated pipes.

.8 Adjustable clevis: material to MSS SP69 UL listed, (FM approved where required) clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
.1 Ensure "U" has hole in bottom for riveting to insulation shields.

.9 Yoke style pipe roll: carbon steel yoke, rod and nuts with cast iron roll, to MSS SP69.

.10 U-bolts: carbon steel to MSS SP69 with 2 nuts at each end to ASTM A563.
.1 Finishes for steel pipework: galvanized.
.2 Finishes for copper, glass, brass or aluminum pipework: black with farmed portion plastic coated or epoxy coated.

.11 Pipe rollers: cast iron roll and roll stand with carbon steel rod to MSS SP69.

2.3 RISER CLAMPS

.1 Steel or cast iron pipe: galvanized carbon steel to MSS SP58, type 42, UL listed, FM approved where required.
.2 Copper pipe: carbon steel copper plated to MSS SP58, type 42.
.3 Bolts: to ASTM A307.
.4 Nuts: to ASTM A563.

2.4 INSULATION PROTECTION SHIELDS

.1 Insulated cold piping:
.1 64 kg/m3 density insulation plus insulation protection shield to: MSS SP69, galvanized sheet carbon steel. Length designed for maximum 3 m span.

.2 Insulated hot piping:
.1 Curved plate 300 mm long, with edges turned up, welded-in center plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP69.

2.5 CONSTANT SUPPORT SPRING HANGERS

.1 Springs: alloy steel to ASTM A125, shot peened, magnetic particle inspected, with +/-5% spring rate tolerance, tested for free height, spring rate, loaded height and provided with Certified Mill Test Report (CMTR).
.2 Load adjustability: 10% minimum adjustability each side of calibrated load. Adjustment without special tools. Adjustments not to affect travel capabilities.
.3 Provide upper and lower factory set travel stops.
.4 Provide load adjustment scale for field adjustments.
.5 Total travel to be actual travel + 20%. Difference between total travel and actual travel 25 mm minimum.
.6 Individually calibrated scales on each side of support calibrated prior to shipment, complete with calibration record.

2.6 VARIABLE SUPPORT SPRING HANGERS

.1 Vertical movement: 13 mm minimum, 50 mm maximum, use single spring pre-compressed variable spring hangers.
.2 Vertical movement greater than 50 mm: use double spring pre-compressed variable spring hanger with 2 springs in series in single casing.
.3 Variable spring hanger complete with factory calibrated travel stops. Provide certificate of calibration for each hanger.
.4 Steel alloy springs: to ASTM A125, shot peened, magnetic particle inspected, with +/-5 % spring rate tolerance, tested for free height, spring rate, loaded height and provided with CMTR.

2.7 EQUIPMENT SUPPORTS

.1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05 12 23 - Structural Steel for Buildings. Submit calculations with shop drawings.

2.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

.1 Provide templates to ensure accurate location of anchor bolts.

2.9 PLATFORMS AND CATWALKS

.1 To Section 05 50 00 - Metal Fabrications.

2.10 HOUSE-KEEPING PADS

.1 For base mounted equipment: Provide 100 mm high concrete housekeeping pads for base-mounted equipment; size pads 50 mm larger than equipment; chamfer pad edges.
.2 Concrete: to Section 03 30 00 - Cast-in-place Concrete.

2.11 OTHER EQUIPMENT SUPPORTS

.1 Fabricate equipment supports from structural grade steel meeting requirements of Section 05 12 23 - Structural Steel for Buildings.
.2 Submit structural calculations with shop drawings.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Install in accordance with:
  .1 manufacturer's instructions and recommendations.
.2 Vibration Control Devices:
  .1 Install on piping systems at pumps, boilers, chillers, cooling towers, and as indicated.
.3 Clamps on riser piping:
  .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
  .2 Bolt-tightening torques to be to industry standards.
  .3 Steel pipes: install below coupling or shear lugs welded to pipe.
  .4 Cast iron pipes: install below joint.
.4 Clevis plates:
  .1 Attach to concrete with four (4) minimum concrete inserts, one (1) at each

corner.

.5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

.6 Use approved constant support type hangers where:

.1 Vertical movement of pipework is 13 mm or more.

.2 Transfer of load to adjacent hangers or connected equipment is not permitted.

.7 Use variable support spring hangers where:

.1 Transfer of load to adjacent piping or to connected equipment is not critical.

.2 Variation in supporting effect does not exceed 25 % of total load.

3.3 HANGER SPACING

.1 Plumbing piping: to most stringent requirements of Canadian Plumbing Code.

.2 Fire protection: to applicable fire code.

.3 Gas and fuel oil piping: up to NPS 1/2: every 1.8 m.

.4 Copper piping: up to NPS 1/2: every 1.5 m.

.5 Hyronic, steam, condensate, rigid and flexible roll grooved piped: in accordance with table below, but not less than one hanger at joints.

.6 Within 300 mm of each elbow.

.7

Max Pipe Size: NPS	Max Spacing Steel	Max Spacing Copper
up to 1-1/4	2.1m	1.8m
1-1/2	2.7m	2.4m
2	3.0m	2.7m
2-1/2	3.6m	3.0m
3	3.6m	3.0m
3-1/2	3.9m	3.3m
4	4.2m	3.6m
5	4.8m	
6	5.1m	
8	5.7m	
10	6.6m	
12	6.9m	

Pipework greater than NPS 12: to MSS SP69

3.4 HANGER INSTALLATION

.1 Install hanger so that rod is vertical under operating conditions.

.2 Adjust hangers to equalize load.

.3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members. Comprised of angle Iron or c-channel.

3.5 HORIZONTAL MOVEMENT

.1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.

.2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.6 FINAL ADJUSTMENT

.1 Adjust hangers and supports:

.1 Ensure that rod is vertical under operating conditions.

.2 Equalize loads.

.2 Adjustable clevis:

.1 Tighten hanger load nut securely to ensure proper hanger performance.

.2 Tighten upper nut after adjustment.

.3 C-clamps:

.1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.

.4 Beam clamps:

.1 Hammer jaw firmly against underside of beam.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 03 30 33 - Cast in Place Concrete.

.2 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

1.2 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 National Fire Protection Association (NFPA)

.1 NFPA 13, Standard for the Installation of Sprinkler Systems.

.3 National Building Code of Canada (NBC)

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.

.1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.1 Provide separate shop drawings for each isolated system complete with performance and product data.

.2 Shop drawings; submit drawings stamped and signed for approval by Consultant.

.3 Provide detailed drawings of seismic control measures for equipment and piping.

.3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions.

.1 Consultant will make available 1 copy of systems supplier's installation instructions

.3 Manufacturer's Field Reports: manufacturer's field reports specified.

1.4 ADDITIONAL REQUIREMENTS

.1 The Contractor and the vibration isolation manufacturer or his regularly designated and factory authorized representative shall perform the following tasks in addition to the supply and installation of isolation equipment.

.1 Obtain from the Architect the approved manufacturer's name, model number, and other necessary identifying data for each item of mechanical and electrical equipment to be resiliently mounted. Coordinate all resilient mounting systems with the exact equipment to be furnished in regard to physical size, isolator locations, weight, rotating speed, etc. Direct contact and cooperation between the vibration isolation device fabricator and the equipment manufacturer will be required.

.2 Obtain all necessary date in regard to piping systems which are to be resiliency supported so that proper isolators can be selected. Select piping system isolators for proper coordination with the physical arrangement of pipe lines and with the physical characteristics of the building.

.3 Submit shop drawings as required by other portions of this specification. These

drawings shall include specification information as follows:

.1 Manufacturer's model number for each isolator, the machine or pipeline to which it is to be applied, and the number of isolators to be furnished for each machine or pipeline.

.2 For steel spring mounts or hangers - free height, deflected height, solid height, isolator loading, and diameter of spring coil.

.3 For elastomer or glass fiber isolators - free height, deflected height, and isolator loading.

.4 Dimensional and weight data for concrete inertia bases, steel and rail bases, and details of isolator attachment.

.4 Provide on-the-job supervision as required during installation of resiliently mounted equipment and piping to assure that all vibration isolators are installed in strict accordance with normally accepted practices for critical environments.

.5 Replace at no extra cost to the Owner and isolators which do not produce the required deflection, are improperly loaded above or below their correct operating height, or which in any way do not produce the required isolation.

.6 Cooperate with all other Contractors engaged in this project so that the installation of vibration isolation devices will proceed in a manner that is in the best interests of the Owner.

.7 Notify the Architect of any project conditions which affect vibration isolation system installation or performance and which are found to be different from conditions indicated by the drawings or described by the specifications. Should vibration isolation system installation proceed without such notifications any remedial work required to achieve proper isolator performance shall be accomplished by the Contractor at no additional cost to the Owner.

.8 Be alert for possible "short-circuiting" of vibration isolation systems by piping supports, electrical connections, temperature control connections, drain lines, building construction, etc., and notify the involved contractor as to these problems or potential problems. Where such situations cannot be easily resolved, notify the Architect so that preventive or remedial action can take place on a timely basis. Any remedial measures required shall be undertaken by the contractor responsible at no additional cost to the Owner.

1.5 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse in accordance with Section 01 74 00 - Cleaning and Waste Management.

2 Products

2.1 GENERAL

.1 Size and shape of bases type and performance of vibration isolation as indicated.

2.2 ELASTOMERIC PADS

.1 Type EP1 - neoprene waffle or ribbed; 9mm minimum thick; 50 durometer; maximum loading 350 kPa.

.2 Type EP2 - rubber waffle or ribbed; 9 mm minimum thick; 30 durometer natural rubber; maximum loading 415 kPa.

.3 Type EP3 - neoprene-steel-neoprene; 9mm minimum thick neoprene bonded to 1.71mm steel plate; 50 durometer neoprene, waffle or ribbed; holes sleeved with isolation washers; maximum loading 350 kPa.

.4 Type EP4 - rubber-steel-rubber; 9 mm minimum thick rubber bonded to 1.71 mm steel plate; 30 durometer natural rubber, waffle or ribbed; holes sleeved with isolation washers; maximum loading 415 kPa.

2.3 ELASTOMERIC MOUNTS

.1 Type M1 - colour coded; neoprene in shear; maximum durometer of 60; threaded insert and two bolt-down holes; ribbed top and bottom surfaces.

2.4 SPRINGS

.1 Design stable springs: ratio of lateral to axial stiffness is equal to or greater than 1.2 times ratio of static deflection to working height. Select for 50% travel beyond rated load. Units complete with leveling devices.

.2 Ratio of height when loaded to diameter of spring between 0.8 to 1.0.

.3 Cadmium plate for outdoor installations, 100% relative humidity.

.4 Colour code springs.

2.5 SPRING MOUNT

.1 Zinc or cadmium plated hardware; housings coated with rust resistant paint.

.2 Type M2 - stable open spring: support on bonded 6 mm minimum thick ribbed neoprene or rubber friction and acoustic pad.

.3 Type M3 - stable open spring: 6 mm minimum thick ribbed neoprene or rubber friction and acoustic pad, bonded under isolator and on isolator top plate; leveling bolt for rigidly mounting to equipment.

.4 Type M4 - restrained stable open spring: supported on bonded 6 mm minimum thick ribbed neoprene or rubber friction and acoustic pad; built-in resilient limit stops, removable spacer plates.

.5 Type M5 - enclosed spring mounts with snubbers for isolation up to 950 kg maximum.

.6 Acceptable material: Korfund, Masdom, Vibron, Vibro Acoustics, Mason

2.6 HANGERS

.1 Colour coded springs, rust resistant, painted box type hangers. Arrange to permit hanger box or rod to move through a 30 degrees arc without metal to metal contact.

.2 Type H1 - neoprene - in-shear, molded with rod isolation bushing which passes through hanger box.

.3 Type H2 - stable spring, elastomeric washer, cup with molded isolation bushing which passes through hanger box.

.4 Type H3 - stable spring, elastomeric element with precompression washer and nut with deflection indicator.

.5 Acceptable material: Korfund, Masdom, Vibron, Vibro Acoustics, Mason.

2.7 ACOUSTIC BARRIERS FOR ANCHORS AND GUIDES

.1 Acoustic barriers: between pipe and support, consisting of 25 mm minimum thick heavy duty duck and neoprene isolation material.

2.8 HORIZONTAL THRUST RESTRAINT

.1 Spring and elastomeric element housed in box frame; assembly complete with rods and angle brackets for equipment and ductwork attachment; provision for adjustment to limit maximum start and stop movement to 9 mm.

.2 Arrange restraints symmetrically on either side of unit and attach at centerline of thrust.

2.9 STRUCTURAL BASES

.1 Type B1 - Prefabricated steel base: integrally welded on sizes up to 2400 mm on smallest dimension, split for field welding on sizes over 2400 mm on smallest dimension and reinforced for alignment of drive and driven equipment; without supplementary hold down devices; complete with isolation element attached to base brackets arranged to minimize height; pre-drilled holes to receive equipment anchor bolts; and complete with adjustable built-in motor slide rail where indicated.

.2 Type B2 - Steel rail base: structural steel, positioned for alignment of drive and driven equipment; without supplementary hold down devices; complete with isolation element attached to base brackets arranged to minimize height; and pre-drilled holes to receive equipment anchor bolts.

.3 Bases to clear housekeeping pads by 25 mm minimum.

.4 Acceptable material: Korfund, Masdom, Vibron, Vibro Acoustics, Mason.

2.10 INERTIA BASE

.1 Type B3 - Full depth perimeter structural or formed channels, frames: welded in place reinforcing rods running in both directions; spring mounted, carried by gussetted height-saving brackets welded to frame; and clear housekeeping pads by 50 mm minimum.

.2 Pump bases: "T" shaped, where applicable, to provide support for elbows.

.3 Concrete: to Section 03 30 00 - Cast-in-Place Concrete.

.4 Acceptable material: Korfund, Masdom, Vibron, Vibro Acoustics, Mason.

2.11 ROOF CURB ISOLATION RAILS

.1 General: complete factory assembled without need for sub-base.

.2 Lower member: continuous rectangular steel tube or extruded aluminum channel.

.3 Upper member: continuous rectangular steel tube or extruded aluminum channel to provide continuous support for equipment, complete with all-directional neoprene snubber bushings 6 mm thick to resist wind and seismic forces.

.4 Springs: steel, adjustable, removable, selected for 50 mm maximum static deflection plus 50% additional travel to solid, cadmium plated, sized and positioned to ensure uniform deflection.

.5 High frequency isolation: 6 mm minimum thick continuous gasket on top and bottom of complete assembly, or pads on top and bottom of each spring. Material: closed cell neoprene.

.6 Weatherproofing: continuous flexible counterflashing to curb and providing access to springs. Material: aluminum or neoprene.

.7 Hardware: cadmium plated or galvanized.

2.12 SEISMIC CONTROL MEASURES

.1 General:

.1 Following systems and/or equipment to remain operational during and after earthquakes:

.1 AC Units

.2 Air Distribution Boxes

.3 Air Handling Units

.4 Air Separators

.5 Battery Racks
.6 Boilers
.7 Bus Ducts
.8 Cabinet Heaters
.9 Cable Trays
.10 Compressors
.11 Condensing Units
.12 Conduit
.13 Ductwork
.14 Electrical Panels
.15 Generators
.16 Heat Exchangers
.17 Light Fixtures
.18 Motor Control Centers
.19 Piping (all types)
.20 Switch Gear
.21 Transformers
.22 Unit Heaters
.23 Variable Frequency Drives
.24 Water Heaters
.25 Fans All Types

.2 Seismic control systems to work in every direction.
.3 Fasteners and attachment points to resist same maximum load as seismic restraint.
.4 Drilled or power driven anchors and fasteners not permitted.
.5 No equipment, equipment supports or mounts to fail before failure of structure.
.6 Supports of cast iron or threaded pipe not permitted.
.7 Seismic control measures not to interfere with integrity of firestopping.

.2 Static equipment:
.1 Anchor equipment to equipment supports. Anchor equipment supports to structure.
.2 Suspended equipment:
.1 Use one or more of following methods depending upon site conditions:
.1 Install tight to structure.
.2 Cross brace in every direction.
.3 Brace back to structure.
.4 Cable restraint system.
.3 Seismic restraints:
.1 Cushioning action gentle and steady.
.2 Never reach metal-like stiffness.

.3 Vibration isolated equipment:
.1 Seismic control measures not to jeopardize noise and vibration isolation systems. Provide 6 to 9 mm clearance during normal operation of equipment and systems between seismic restraint and equipment.
.2 Incorporate seismic restraints into vibration isolation system to resist complete isolator unloading.
.3 As indicated.

.4 Piping systems:
.1 Fire protection systems: to NFPA 13.

.2 Piping systems: hangers longer than 300 mm; brace at each hanger.
.3 Compatible with requirements for anchoring and guiding of piping systems.

.5 Bracing methods:
.1 Approved by Consultant.
.2 Structural angles or channels.
.3 Cable restraint system incorporating grommets, shackles and other hardware to ensure alignment of restraints and to avoid bending of cables at connection points. Incorporate neoprene into cable connections to reduce shock loads.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

.1 Seismic control measures to meet requirements of NBC (delete this where seismic control measures are not required on project).
.2 Install vibration isolation equipment in accordance with manufacturers instructions and adjust mountings to level equipment.
.3 Ensure piping, ducting and electrical connections to isolated equipment do not reduce system flexibility and that piping, conduit and ducting passage through walls and floors do not transmit vibrations.
.4 Unless indicated otherwise, support piping connected to isolated equipment with spring mounts or spring hangers with 25 mm minimum static deflection as follows:
.1 Up to NPS4: first 3 points of support. NPS5 to NPS8: first 4 points of support. NPS10 and over.
.2 First point of support: static deflection of twice deflection of isolated equipment, but not more than 50 mm.
.5 Where isolation is bolted to floor use vibration isolation rubber washers.
.6 Block and shim level bases so that ductwork and piping connections can be made to rigid system at operating level, before isolator adjustment is made. Ensure that there is no physical contact between isolated equipment and building structure.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:
.1 Arrange with manufacturer's representative to review work of this Section and submit written reports to verify compliance with Contract Documents.
.1 Manufacturer's Field Services: consisting of product use recommendations and site visits for inspection of product installation in accordance with manufacturer's instructions.
.2 Submit reports to Consultant within 3 days of manufacturer representative's final review.
.2 Make adjustments and corrections in accordance with written report.

.2 Inspection and Certification:
.1 Experienced and competent sound and vibration testing professional engineer to take vibration measurement for HVAC systems after start up and TAB of systems to Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
.2 Take vibration measurements for equipment as indicated.
.3 Provide Consultant with notice 24 h in advance of commencement of tests.
.4 Establish adequacy of equipment isolation and acceptability of noise levels in

occupied areas and where appropriate, remedial recommendations (including sound curves).

.5 Submit complete report of test results including sound curves.

3.4 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 09 91 00 - Painting.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.60-97, Interior Alkyd Gloss Enamel.
- .2 CAN/CGSB-24.3-92, Identification of Piping Systems.

.2 National Fire Protection Association (NFPA)
- .1 NFPA 13-2002, Standard for the Installation of Sprinkler Systems.
- .2 NFPA 14-2003, Standard for the Installation of Standpipe and Hose Systems.

1.3 SUBMITTALS

.1 Product Data:
- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data to include paint colour chips, other products specified in this section.
- .3 Samples:
  - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Samples to include nameplates, labels, tags, lists of proposed legends.

1.4 QUALITY ASSURANCE

.1 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

.2 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:
- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:
- .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse in accordance with Section 01 74 00 - Cleaning and Waste Management.
- .2 Dispose of unused paint material at official hazardous material collections site approved by Owner's Representative.
- .3 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in locations where it will pose health or environmental hazard.

2 Products

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

.1 Metal or plastic laminate nameplate mechanically fastened to each piece of equipment by manufacturer.

.2 Lettering and numbers raised or recessed.

.3 Information to include, as appropriate:
.1 Equipment: manufacturer's name, model, size, serial number, capacity.
.2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 SYSTEM NAMEPLATES

.1 Colours:
.1 Hazardous: red letters, white background.
.2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).

.2 Construction:
.1 3 mm thick laminated plastic, matte finish, with square corners, letters accurately aligned and machine engraved into core.

.3 Sizes:
.1 Conform to following table:

Size # mm	Sizes (mm)	No. of Lines	Height of Letters (mm)
1	10 x 50	1	3
2	13 x 75	1	5
3	13 x 75	2	3
4	20 x 100	1	8
5	20 x 100	2	5
6	20 x 200	1	8
7	25 x 125	1	12
8	25 x 125	2	8
9	35 x 200	1	20

.2 Use maximum of 25 letters/numbers per line.

.4 Locations:
.1 Terminal cabinets, control panels: use #5.
.2 Equipment in Mechanical Rooms: use #9.

2.3 EXISTING IDENTIFICATION SYSTEMS

.1 Apply existing identification system to new work.
.2 Where existing identification system does not cover for new work, use identification system specified this section.
.3 Before starting work, obtain written approval of identification system from Consultant.

2.4 PIPING SYSTEMS GOVERNED BY CODES

.1 Identification:
.1 Sprinklers: to NFPA 13.

2.5 IDENTIFICATION OF PIPING SYSTEMS

.1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.

.2 Pictograms:
.1 Where required: Workplace Hazardous Materials Information System (WHMIS) regulations.

.3 Legend:
.1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.

.4 Arrows showing direction of flow:
.1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.

.2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.

.3 Use double-headed arrows where flow is reversible.

.5 Extent of background colour marking:

.1 To full circumference of pipe or insulation.

.2 Length to accommodate pictogram, full length of legend and arrows.

.6 Materials for background colour marking, legend, arrows:

.1 Pipes and tubing 20 mm and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.

.2 Other pipes: pressure sensitive plastic-coated cloth with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150 degrees C and intermittent temperature of 200 degrees C.

.7 Colours and Legends:

.1 Where not listed, obtain direction from Owner's Representative.

.2 Colours for legends, arrows: to following table:

Background colour:	Legend, arrows:
Yellow	BLACK
Green	WHITE
Red	WHITE

.3 Background colour marking and legends for piping systems:

Contents	Background colour marking	Legend
City water	Green	CITY WATER
Treated water	Green	TREATED WATER
Condenser water supply	Green	COND. WTR. SUPPLY
Condenser water return	Green	COND. WTR. RETURN
Chilled water supply	Green	CH. WTR. SUPPLY
Chilled water return	Green	CH. WTR. RETURN
Hot water heating supply	Yellow	HEATING SUPPLY
Hot water heating return	Yellow	HEATING RETURN
High temp HW Htg supply	Yellow	HTHW HTG. SUPPLY++
High temp HW Htg return	Yellow	HTHW HTG. RETURN++
Domestic hot water supply	Green	DOM. HW SUPPLY
Dom. HWS recirculation	Green	DOM. HW CIRC
Dom. cold water supply	Green	DOM. CWS
Storm water	Green	STORM
Sanitary	Green	SAN
Plumbing vent	Green	SAN. VENT
No. ___ fuel oil suction	Yellow	#___ FUEL OIL
No. ___ fuel oil return	Yellow	# ___ FUEL OIL
Compressed air (700kPa)	Green	COMP. AIR ___ kPa
Compressed air (>700kPa)	Yellow	COMP. AIR ___ kPa
Fire protection water	Red	FIRE PROT. WTR
Sprinklers	Red	SPRINKLERS

**Add design temperature
++Add design temperature and pressure

2.6 IDENTIFICATION DUCTWORK SYSTEMS

.1 50 mm high stenciled letters and directional arrows 150 mm long x 50 mm high.

.2 Colours: back, or coordinated with base colour to ensure strong contrast.
.3 Identify Systems: eg Supply AHU-1, Exhaust EF-1

2.7 VALVES, CONTROLLERS

.1 Brass tags with 12 mm stamped identification data filled with black paint.
.2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.

2.8 CONTROLS COMPONENTS IDENTIFICATION

.1 Identify all systems, equipment, components, controls, sensors with system nameplates specified in this section.
.2 Inscriptions to include function and (where appropriate) fail-safe position, component ID name.

2.9 LANGUAGE

.1 Identification in English.
.2 Use one nameplate and label for each language.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 TIMING

.1 Provide identification only after painting specified Section 09 91 23 - Interior Painting has been completed.

3.3 INSTALLATION

.1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.
.2 Provide ULC and CSA registration plates as required by respective agency.

3.4 NAMEPLATES

.1 Locations:
  .1 In conspicuous location to facilitate easy reading and identification from operating floor.
.2 Standoffs:
  .1 Provide for nameplates on hot and/or insulated surfaces.
.3 Protection:
  .1 Do not paint, insulate or cover in any way.

3.5 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

.1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels: at not more than 17 m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
.2 Adjacent to each change in direction.
.3 At least once in each small room through which piping or ductwork passes.
.4 On both sides of visual obstruction or where run is difficult to follow.
.5 On both sides of separations such as walls, floors, partitions.
.6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at

entry and exit points, and at access openings.

.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, and dampers. Where this is not possible, place identification as close as possible, preferably on upstream side.

.9 Identification easily and accurately readable from usual operating areas and from access points.

.1 Position of identification approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.6 VALVES, CONTROLLERS

.1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed "S" hooks.

.2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by Consultant. Provide one copy (reduced in size if required) in each operating and maintenance manual.

.3 Number valves in each system consecutively.

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 22 11 18 - Domestic Water Piping Copper & PEX.
.2 Section 22 42 01 - Plumbing Specialties and Accessories.
.3 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
.4 Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.
.5 Section 23 11 13 - Facility Fuel-oil Piping.
.6 Section 23 21 13 - Hydronic Systems: Steel.
.7 Section 23 23 00 - Copper Tubing and Fittings Refrigerant.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
  .1 ASTM E202-04, Standard Test Methods for Analysis of Ethylene Glycols and Propylene Glycols.

1.3 CLEANING AND START-UP OF MECHANICAL PIPING SYSTEMS

.1 In accordance with Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.

1.4 HYDRONIC SYSTEMS - PERFORMANCE VERIFICATION (PV)

.1 Perform hydronic systems performance verification after cleaning is completed and system is in full operation.
.2 When systems are operational, perform following tests:
  .1 Conduct full scale tests at maximum design flow rates, temperatures and pressures for continuous consecutive period of 48 hours to demonstrate compliance with design criteria.
  .2 Verify performance of hydronic system circulating pumps as specified in relevant technical sections, recording system pressures, temperatures, fluctuations by simulating maximum design conditions and varying.
    .1 Pump operation.
    .2 Boiler and/or chiller operation.
    .3 Pressure bypass open/closed.
    .4 Control pressure failure.
    .5 Maximum heating demand.
    .6 Boiler and/or chiller failure.
    .7 Outdoor reset. Re-check heat exchanger output supply temperature at 100% and 50% reset, maximum water temperature.

1.5 HYDRONIC SYSTEM CAPACITY TEST

.1 Perform hydronic system capacity tests after:
  .1 TAB has been completed
  .2 Verification of operating, limit, safety controls.
  .3 Verification of primary and secondary pump flow rates.
  .4 Verification of accuracy of temperature and pressure sensors and gauges.
.2 Calculate system capacity at test conditions.
.3 Using manufacturer's published data and calculated capacity at test conditions, extrapolate system capacity at design conditions.
.4 When capacity test is completed, return controls and equipment status to normal operating conditions.
.5 Submit sample of system water to approved testing agency to determine if chemical

treatment is correct. Include cost.

.6 Heating system capacity test:

.1 Perform capacity test when ambient temperature is within 10% of design conditions. Simulate design conditions by:

.1 Increasing OA flow rates through heating coils (in this case, monitor heating coil discharge temperatures to ensure that coils are not subjected to freezing conditions) or

.2 Reducing space temperature by turning of heating system for sufficient period of time before starting testing.

.2 Test procedures:

.1 Open fully heat exchanger, heating coil and radiation control valves.

.2 With boilers on full firing and hot water heating supply temperature stabilized, record flow rates and supply and return temperatures simultaneously.

.3 Conduct flue gas analysis test on boilers at full load and at low fire conditions.

.7 Chilled water system capacity test:

.1 Perform capacity test when ambient temperature is within 10% of design conditions. Simulate design conditions by:

.1 Adding heat from building heating system or;

.2 Raising space temperature by turning off cooling and air systems for sufficient period of time before starting testing and pre-heating building to summer design space temperature (occupied) or above. Set OAD and RAD for minimum outside air if OAT is near outside design temperature or to maximum recirculation if RAT is greater that OAT. RAT to be at least 23 degrees C minimum.

.2 Test procedures:

.1 Open fully cooling coil control valves.

.2 Set thermostats on associated AHU's for maximum cooling.

.3 Set AHU's for design maximum air flow rates.

.4 Set load or demand limiters on chillers to 100%.

.5 After system has stabilized, record chilled water, and condenser water flow rates and supply and return temperatures simultaneously.

1.6 GLYCOL SYSTEMS

.1 Test to prove concentration will prevent freezing to minus 40 degrees C Test inhibitor strength and include in procedural report. Refer to ASTM E202.

1.7 FUEL OIL SYSTEMS

.1 Environmental protection systems:

.1 Test oil storage tank leakage detection system using manufacturer's recommended procedures.

.2 Test spill protection and over-fill protection systems using manufacturer's recommended procedures.

.2 Fuel oil pumps:

.1 Check strainers on pump inlet, relief valve on pump outlet with discharge to oil return piping, pressure gauge on strainer inlet, pump inlet and pump discharge.

.2 Verify pump performance.

.3 Pump performance within plus 20% and minus 0% of design.

.3 Operational Tests:

.1 Timing: perform at same time as 100% and 105% boiler PV tests.

.2 Charge system and verify operation.
.3 Verify adequacy of flow rates and pressure from storage facilities to burners.
.4 Verify accurate metering of fuel to burners.
.5 For further details refer to relevant sections of Division 23.

.4 Notify authorities having jurisdiction to enable witnessing of tests as required.

1.8 POTABLE WATER SYSTEMS

.1 When cleaning is completed and system filled:
.1 Verify performance of equipment and systems as specified elsewhere in Division 23.
.2 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or recharge air chambers. Repeat for each outlet and flush valve.
.3 Confirm water quality consistent with supply standards, verifying that no residuals remain resulting from flushing and/or cleaning.

1.9 WET AND DRY PIPE SPRINKLER SYSTEM, STANDPIPE AND HOSE SYSTEMS

.1 Cleaning, testing, start-up, performance verification of equipment, systems, components, and devices is specified elsewhere in Division 23.
.2 Verification of controls, detection devices, alarm devices is specified Division 26.
.3 Demonstrate that fire hose will reach to most remote location regardless of partitions, and obstructions.
.4 Verify operation of interlocks between HVAC systems and fire alarm systems.

1.10 SANITARY AND STORM DRAINAGE SYSTEMS

.1 Buried systems: perform tests prior to back-filling. Perform hydraulic tests to verify grades and freedom from obstructions.
.2 Ensure that traps are fully and permanently primed.
.3 Ensure that fixtures are properly anchored, connected to system.
.4 Operate flush valves, tank and operate each fixture to verify drainage and no leakage.
.5 Cleanouts: refer to Section 22 42 01 - Plumbing Specialties And Accessories
.6 Roof drains:
.1 Refer to Section 22 42 01 - Plumbing Specialties And Accessories
.2 Remove caps as required.

1.11 REPORTS

.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: Reports, supplemented as specified herein.

1.12 TRAINING

.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: Training of O&M Personnel, supplemented as specified herein.

END OF SECTION

1 General

1.1 RELATED SECTIONS

.1 Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
.2 Section 23 25 00 - HVAC Water Treatment Systems.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
  .1 ASTM E202, Standard Test Methods for Analysis of Ethylene Glycols and Propylene Glycols.
.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

.1 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
.2 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
  .1 Instructions: submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Health and Safety:
  .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health, Safety and Emergency Response Procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:
  .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
.2 Waste Management and Disposal:
  .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse in accordance with Section 01 74 00 - Cleaning and Waste Management.

2 Products

2.1 CLEANING SOLUTIONS

.1 Low-foaming detergent: at all temperatures.
.2 Designed for use on most metals including aluminum.
.3 No pH neutralization required.
.4 Phosphate free.
.5 Biodegradable.
.6 Nitrate Free.

3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and

datasheet.

3.2 CLEANING HYDRONIC SYSTEMS

.1 Timing: systems operational, hydrostatically tested and with safety devices functional, before cleaning is carried out.

.2 Cleaning Agency:

.1 Retain qualified water treatment specialist to perform system cleaning.

.3 Install instrumentation such as flow meters, orifice plates, pitot tubes, flow metering valves only after cleaning is certified as complete by water treatment specialist.

.4 Cleaning procedures:

.1 Provide detailed report outlining proposed cleaning procedures at least 4 weeks prior to proposed starting date. Report to include:

.1 Cleaning procedures, flow rates, elapsed time.

.2 Chemicals and concentrations used.

.3 Inhibitors and concentrations.

.4 Specific requirements for completion of work.

.5 Special precautions for protecting piping system materials and components.

.6 Complete analysis of water used to ensure water will not damage systems or equipment.

.5 Conditions at time of cleaning of systems:

.1 Systems: free from construction debris, dirt and other foreign material.

.2 Control valves: operational, fully open to ensure that terminal units can be cleaned properly.

.3 Strainers: clean prior to initial fill.

.4 Install temporary filters on pumps not equipped with permanent filters.

.5 Install pressure gauges on strainers to detect plugging.

.6 Report on Completion of Cleaning:

.1 When cleaning is completed, submit report, complete with certificate of compliance with specifications of cleaning component supplier.

.7 Hydronic Systems:

.1 Flush system thoroughly with water, back flush pump, strainers, blow down drain valves and risers to remove loose debris. Remove accumulated sludge in boilers.

.2 Add 2% solution of low foaming detergent to the system through a bypass feeder or another feeding device.

.3 Closed loop systems: circulate system cleaner at 820 degrees C for at least 36 hours. For chiller systems, circulate at least 48 hours at ambient temperature.

.4 During recirculation, back flush strainers, drain valves and risers at their lowest point once every 8 hours.

.5 Drain cleaning water completely.

.6 Fill and drain system several times. Circulate 30 minutes every time system is refilled.

.7 Blend system at secured points until water is clear and non foaming. Clean pump strainers.

.8 Draw a water sample from the system and send it to laboratory for analysis.

.9 If the laboratory report is unsatisfactory, repeat cleaning procedure.

.8 Glycol Systems:

.1 In addition to procedures specified above perform specified procedures.

.2 Test to prove concentration will prevent freezing to minus 40 degrees C. Test inhibitor strength and include in procedural report. Refer to ASTM E202.

3.3 START-UP OF HYDRONIC SYSTEMS

.1 After cleaning is completed and system is filled:

- .1 Establish circulation and expansion tank level, set pressure controls.
- .2 Ensure air is removed.
- .3 Check pumps to be free from air, debris, possibility of cavitation when system is at design temperature.
- .4 Dismantle system pumps used for cleaning, inspect, replace worn parts, install new gaskets and new set of seals.
- .5 Clean out strainers repeatedly until system is clean.
- .6 Commission water treatment systems as specified in Section 23 25 00 - HVAC Water Treatment Systems.
- .7 Check water level in expansion tank with cold water with circulating pumps OFF and again with pumps ON.
- .8 Repeat with water at design temperature.
- .9 Check pressurization to ensure proper operation and to prevent water hammer, flashing, cavitation. Eliminate water hammer and other noises.
- .10 Bring system up to design temperature and pressure slowly over a 48 hour period.
- .11 Perform TAB as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .12 Adjust pipe supports, hangers, springs as necessary.
- .13 Monitor pipe movement, performance of expansion joints, loops, guides, anchors.
- .14 If sliding type expansion joints bind or if bellows type expansion joints flex incorrectly, shut down system, re-align, repeat start-up procedures.
- .15 Re-tighten bolts using torque wrench, to compensate for heat-caused relaxation. Repeat several times during commissioning.
- .16 Check operation of drain valves.
- .17 Adjust valve stem packings as systems settle down.
- .18 Fully open balancing valves (except those that are factory-set).
- .19 Check operation of over-temperature protection devices on circulating pumps.
- .20 Adjust alignment of piping at pumps to ensure flexibility, adequacy of pipe movement, absence of noise or vibration transmission.

3.4 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning and Waste Management.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

APPENDIX 'A'

Hazardous Assessment Report

HAZARDOUS MATERIALS ASSESSMENT
Eliot River Elementary School
28 Terry Fox Place, Cornwall, PE

Prepared For:

PEI Department of Transportation, Infrastructure, and Energy
11 Kent St,
Charlottetown, PE

January 26, 2021

ALL-TECH Project No.: PE283

ALL-TECH Environmental Services Limited, 70 Nicholas, Unit 4, Charlottetown, PE, C1E 3J5
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Bedford, NS Sydney, NS St. John, NB Moncton, NB Charlottetown, PE St John's, NL Cornerbrook, NL Gander, NL

EXECUTIVE SUMMARY

ALL-TECH Environmental Services Limited was retained by Prince Edward Island's Department of Transportation, Infrastructure and Energy (DTIE) to conduct a hazardous material assessment for Eliot River Elementary School located at 28 Terry Fox Place, Cornwall, Prince Edward Island.

This report has been prepared to document the identities, usages and locations of any designated substances and hazardous materials identified within the building.

The purpose of the Hazardous Materials Survey was to identify hazardous materials which may require safe handling procedures and disposal requirements in accordance with their applicable regulations prior to an upcoming major renovation project.

The on-site assessment was conducted in December 2020. During the assessment hazardous materials including asbestos and lead (paint) were sampled.

Other suspect materials including but not limited to mercury, mould (active growth), Polychlorinated Biphenyls (PCBs), Silica and other potential hazardous materials were visually assessed and reported if identified.

Based on the findings from the Hazardous Materials Assessment, the following conclusions and recommendations are presented.

Hazardous Materials identified through sampling and identification were:

- Asbestos Containing Mechanical Insulation (ER-01; ER-02)
- Asbestos Containing Parging (ER-03; ER-05; ER-09; ER-12; ER-23; ER-24; ER-25)
- Asbestos Drywall Joint Compound (ER-14)
- Lead Paint (LE-01; LE-03; LE-04; LE-06; LE-07)
- Crystalline Silica
- Mercury containing lamps (minor)

A summary of the Hazardous Materials identified within the accessible areas of the building is provided below in Table A based on our assessment. It should be noted that the removal/handling procedures will vary depending upon a number of factors including removal techniques, tools used during removal, quantities, etc. Therefore, detailed specifications and a scope of work should be developed for the handling, removal, and disposal of the hazardous materials.

TABLE A
Summary of Hazardous Materials
Eliot River Elementary School - Cornwall, Prince Edward Island

Hazardous Materials	*Description / Comments*	*Safe Handling Requirements*	*Disposal Requirements*
ASBESTOS	Asbestos Containing Mechanical Insulation Boiler Room 205	Licensed contractor to obtain work permit prior to handling from PEI Dept. of WCB/OSH Division and all other	Regulatory approval from PEIELJ Disposal at approved facility
	Asbestos Containing Parging cement pipe fittings Rooms 202; 205; 207; 209; Penthouse		

	Asbestos Containing Parging cement on roof drains Rooms 205; 209	pertinent sections of the *Occupational Health and Safety Act* R.S.P.E.I.	such as EPWMF in Wellington, PEI
	Asbestos Drywall Joint Compound Room 200 - Main Lobby		
LEAD	Red Floor Paint Room 205	TDG – manifest Trained personnel in the safe handling of lead coated surfaces and all other pertinent sections of the *Occupational Health and Safety Act* R.S.P.E.I	Regulatory approval from PEIELJ Additional analysis required for TCLP for disposal purposes, if required.
	Cream Colour Paint on Concrete wall Main Floor corridor		
	Brown Paint on Wood Door Room 202		
	Brown Paint on Door Room 320		
	Beige Paint on Concrete wall Daisy square		
CRYSTALLINE SILICA	Numerous areas through building interior and exterior with concrete / brick structures including walls, floors, exterior finish.	Trained personnel in the safe handling of crystalline silica surfaces for cutting, grinding and demolition activities and all other pertinent sections of the *Occupational Health and Safety Act* R.S.P.E.I.	C&D disposal
MERCURY	Mercury containing bulbs and lamps	Safe handling procedures	Recycle

This summary should not be used alone. The report must be read in its entirety.

Larry Koughan, CET, CRSP
Project Principal
ALL-TECH Environmental Services Limited

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SITE / CLIENT INFORMATION

Project No:	PE283
Assessment Date:	**December 2020**
Client Name:	**DTIE**
Site Address:	Eliot River Elementary School 28 Terry Fox Place, Cornwall PE

1. INTRODUCTION

ALL-TECH Environmental Services Limited was retained by Prince Edward Island's Department of Transportation, Infrastructure and Energy (DTIE) to conduct a hazardous material assessment for Eliot River Elementary School located at 28 Terry Fox Place in Cornwall, Prince Edward Island.

This report has been prepared to document the identities, usages and locations of any designated substances and hazardous materials identified within the building.

The purpose of the Hazardous Materials Survey was to identify hazardous materials which may require safe handling procedures and disposal requirements in accordance with their applicable regulations prior to an upcoming major renovation project.

The on-site assessment was conducted in December 2020. During the assessment hazardous materials including asbestos and lead (paint) were sampled.

Other suspect materials including but not limited to mercury, mould (active growth), Polychlorinated Biphenyls (PCBs), Silica and other potential hazardous materials were visually assessed and reported if identified.

1.1 SURVEY OBJECTIVES

The scope of the survey was to conduct a semi-destructive assessment to identify any designated substances and hazardous materials within the subject building. ALL-TECH inspected both interior and exterior spaces of the subject building to determine whether designated substances and hazardous materials were present. Representative sampling for suspect asbestos and lead paint materials was conducted as required based on industry standards and the consultant's experience.

2. REGULATIONS & GUIDELINES

A summary table (Table 1) is provided for the applicable regulations, policies, codes, and / or guidelines of hazardous materials assessed for the purpose of this report. This information was used as reference to assess suspect hazardous materials and make recommendations based on the findings.

TABLE 1 SUMMARY OF REGULATORY FRAMEWORK	
ASBESTOS	▪ *Occupational Health and Safety Act* R.S.P.E.I. 1988, Cap. O-1.01 General Regulations – Part 49 (Including any amendments to May 2006) ▪ *Environmental Protection Act Chapter E-9 Waste Management Regulations*, Prince Edward Island ▪ Federal Treasury Board of Canada Secretariat Hazardous Substances Directive –II, Section 2.9 ▪ Transportation of Dangerous Goods Act (TDGA)
LEAD	▪ Hazardous Products Act ▪ Prince Edward Island Department of Environment, Labor and Justice (PEIELJ) ▪ Transportation of Dangerous Goods Act (TDGA) ▪ US Environmental Protection Agency (EPA)
MERCURY	▪ Hazardous Products Act ▪ Canadian Council of Ministers of the Environment (CCME)
MOULD	• *Occupational Health and Safety Act* R.S.P.E.I. 1988, Cap. O-1.01 General Regulations – Part 11 Ventilation (Including any amendments to May 2006)
OZONE DEPLETING SUBSTANCES	▪ *Canadian Environmental Protection Act, Federal Halocarbon Regulation (SOR/99-255) Ozone Depleting Substance Regulations, 2003* under the *Environmental Protection Act* (O.C. 2003-222). ▪ Prince Edward Island *Environmental Protection Act E-9 Ozone Layer Protection Regulations*
PCB's	▪ Environmental Contaminants Act, Chlorophenyl Regulations ▪ Environment Canada – "Identification of Lamp Ballasts Containing PCB's", report EPS 2/CC/2 (revised) August, 1991
OTHER HAZARDOUS MATERIALS	• Hazardous Products Act

2.1 ASBESTOS

Asbestos materials can be found in one of two forms: friable asbestos or a non-friable type. Friable asbestos material refers to material that when dry, can be crumbled, pulverized, or reduced to a powder by hand pressure. This type of asbestos material is hazardous due to its potential to become airborne, if damaged or disturbed.

Friable asbestos building products used that have been used in the past are sprayed acoustic and fire protection insulation which were installed on mechanical room ceilings, building structures, ceiling finishes, etc., and mechanical insulation on piping, tanks, boilers, vessels, etc. Some non-friable building products are vinyl acoustic floor tiles, gaskets, transite panels, piping, and shingles.

Non-friable materials if handled improperly during removal or renovations, such as cutting transite panels with an electrical tool, can cause high fiber releases.

Asbestos is classified as a hazardous material under the TDGA and must adhere to specific requirements for transfer including but not limited to waste transfer manifests and proper placards. All asbestos waste must be disposed of at an approved municipal solid waste disposal site. Recent changes from the Prince Edward Island's Department of Environment's Environmental Protection Act, Waste Resource Management Regulations have defined asbestos as "special waste" as asbestos containing materials containing greater than 1% by weight for the purpose of disposal.

All work should be carried out by personnel trained and licensed with the provincial department of the Workers Compensation Board / Occupational Health and Safety Division for asbestos abatement.

2.2 LEAD

Lead in paints is regulated under the Canadian Environmental Protection Act (CEPA) as published in Canada Gazette Part II. The lead content limit has been set to 600 mg/kg (0.06 percent by weight) for surface coating materials.

Any disturbance or removal of lead-based materials which may generate lead dust shall have to conform to the federal and provincial Occupational Health and Safety Act and Regulations. All work should be carried out by personnel trained in the safe handling of lead-based paint coatings and shall be trained in the use of respirators and be properly fit tested.

PEIELJ has established guidelines that restrict hazardous materials from municipal landfills and Construction and Demolition (C&D) waste disposal sites which potentially may migrate / leach into groundwater and cause adverse environmental impacts. Lead coated surfaces may leach from their base materials into soil and subsequent groundwater. PEIELJ has established guidelines that materials containing 1000 mg/kg or 0.1% lead by weight shall be classified as lead-based paints. If materials are found to be above this guideline and require removal and disposal, then the materials must undergo leachate testing to assess to concentration which could potentially leach into the ground soil and groundwater. Presently provincial requirements for lead leachate testing shall not exceed 5 mg/L.

Materials with leachable lead concentrations above provincial guidelines must be manifested as dangerous goods during transport under the federal TDGA. Hazardous materials that are being disposed of out of province must comply with Interprovincial Movement of Hazardous Waste Regulations under the Canadian Environmental Protection Act (CEPA).

PEIELJ has established guidelines that restrict hazardous materials from municipal landfills and Construction and Demolition (C&D) waste disposal sites which potentially may migrate / leach into groundwater and cause adverse environmental impacts. Lead coated surfaces may leach from their base materials into soil and subsequent groundwater. PEIELJ has established guidelines that materials containing 1000 mg/kg or 0.1% lead by weight shall be classified as lead based paints. If materials are

found to be above this guideline and require removal and disposal, then the materials must undergo leachate testing to assess to concentration which could potentially leach into the ground soil and groundwater. Presently provincial requirements for lead leachate testing shall not exceed 5 mg/L. Disposal criteria for lead containing paints are based on total and leachable concentrations are as follows:

- Materials with total lead concentrations below the applicable Total guidelines can be disposed of at any C&D disposal site.
- Materials with *total lead concentrations above* the applicable Total guidelines and *leachable lead concentrations below* the applicable Leachate guidelines must be disposed of at an approved municipal solid waste landfill that has a composite liner and leachate collection system (i.e. East Prince Waste Management Facility in Wellington, PEI). A waste generator permit must first be approved and obtained by PEIELJ.
- Materials with total and leachable lead concentrations above provincial guidelines must be transported to an approved hazardous waste disposal site.

Materials with leachable lead concentrations above provincial guidelines must be manifested as dangerous goods during transport under the federal TDGA. Hazardous materials that are being disposed of out of province must comply with Interprovincial Movement of Hazardous Waste Regulations under the Canadian Environmental Protection Act (CEPA).

2.3 POLYCHLORINATED BIPHENYLS (PCB's)

In 1976, the Canadian Environment Contaminants Act passed regulations which prohibited the use of PCB's in transformer equipment. Under the same Act, the Chlorophenyl Regulations No. 1, states that PCBs cannot be used as a constituent of electrical capacitors, electrical transformers and associated electrical equipment manufactured in or imported into Canada after July 1, 1980.
There is currently no regulatory requirement to remove in-use PCB's from service. However, should suspect PCB containing light ballasts be removed from service, they should be treated as PCB waste or if confirmed to contain PCB oil in excess of 0.5 kg.

2.4 MERCURY

Standard for Mercury Containing Lamps and a Canada- Wide Standard for Mercury Emissions. The goal of the standards is to reduce the release of mercury into the environment.

The province of Prince Edward Island Workers Compensation Board / Occupational Health & Safety Services follows the American Conference of Governmental Industrial Hygienists (ACGIH) levels when dealing with airborne mercury levels: TLV = 0.01 mg/m^3. These limits represent conditions under which it is believed that nearly all workers can be repeatedly exposed day after day without adverse health effects.

Regulations classify mercury as a hazardous waste and proper handling and disposal is required.

2.5 MOULD

There are no specific regulations in P.E.I. addressing mould contamination. However, according to Health Canada and the Canadian Construction Association (CCA) guidelines on assessment and remediation of fungi in indoor environments, building materials supporting mould growth should be remediated *as rapidly as possible* in order to ensure a healthy environment. Remediation of mould growth is based on an approximation of the extent of visible mould growth including the estimated extent of any hidden mould growth.

2.6 OZONE DEPLETING SUBSTANCES

In 1994, the federal government filed the Ozone-Depleting Substances (ODS) Regulation to amend controls on production and consumption of chlorofluorocarbons (CFC's), halons, carbon tetrachloride and methyl chloroform. CFC's have been used in refrigeration, air conditioners, heat pumps, cooling systems and fire extinguishing systems for many years. Regulations set forth are intended to prevent CFC gases from escaping into the environment. CFC's are primarily used as a cooling and heating agent inside mechanical units.

2.7 CRYSTALLINE SILICA

No specific provincial disposal requirements have been established for silica. Worker protection must be adhered to when generating airborne silica dust through cutting or grinding processes.
Indoor air pollutants in commercial buildings and non-industrial workplaces at the present time in Prince Edward Island are regulated under Part 11 *Ventilation*, section 11.3. Regulations are adopted from the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV's). The ACGIH has established Threshold Limit Value/Time-Weighted Averages (TLV-TWA's) for a large number of airborne contaminants. TLV-TWA's are contaminant concentrations considered acceptable for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse health effects. Currently in the province of Prince Edward Island, ACGIH TLV-TWA's have been adopted under the Occupational Health and Safety Act.
Should TLV's be exceeded, employers are required to ensure suitable ventilation is provided to reduce contamination in the workplace.
Some contaminants have Short-Term Exposure Limits (STEL) which is a 15 minute exposure that should not be exceeded at any time during a workday.
Also, some chemicals have Ceiling (C) limits which should not be exceeded for any part of the working exposure.

3. METHODOLOGY

The scope of work for the survey was to visually identify controlled hazardous materials for the safe handling and disposal of hazardous materials prior to renovations within the building. Where visual identification of asbestos containing materials and lead based paints were suspected but unable to be determined, samples were collected and sent to an approved laboratory for analysis.

There was limited destructive testing of structural members (i.e. walls, flooring, and roof membranes) during the assessment. Where accessible, areas above ceiling cavities and behind walls were visually assessed to identify potentially concealed hazardous materials.

3.1 ASBESTOS

Using standard bulk sampling methodologies, representative suspect asbestos containing materials were sampled from ceiling & wall finishes, floor coverings, located throughout the building. Samples were placed in sealed plastic bags, labelled and a chain of custody form completed to be forwarded to IATL Laboratory via courier for analysis.

The asbestos assessment involved a visual investigation of suspect materials for the presence of asbestos containing materials. If these materials were suspected to contain asbestos, a bulk sample was collected of the representative material to be analysed with Polarized Light Microscopy.

It should be noted that asbestos containing materials may be present behind unrevealed areas. During demolition of these materials, precautions should be taken such as the use of personal protective equipment in the event of exposing concealed asbestos materials. If suspect materials are revealed, have them tested immediately.

3.2 LEAD

During the assessment, suspect mercury and lead-based paints were sampled from surfaces as determined by the consultant. Where practical, all layers of paint were removed and placed in sealed plastic bags, labelled and a chain of custody form completed to be forwarded to IATL Laboratory via courier for analysis.

3.3 POLYCHLORINATED BIPHENYLS

During the assessment, suspect PCB containing light ballasts were examined for PCB identification or by recording serial numbers for reference. Ballasts were inspected and manufacturers name, date and serial numbers were recorded when visible. The manufacturers identification numbers were then compared to Environment Canada's "Identification of Lamp Ballasts Containing PCB's", Report EPS 2/CC/2 9revised), August 1991.

It should be noted that the assessment did not include the sampling / testing or analysis of the suspect PCB containing materials.

3.4 OTHER HAZARDOUS MATERIAL

During the assessment, other hazardous materials including, but not limited to, crystalline silica, mercury, mould, ozone depleting substances, etc. were visually assessed for the presence within suspect areas or materials. No sampling was carried out for any other noted hazardous materials.

4. ASSESSMENT FINDINGS

Asbestos materials can be found in one of two forms: friable asbestos or a non-friable type.
Asbestos containing materials can be properly managed and left in place depending on their location, condition, and friability. Non-friable materials receive less attention than friable materials due to the fact that the asbestos fibres in the non-friable material are bound or held tightly together, reducing the chance of fibres becoming airborne. This makes the non-friable products safer and easier to manage.

4.1 FRIABLE ASBESTOS CONTAINING MATERIALS (ACM)

During the survey, the consultants collected individual bulk material samples of suspect materials within the structure. A total of twenty-five (25) bulk material samples were collected within the buildings during the survey. Some of these samples such as tile floor coverings with adhesives were separated and a total of twenty-nine (29) samples were analyzed. Of the 29 samples analyzed, ten (10) were found to be asbestos containing.

Results of the asbestos assessment sampling and findings are summarized below in table 2.
Laboratory analysis certificate are presented in Appendix I and site photos are itemized in Appendix III for reference. Estimated quantities for ACM's assessed in accessible areas are outlined in Appendix V.

Other materials such as pipe and duct insulations visually identified as fibreglass insulation were noted and not sampled. Most areas of the school were noted with fiberglass straight run insulation with fiberglass fittings butted together.

TABLE 2
SUMMARY OF FRIABLE ASBESTOS CONTAINING MATERIALS

Sample No.	Material Design / Location	Asbestos Content (%)
ER-01	Mechanical Tank Insulation / Boiler Room 205	65% Chrysotile
ER-02	Boiler Insulation Port Holes / Boiler Room 205	45% Chrysotile
ER-03; ER-05	Pipe Elbow Insulation / Boiler Room 205	60- 65% Chrysotile
ER-09	Parging on Roof Drain / Room 207	60% Chrysotile
ER-12	Parging on fitting / Room 202	65% Chrysotile

ER-14	Drywall joint compound / Main Lobby	1.3 Chrysotile
ER-23; ER-24; ER-25	Pipe parging on fitting / Penthouse	65 - 70% Chrysotile

4.2 LEAD-BASED PAINTS

Based on the age of the building, lead based paints were sampled. A total of seven (7) painted surface coatings were sampled within the buildings and sent to the laboratory for analysis for lead in paint.

Based on the assessment findings, five of the paints sampled exceeded CEPA guidelines of 0.06% by weight for safe handling. Four of the samples exceeded Provincial Regulations set by PEIELJ of 0.1% lead by weight for disposal purposes.

A summary of results for lead based paints is presented below in table 3.

Laboratory analysis certificate is presented in Appendix II and site photos are itemized in Appendix III for reference.

TABLE 3 SUMMARY OF LEAD BASED PAINTS		
Sample No.	Paint description / Location	Total Lead (% by weight)
LE-01	Red Floor Paint / Room 205	0.32
LE-03	Cream Colour Paint on Concrete wall	0.30
LE-04	Brown Paint on Wood Door / Room 202	0.10
LE-06	Brown Paint on Door / Room 320	0.22
LE-07	Beige Paint on Concrete wall / Daisy square	0.089

4.3 MERCURY

Some types of lamps, such as household light bulbs, straight (or linear) fluorescent lamps contain small quantities of mercury.

During the assessment, straight (or linear) fluorescent lamps were observed in some areas of the buildings. Although they are safe to use, when a lamp breaks, the mercury can be released and contaminate the environment. It is important to safely handle and recycle these lamps.

Mercury filled thermostats were not observed during the assessment.

4.4 MOULD AFFECTED AREAS

No visible mould was encountered during the assessment. Minor water staining on ceiling tiles was observed but no significant issues were noted or reported. Most walls throughout the school are concrete construction, so no destructive testing is or shall be required and extensive mould in walls is not anticipated.

4.5 OZONE DEPLETING SUBSTANCES (ODS)

Materials/equipment suspected to contain ozone depleting substances were not visually identified during time of assessment.

4.6 POLYCHLORINATED BIPHENYLS (PCB's)

Lamp ballasts were randomly visually assessed at the time of the assessment and present ballasts assessed were labelled Non-PCB containing.

4.7 CHRYSTALLINE SILICA

Renovations, demolition, or building maintenance involving work with concrete and masonry products is a ubiquitous activity. Research has identified demolition of concrete or masonry structures as one of the construction activities with potentially high exposures to respirable crystalline silica[1]. There is consistency among various professionals that total elimination or substitution of silica from the construction process may not be a feasible option. The use of wet methods, local exhaust ventilation and high efficiency particulate air (HEPA) filtration systems attached to work tools or equipment, worker's isolation from dust generating sources by tenting off or use of other physical barriers, respiratory protection, practice of basic hygiene, work practices, and worker training may significantly reduce silica dust in many construction activities. However, these controls when used separately or incompletely may fail to reduce exposure to less than established occupational exposure limits[2].

A visual assessment of materials that are suspected to contain crystalline silica during the survey was completed. No samples were collected. The main wall structures observed within the building are exterior brick and mortars as well as concrete floors and concrete block walls.

4.8 OTHER HAZARDOUS MATERIALS

No other potentially hazardous materials were not observed during the assessment.

5. SUMMARY OF HAZARDOUS MATERIALS

Based on the findings from the Hazardous Materials Assessment, the following conclusions and recommendations are presented.

Hazardous Materials identified through sampling and identification were:

- Asbestos Containing Mechanical Insulation (ER-01; ER-02)
- Asbestos Containing Parging (ER-03; ER-05; ER-09; ER-12; ER-23; ER-24; ER-25)
- Asbestos Drywall Joint Compound (ER-14)
- Lead Paint (LE-01; LE-03; LE-04; LE-06; LE-07)
- Crystalline Silica
- Mercury containing lamps (minor)

A summary of the Hazardous Materials identified within the accessible areas of the building is provided below in Table 4 based on our assessment. It should be noted that the removal/handling procedures will vary depending upon a number of factors including removal techniques, tools used during removal, quantities, etc. Therefore, detailed specifications and a scope of work should be developed for the handling, removal, and disposal of the hazardous materials.

TABLE 4
Summary of Hazardous Materials
Eliot River Elementary School - Cornwall, Prince Edward Island

Hazardous Materials	*Description / Comments*	*Safe Handling Requirements*	*Disposal Requirements*
ASBESTOS	Asbestos Containing Mechanical Insulation Boiler Room 205	Licensed contractor to obtain work permit prior to handling from PEI Dept. of WCB/OSH Division and all other pertinent sections of the *Occupational Health and Safety Act* R.S.P.E.I.	Regulatory approval from PEIELJ Disposal at approved facility such as EPWMF in Wellington, PEI
	Asbestos Containing Parging cement pipe fittings Rooms 202; 205; 207; 209; Penthouse		
	Asbestos Containing Parging cement on roof drains Rooms 205; 209		
	Asbestos Drywall Joint Compound Room 200 - Main Lobby		
LEAD	Red Floor Paint Room 205	TDG – manifest Trained personnel in the safe handling of lead coated surfaces and all other pertinent sections of the *Occupational Health and Safety Act* R.S.P.E.I	Regulatory approval from PEIELJ Additional analysis required for TCLP for disposal purposes, if required.
	Cream Colour Paint on Concrete wall Main Floor corridor		
	Brown Paint on Wood Door Room 202		
	Brown Paint on Door Room 320		
	Beige Paint on Concrete wall Daisy square		

CRYSTALLINE SILICA	Numerous areas through building interior and exterior with concrete / brick structures including walls, floors, exterior finish.	Trained personnel in the safe handling of crystalline silica surfaces for cutting, grinding and demolition activities and all other pertinent sections of the *Occupational Health and Safety Act* R.S.P.E.I.	C&D disposal
MERCURY	Mercury containing bulbs and lamps	Safe handling procedures	Recycle

6. DISCLAIMER

The recommendations detailed in this report were carried out in a manner consistent with the level of care and skill normally exercised by reasonable members of the environmental and industrial hygiene consulting profession currently practicing under similar conditions in the area.
In preparing this report, ALL-TECH Environmental Services Limited relied on information supplied by others, including independent laboratories and testing services. Except as expressly set out in this report, we have not made any independent verification of such information.

The recommendations in this report have been made in the context of existing industry accepted guidelines which were in place at the date of this report.

We trust this information is beneficial for assisting you in better understanding the process that has been carried out as well as the benefits and limitations of air sample results.

Should you have any questions or concerns pertaining to this report, please contact the undersigned directly.

Larry G. Koughan, CET, CRSP
Senior Project Consultant

ALL-TECH
ENVIRONMENTAL SERVICES LIMITED

CANADIAN SOCIETY OF SAFETY ENGINEERING
MEMBER

APPENDIX I

Laboratory Certificate of Analysis – Asbestos PLM Samples

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/8/2021
	20 Duke St.,Suite 109	Report No.:	625905 - PLM
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 7121980
Client No.: ER-01
Analyst Observation: Grey Insulation
Client Description: Tank Insulation
Location: Boiler Rm 205
Facility:

Percent Asbestos:
65 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
35

Lab No.: 7121981
Client No.: ER-02
Analyst Observation: Off-White Insulation
Client Description: Boiler Insulation Duct Hole
Location: B-1002
Facility:

Percent Asbestos:
45 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
55

Lab No.: 7121982
Client No.: ER-03
Analyst Observation: Grey Insulation
Client Description: Pipe Elbow Insulation
Location: Rm 205
Facility:

Percent Asbestos:
65 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
35

Lab No.: 7121983
Client No.: ER-04
Analyst Observation: Brown/Yellow Insulation
Client Description:
Location: Rm 205
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
85 Fibrous Glass

Percent Non-Fibrous Material:
15

Lab No.: 7121984
Client No.: ER-05
Analyst Observation: Lt Grey Insulation
Client Description: 8" Supply Elbow
Location: Rm 205
Facility:

Percent Asbestos:
60 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
40

Lab No.: 7121985
Client No.: ER-06
Analyst Observation: White/Off-White Ceiling Tile
Client Description: 2x2 Ceiling Tile Outside
Location: Rm 203
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
60 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
30

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 1/6/2021
Date Analyzed: 01/08/2021
Signature: David Hayes
Analyst: David Hayes

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/8/2021
	20 Duke St.,Suite 109	Report No.:	625905 - PLM
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 7121986
Client No.: ER-07
Analyst Observation: Off-White Floor Tile
Client Description: 12x12 Off-White Floor Tile
Location: Rm 207
Facility:

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 7121986(L2)
Client No.: ER-07
Analyst Observation: Black Mastic
Client Description: 12x12 Off-White Floor Tile
Location: Rm 207
Facility:

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 7121987
Client No.: ER-08
Analyst Observation: White/Grey Texture
Client Description: Texture Coat Ceiling
Location: Rm 207
Facility:

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 15 Cellulose
Percent Non-Fibrous Material: 85

Lab No.: 7121988
Client No.: ER-09
Analyst Observation: Grey Insulation
Client Description: Parging On Roof Drain
Location: Rm 207
Facility:

Percent Asbestos: ***60*** *Chrysotile*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 40

Lab No.: 7121989
Client No.: ER-10
Analyst Observation: White/Grey Texture
Client Description: Ceiling Texture Coat
Location: Rm 208
Facility:

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 3 Cellulose
Percent Non-Fibrous Material: 97

Lab No.: 7121990
Client No.: ER-11
Analyst Observation: White/Off-White Ceiling Tile
Client Description: 2x4 Ceiling Tile
Location: Rm 204
Facility:

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 1/6/2021
Date Analyzed: 01/08/2021
Signature: David Hayes
Analyst: David Hayes

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/8/2021
	20 Duke St.,Suite 109	Report No.:	625905 - PLM
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 7121991 **Analyst Observation:** Grey Insulation **Location:** Rm 202
Client No.: ER-12 **Client Description:** Parging On Fitting **Facility:**

Percent Asbestos: ***65*** *Chrysotile*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 35

Lab No.: 7121992 **Analyst Observation:** White Joint Compound **Location:** Rm 214
Client No.: ER-13 **Client Description:** Drywall Joint Compound **Facility:**

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 7121993 **Analyst Observation:** Off-White Joint Compound **Location:** Main Lobby
Client No.: ER-14 **Client Description:** Drywall Joint Compound **Facility:**

Percent Asbestos: ***PC 1.3*** *Chrysotile*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 98.7

Lab No.: 7121994 **Analyst Observation:** Off-White Ceiling Texture **Location:** Rm 118
Client No.: ER-15 **Client Description:** Texture Coat Ceiling **Facility:**

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 2 Cellulose
Percent Non-Fibrous Material: 98

Lab No.: 7121995 **Analyst Observation:** Off-White Floor Tile **Location:** Rm 101
Client No.: ER-16 **Client Description:** 12x12 Off-White Tile **Facility:**

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: None Detected
Percent Non-Fibrous Material: 100

Lab No.: 7121995(L2) **Analyst Observation:** Black Mastic **Location:** Rm 101
Client No.: ER-16 **Client Description:** 12x12 Off-White Tile **Facility:**

Percent Asbestos: *None Detected*
Percent Non-Asbestos Fibrous Material: 3 Cellulose
Percent Non-Fibrous Material: 97

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 1/6/2021
Date Analyzed: 01/08/2021
Signature: David Hayes
Analyst: David Hayes

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
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CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/8/2021
	20 Duke St.,Suite 109	Report No.:	625905 - PLM
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 7121996
Client No.: ER-17
Analyst Observation: White/Off-White Ceiling Tile
Client Description: 2x2 Ceiling Tile Outside
Location: Rm 119
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
65 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
25

Lab No.: 7121997
Client No.: ER-18
Analyst Observation: Lt Blue Floor Tile
Client Description: 12x12 Light Blue Floor Tile
Location: Rm 102
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 7121997(L2)
Client No.: ER-18
Analyst Observation: Black Mastic
Client Description: 12x12 Light Blue Floor Tile
Location: Rm 102
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
5 Cellulose

Percent Non-Fibrous Material:
95

Lab No.: 7121998
Client No.: ER-19
Analyst Observation: Grey Floor Tile
Client Description: Gray 12x12 Floor Tile
Location: Rm 307
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
100

Lab No.: 7121998(L2)
Client No.: ER-19
Analyst Observation: Black Mastic
Client Description: Gray 12x12 Floor Tile
Location: Rm 307
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
3 Cellulose

Percent Non-Fibrous Material:
97

Lab No.: 7121999
Client No.: ER-20
Analyst Observation: White/Off-White Ceiling Tile
Client Description: Ceiling Tile
Location: Corridor Outside Rm 305
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
60 Cellulose
15 Fibrous Glass

Percent Non-Fibrous Material:
25

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 1/6/2021
Date Analyzed: 01/08/2021
Signature: David Hayes
Analyst: David Hayes

Approved By: Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/8/2021
	20 Duke St.,Suite 109	Report No.:	625905 - PLM
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

PLM BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 7122000
Client No.: ER-21
Analyst Observation: White/Off-White Ceiling Tile
Client Description: 2x4 Ceiling Tile Fissure
Location:
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
60 Cellulose
10 Fibrous Glass

Percent Non-Fibrous Material:
30

Lab No.: 7122001
Client No.: ER-22
Analyst Observation: Brown Wrap / Mastic
Client Description: Brown Mastic On Duct
Location: Penthouse
Facility:

Percent Asbestos:
None Detected

Percent Non-Asbestos Fibrous Material:
15 Fibrous Glass

Percent Non-Fibrous Material:
85

Lab No.: 7122002
Client No.: ER-23
Analyst Observation: Grey Insulation
Client Description: Pipe Parging On Fitting
Location: Penthouse
Facility:

Percent Asbestos:
65 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
35

Lab No.: 7122003
Client No.: ER-24
Analyst Observation: Grey Insulation
Client Description: Pipe Parging
Location: Penthouse
Facility:

Percent Asbestos:
65 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
35

Lab No.: 7122004
Client No.: ER-25
Analyst Observation: Grey Insulation
Client Description: Parging On Tee (Return)
Location: Penthouse
Facility:

Percent Asbestos:
70 *Chrysotile*

Percent Non-Asbestos Fibrous Material:
None Detected

Percent Non-Fibrous Material:
30

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 1/6/2021
Date Analyzed: 01/08/2021
Signature: David Hayes
Analyst: David Hayes

Approved By:
Frank E. Ehrenfeld, III
Laboratory Director

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Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/8/2021
	20 Duke St.,Suite 109	Report No.:	625905 - PLM
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

Appendix to Analytical Report

Customer Contact:
Method:40 CFR Appendix E to Subpart E of Part 763, interim method for the Determination of Asbestos in Bulk Insulation Samples, and USEPA 600, R93-116 as needed.

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager:wchampion@iatl.com
iATL Account Representative: Semih Kocahasan
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Bulk Building Materials
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and ir our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by US EPA 600 93-116: Determination of Asbestos in Bulk Building Materials by Polarized Light Microscopy (PLM).

Certifications:

- NIST-NVLAP No. 101165-0
- NYSDOH-ELAP No. 11021
- AIHA-LAP, LLC No. 100188

Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. PC Trace represents a <0.25% amount. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analytical Methodology Alternatives: Your initial request for analysis may not have accounted for recent advances in regulatory requirements or advances in technology that are routinely used in similar situations for other qualified projects. You may have the option to explore additional analysis for further information. Below are a few options, listed as the matrix followed by the appropriate methodology. Also included are links to more information on our website.

Bulk Building Materials that are Non-Friable Organically Bound (NOB) by Gravimetric Reduction techniques employing PLM and TEM: ELAP 198.6 (PLM-NOB), ELAP 198.4 (TEM-NOB)

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Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/8/2021
	20 Duke St.,Suite 109	Report No.:	625905 - PLM
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

Loose Fill Vermiculite Insulation, Attic Insulation, Zonolite (copyright), etc.: US EPA 600 R-4/004 (multi-tiered analytical process)
Sprayed On Insulation/Fireproofing with Vermiculite (SOF-V): ELAP 198.8 (PLM-SOF-V)

Soil, sludge, sediment, aggregate, and like materials analyzed for asbestos or other elongated mineral particles (ex. erionite, etc.): ASTM D7521, CARB 435, and other options available

Asbestos in Surface Dust according to one of ASTM's Methods (very dependent on sampling collection technique – by TEM): ASTM D 5755, D5756, or D6480

Various other asbestos matrices (air, water, etc.) and analytical methods are available.

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a list with highlighted disclaimers that may be pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com**.

1) Note: No mastic provided for analysis.
2) Note: Insufficient mastic provided for analysis.
3) Note: Insufficient material provided for analysis.
4) Note: Insufficient sample provided for QC reanalysis.
5) Note: Different material than indicated on Sample Log / Description.
6) Note: Sample not submitted.
7) Note: Attached to asbestos containing material.
8) Note: Received wet.
9) Note: Possible surface contamination.
10) Note: Not building material. 1% threshold may not apply.
11) Note: Recommend TEM-NOB analysis as per EPA recommendations.
12) Note: Asbestos detected but not quantifiable.
13) Note: Multiple identical samples submitted, only one analyzed.
14) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.080%.
15) Note: Analyzed by EPA 600/R-93/116. Point Counting detection limit at 0.125%.
16) Note: This sample contains >10% vermiculite mineral. See Appendix for Recommendations for Vermiculite Analysis.

Recommendations for Vermiculite Analysis:

Several analytical protocols exist for the analysis of asbestos in vermiculite. These analytical approaches vary depending upon the nature of the vermiculite mineral being tested (e.g. un-processed gange, homogeneous exfoliated books of mica, or mixed mineral composites).Please contact your client representative for pricing and turnaround time options available.

iATL recommends initial testing using the EPA 600/R-93/116 method. This method is specifically designed for the analysis of asbestos in bulk building materials. It provides an acceptable starting point for primary screening of vermiculite for possible asbestos.

Results from this testing may be inconclusive. EPA suggests proceeding to a multi-tiered analysis involving wet separation techniques in conjunction with PLM and TEM gravimetric analysis (EPA 600/R-04/004).

For New York State customers, NYSDOH requires disclaimers and qualifiers for various vermiculite containing samples that direct analysis via ELAP198.6 and ELAP198.8 for samples that contain >10% vermiculite mineral where ELAP198.6 may be used to evaluate the asbestos content of the material. However, any test result using ELAP198.6 will be reported with the following disclaimer: “ELAP198.6 method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing >10% vermiculite.”

Further information on this method and other vermiculite and asbestos issues can be found at the following: Agency for Toxic Substances and Disease Registry (ATSDR) www.atsdr.cdc.gov, United States Geological Survey (USGS) www.minerals.usgs.gov/minerals/, US EPA www.epa.gov/asbestos. The USEPA also has an informative brochure "Current Best Practices for Vermiculite Attic Insulation" EPA 747F03001 May 2003, that may assist the health and remediation professional. NYS customers please follow current NYSDOH ELAP requirements per policy on subject of surfacing and vermiculite, May 6, 2016, Testing Requirements for Surfacing Material Containing Vermiculite (https://www.wadsworth.org/sites/default/files/WebDoc/I198_8_02_2.pdf)

The following is a summary of the analytical process outlines in the EPA 600/R-04/004 Method:

1)**Analytical Step/Method:** Initial Screening by PLM, EPA 600R-93/116
Requirements/Comments: Minimum of 0.1 g of sample. ~0.25% for most samples.

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	20 Duke St.,Suite 109	Report No.:	625905 - PLM
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

2)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

3)**Analytical Step/Method:** Wet Separation by PLM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Floats" only.

4)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Sinks" only.

5)**Analytical Step/Method:** Wet Separation by TEM Gravimetric Technique, EPA R-04/004
Requirements/Comments: Minimum 50g** of dry sample. Analysis of "Suspension" only.
*With advance notice and confirmation by the laboratory.
**Approximately 1 Liter of sample in double-bagged container (~9x6 inch bag of sample).

APPENDIX II

Laboratory Certificate of Analysis – Lead Paint Samples

9000 Commerce Parkway Suite B
Mt. Laurel, New Jersey 08054
Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/13/2021
	20 Duke St.,Suite 109	Report No.:	625902 - Lead Paint
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.: 7121926 **Description:** Red Floor Paint **Result (% by Weight):** 0.32
Client No.: LE-01 **Location:** RM 205 **Result (ppm):** 3200
Comments:

Lab No.: 7121927 **Description:** Silver Paint On Boiler Breaching **Result (% by Weight):** <0.019
Client No.: LE-02 **Location:** RM 205 Corridor **Result (ppm):** <190
Comments: *

Lab No.: 7121928 **Description:** Cream Color Paint On Concrete Wall **Result (% by Weight):** 0.30
Client No.: LE-03 **Location:** **Result (ppm):** 3000
Comments:

Lab No.: 7121929 **Description:** Brown Paint On Wood Door **Result (% by Weight):** 0.10
Client No.: LE-04 **Location:** RM 202 **Result (ppm):** 1000
Comments: ***

Lab No.: 7121930 **Description:** Light Green Wall Paint **Result (% by Weight):** <0.0075
Client No.: LE-05 **Location:** RM 214 **Result (ppm):** <75
Comments:

Lab No.: 7121931 **Description:** Brown Paint On Door **Result (% by Weight):** 0.22
Client No.: LE-06 **Location:** RM 320 **Result (ppm):** 2200
Comments: ***

Lab No.: 7121932 **Description:** Beige Wall Paint On Concrete **Result (% by Weight):** 0.089
Client No.: LE-07 **Location:** **Result (ppm):** 890
Comments:

Please refer to the Appendix of this report for further information regarding your analysis.

Date Received: 1/6/2021
Date Analyzed: 01/13/2021
Signature: Chad Shaffer
Analyst: Chad Shaffer

Approved By: Frank Ehrenfeld
Frank E. Ehrenfeld, III
Laboratory Director

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CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/13/2021
	20 Duke St.,Suite 109	Report No.:	625902 - Lead Paint
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

Appendix to Analytical Report:

Customer Contact:
Method: ASTM D3335-85a, US EPA SW846 3050B:7000B

This appendix seeks to promote greater understanding of any observations, exceptions, special instructions, or circumstances that the laboratory needs to communicate to the client concerning the above samples. The information below is used to help promote your ability to make the most informed decisions for you and your customers. Please note the following points of contact for any questions you may have.

iATL Customer Service: customerservice@iatl.com
iATL Office Manager:wchampion@iatl.com
iATL Account Representative: Semih Kocahasan
Sample Login Notes: See Batch Sheet Attached
Sample Matrix: Paint
Exceptions Noted: See Following Pages

General Terms, Warrants, Limits, Qualifiers:

General information about iATL capabilities and client/laboratory relationships and responsibilities are spelled out in iATL policies that are listed at www.iATL.com and ir our Quality Assurance Manual per ISO 17025 standard requirements. The information therein is a representation of iATL definitions and policies for turnaround times, sample submittal, collection media, blank definitions, quantification issues and limit of detection, analytical methods and procedures, sub-contracting policies, results reporting options, fees, terms, and discounts, confidentiality, sample archival and disposal, and data interpretation.

iATL warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted. iATL disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. iATL accepts no legal responsibility for the purpose for which the client uses test results. Any analytical work performed must be governed by our Standard Terms and Conditions. Prices, methods and detection limits may be changed without notification. Please contact your Customer Service Representative for the most current information.

This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA LAP LLC, or any agency of local, state or province governments nor of any agency of the U.S. government.

This report shall not be reproduced except in full, without written approval of the laboratory.

Information Pertinent to this Report:

Analysis by ASTM D3335-85a by AAS

Certification:
- National Lead Laboratory Program (NLLAP): AIHA-LAP, LLC No. 100188
- NYSDOH-ELAP No. 11021

This report meets the standards set forth in the EPA's National Lead Laboratory Accreditation Program (NLLAP) through the Laboratory Quality System Requirements (LQSR) Revision 3.0 November 5, 2007. All Environmental Lead Proficiency Analytical Testing (ELPAT) is through the AIHA-PAT established program.

Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation.
All results are based on the samples as received at the lab. iATL assumes that appropriate sampling methods have been used and that the data upon which these results are based have been accurately supplied by the client.
Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B.
Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies.
LSD=0.2 ppm MDL=0.005% by weight. RL= 0.010% by weight (based upon 100 mg sampled).

Disclaimers / Qualifiers:

There may be some samples in this project that have a "NOTE:" associated with a sample result. We use added disclaimers or qualifiers to inform the client about something that requires further explanation. Here is a complete list with highlighted disclaimers pertinent to this project. For a full explanation of these and other disclaimers, please inquire at **customerservice@iatl.com.**

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Telephone: 856-231-9449
Email: customerservice@iatl.com

CERTIFICATE OF ANALYSIS

Client:	ALL-TECH Environmental Services Limited	Report Date:	1/13/2021
	20 Duke St.,Suite 109	Report No.:	625902 - Lead Paint
	Bedford NS B4A 2Z5	Project:	Eliot River Elementary
		Project No.:	PE283
Client:	ALL131		

* Insufficient sample provided to perform QC reanalysis (<200 mg)
** Not enough sample provided to analyze (<50 mg)
*** Matrix / substrate interference possible.

< less than sign, signifies none-detected below the empirical value based upon sub-sampled mass. This is often below the Reporting Limit (see above).

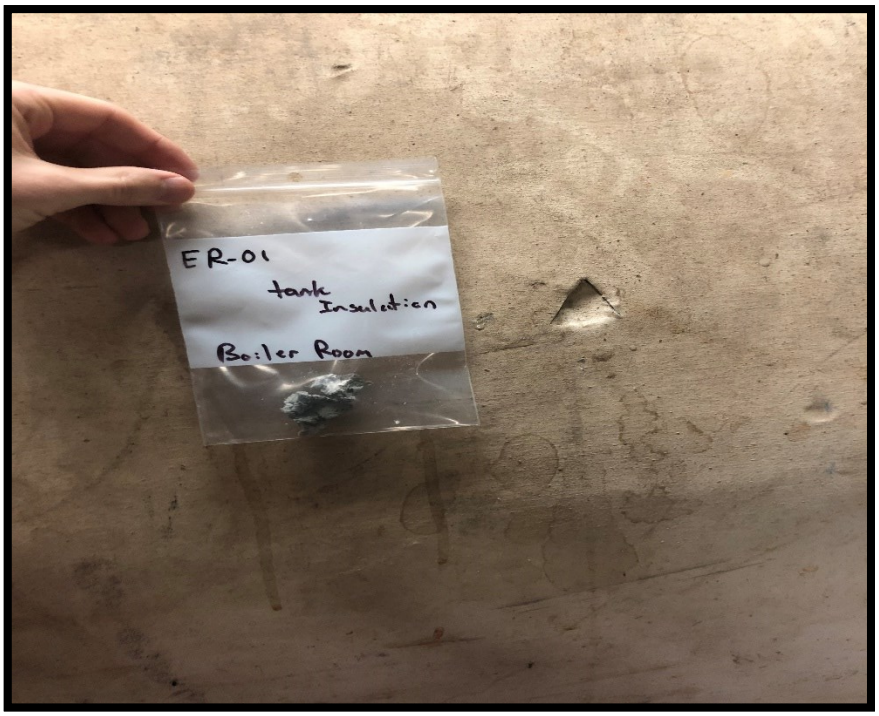
APPENDIX III

Site Photographs

Elliot River Elementary School

Hazmat Assessment Photo Log

Site Building Exterior



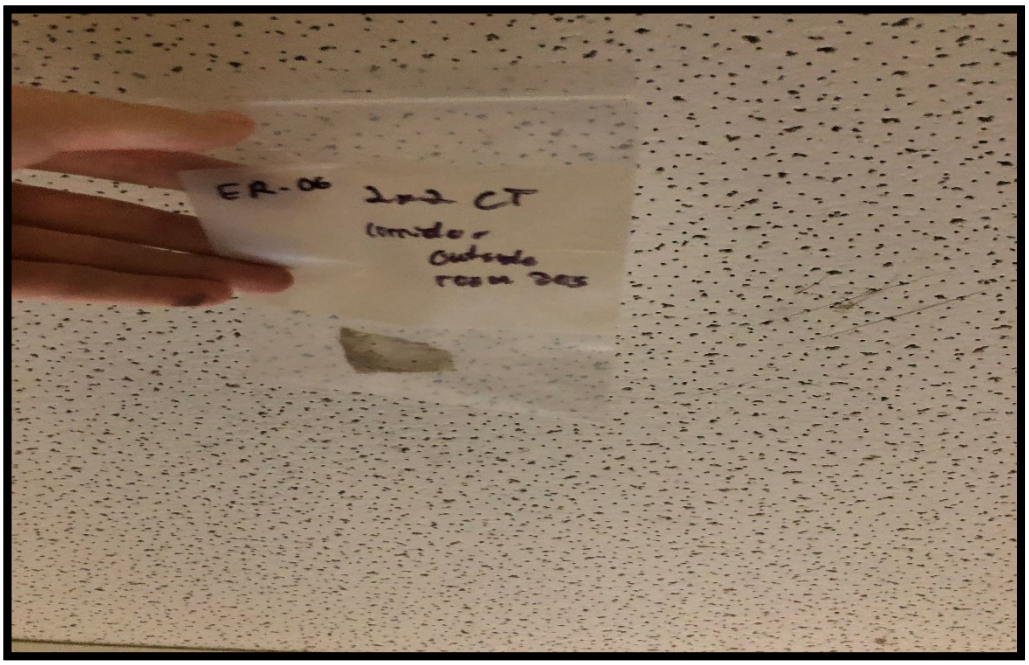
P1	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-01	Boiler Room 205	Tank Insulation	65% Chrysotile

P2	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-02	Boiler Room 205	Boiler Insulation Duct port (B-1002)	45% Chrysotile

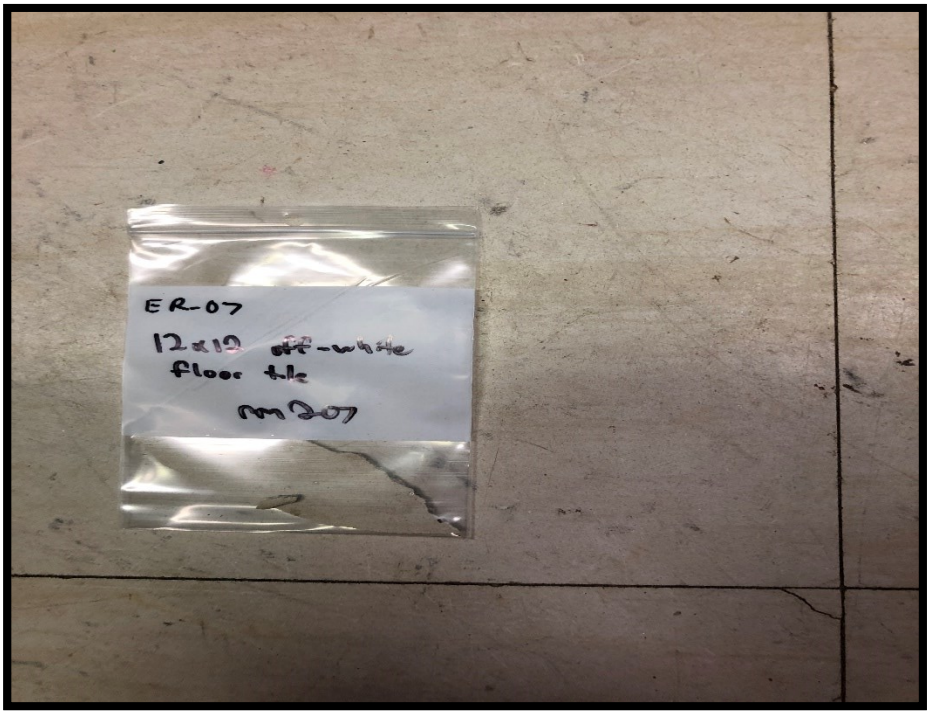
P3	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-03	Boiler Room 205	Pipe Elbow parging Insulation	65% Chrysotile

P4	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-04	Boiler Room 205	Brown / Yellow Boiler Insulation	None Detected

P5	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-05	Boiler Room 205	8” Supply paging cement	60% Chrysotile

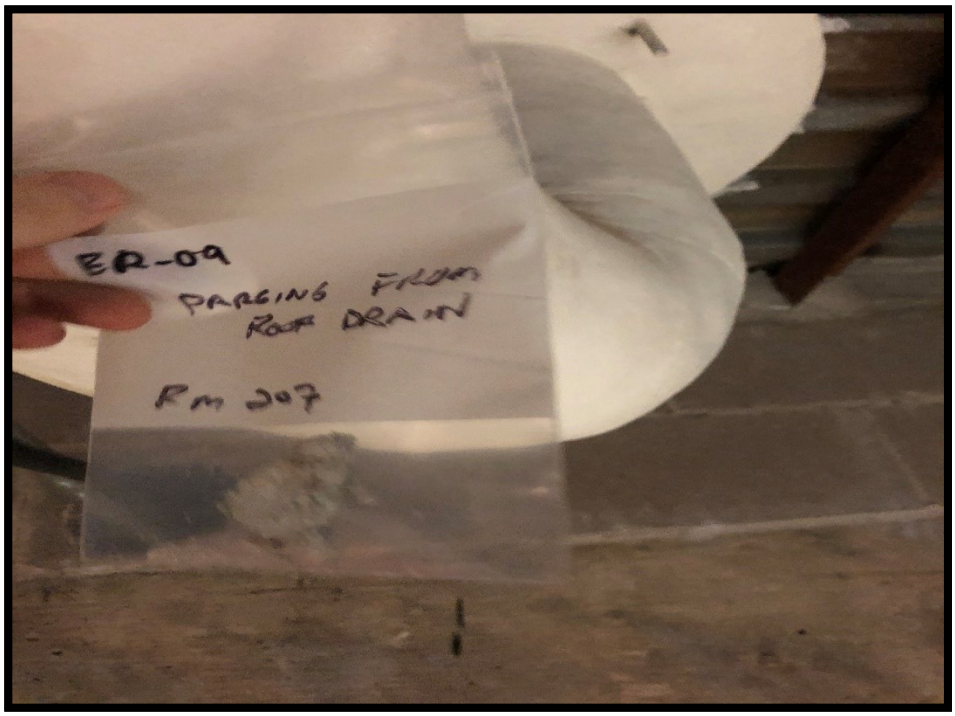


P6	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-06	Room 203	2’ x 2’ Ceiling Tile	None Detected



P7	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-07	Room 207	a) Off-White Floor Tile b) Black Mastic	a) None Detected b) None Detected

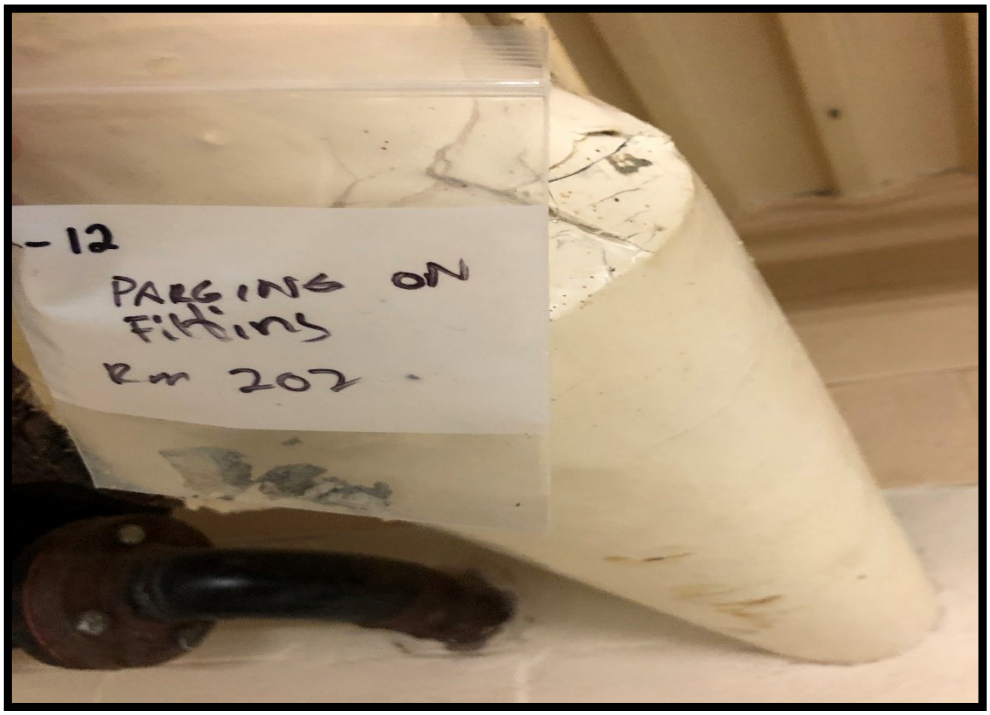
P8	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-08	Room 207	Texture Coat on ceiling	None Detected



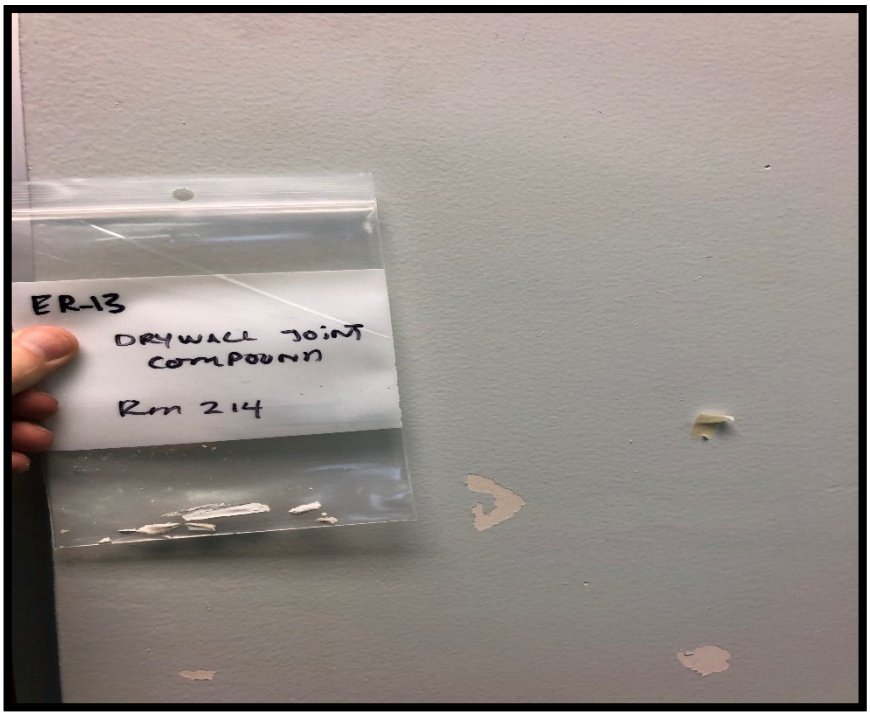
P9	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-09	Room 207	Parging cement on Roof Drain	60% Chrysotile

P10	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-10	Room 208	Texture Coat on ceiling	None Detected

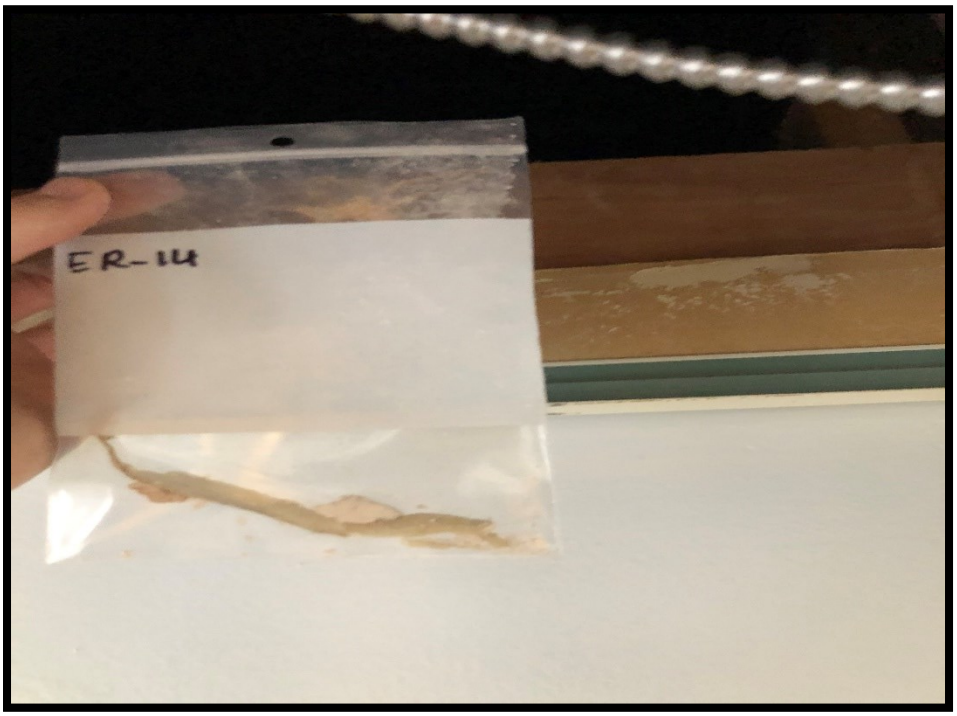
P11	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-11	Room 204	2' x 4' Ceiling Tile	None Detected



P12	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-12	Room 202	Parging cement on Fitting	65 % Chrysotile

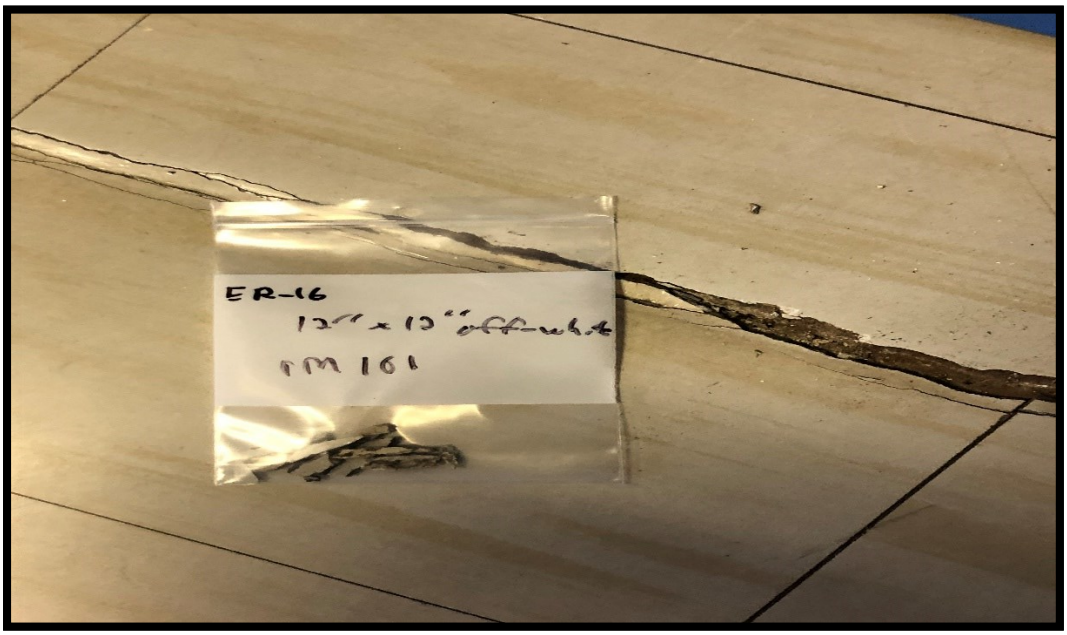


P13	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-13	Room 214	Drywall Joint Compound	None Detected



P14	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-14	Main Lobby	Drywall joint compound	1.3 Chrysotile

P15	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-15	Room 118	Texture Coat	None Detected



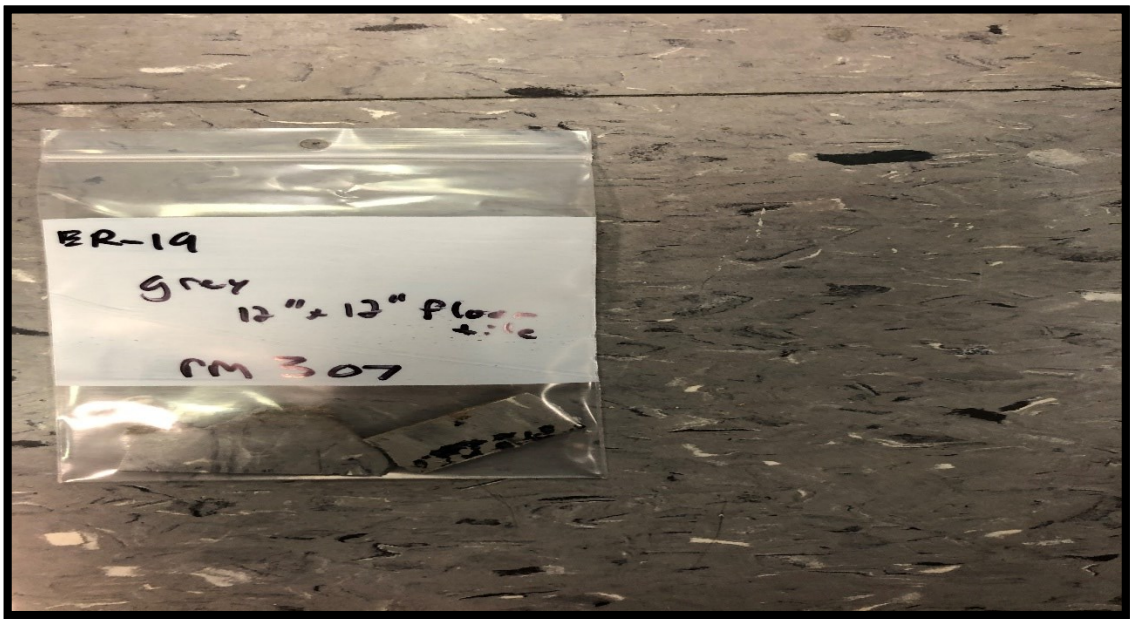
P16	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-16	Room 101	a) Off-White Floor Tile b) Black Mastic	a) None Detected b) None Detected

N/A

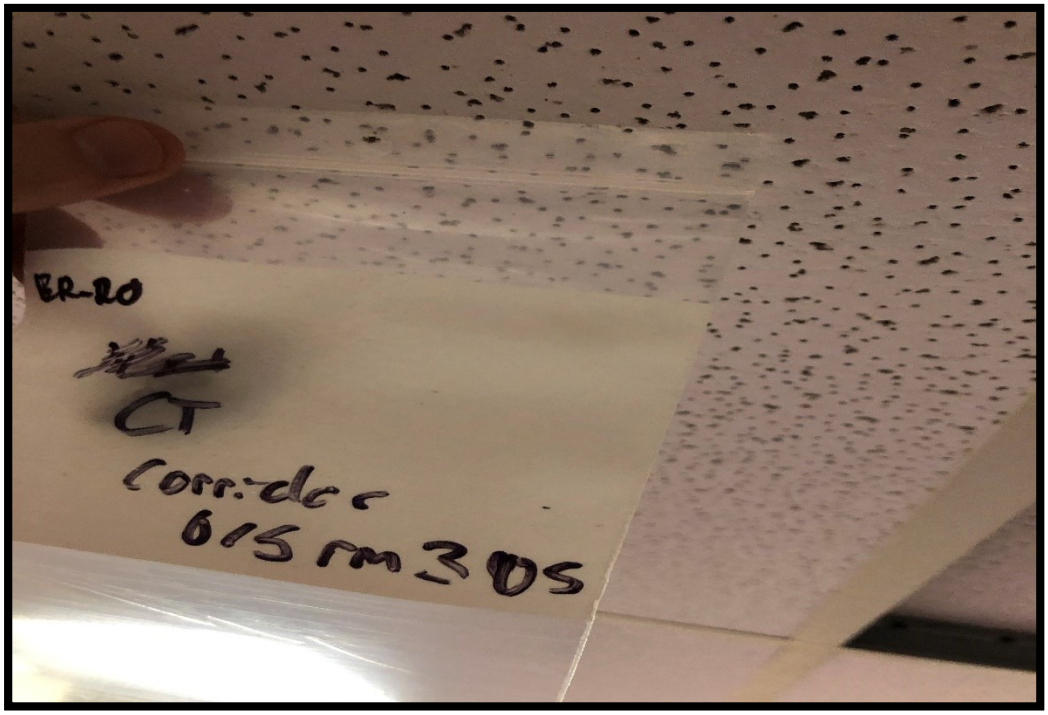
P17	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-17	Room 119	2’ x 2’ Ceiling Tile	None Detected

N/A

P18	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-18	Room 102	a) Light Blue Floor Tile b) Black Mastic	a) None Detected b) None Detected



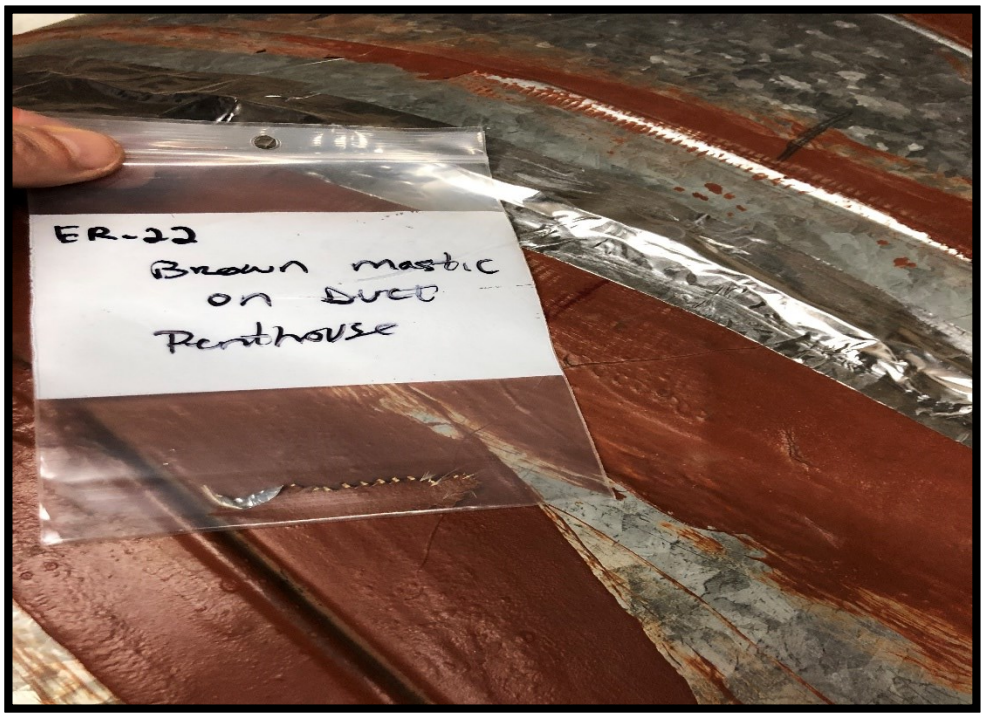
P19	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-19	2nd Floor – Room 307	a) Grey Floor Tile b) Black Mastic	a) None Detected b) None Detected



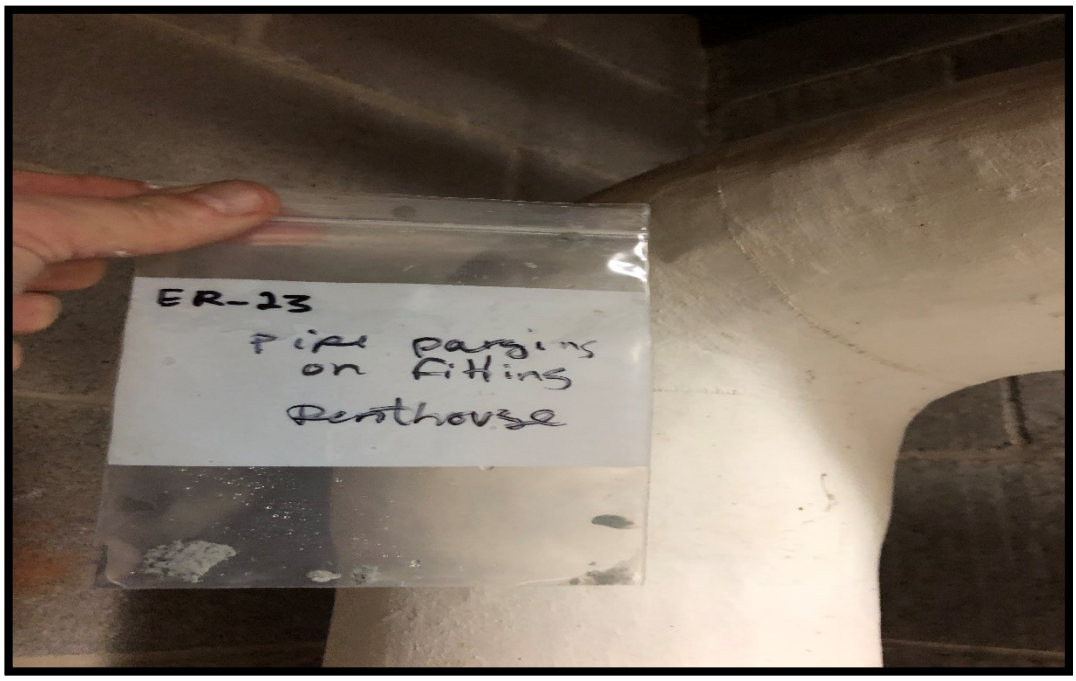
P20	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-20	2nd Floor Corridor outside room 305	2' x 4' Ceiling Tile	None Detected

N/A

P21	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-21	2nd Floor Corridor	Ceiling Tile Fissure Design	None Detected



P22	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-22	Penthouse	Brown Mastic on Duct	None Detected



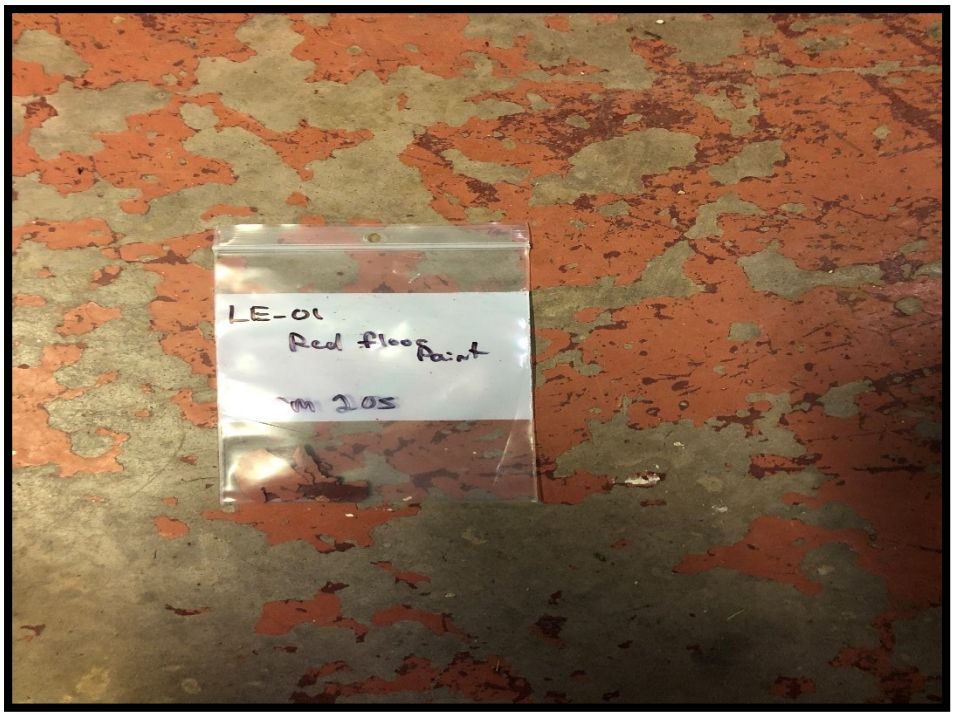
P23	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-23	Penthouse	Pipe Parging on fitting	65% Chrysotile

N/A

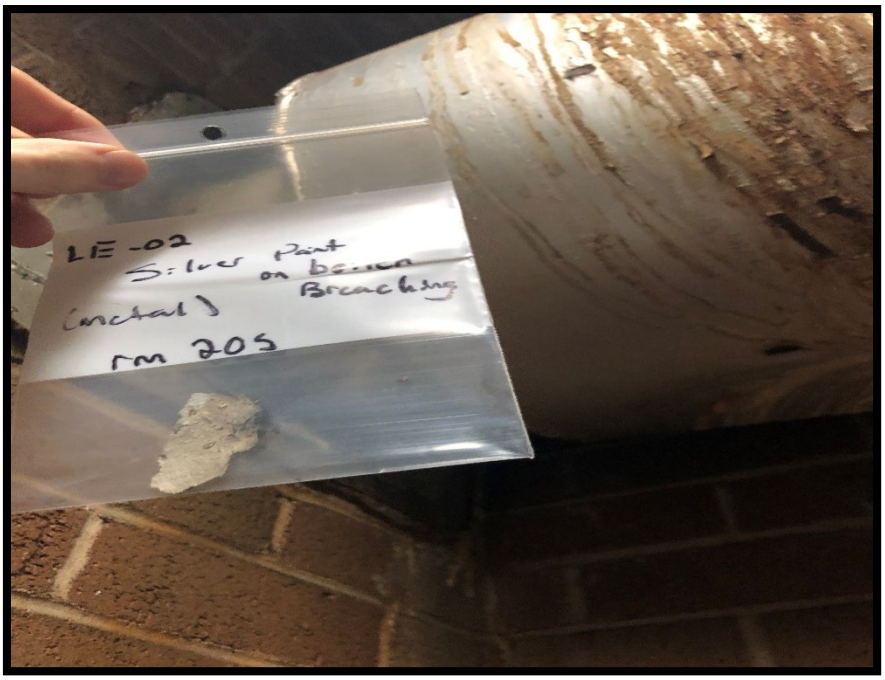
P24	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-24	Penthouse	Pipe Parging	65 % Chrysotile

N/A

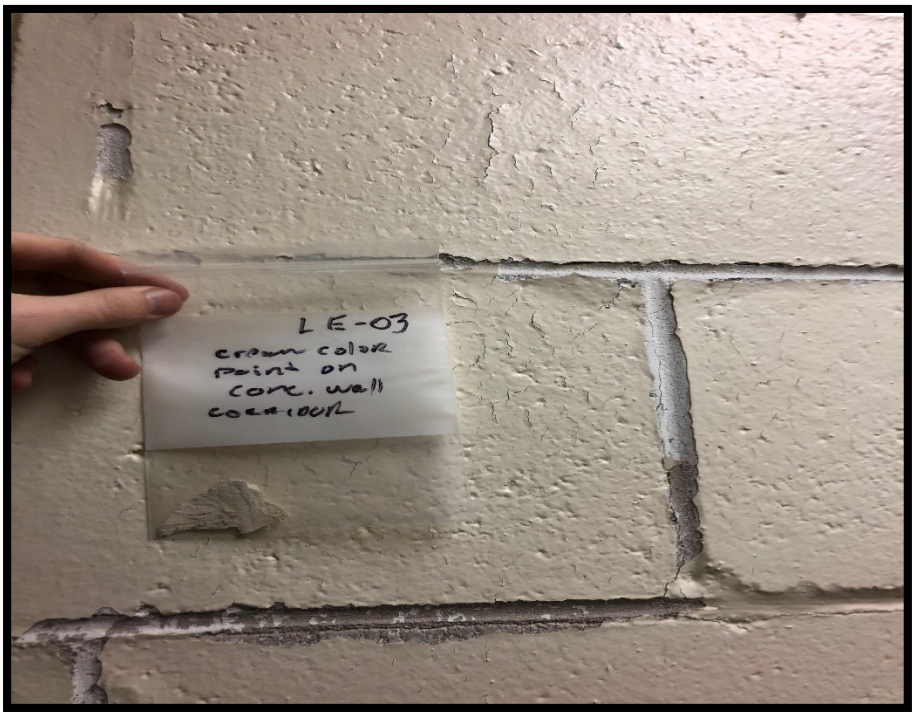
P25	SAMPLE I.D	LOCATION	DESCRIPTION	ASBESTOS CONTENT
	ER-25	Penthouse	Parging cement on T-fitting (Return)	70% Chrysotile



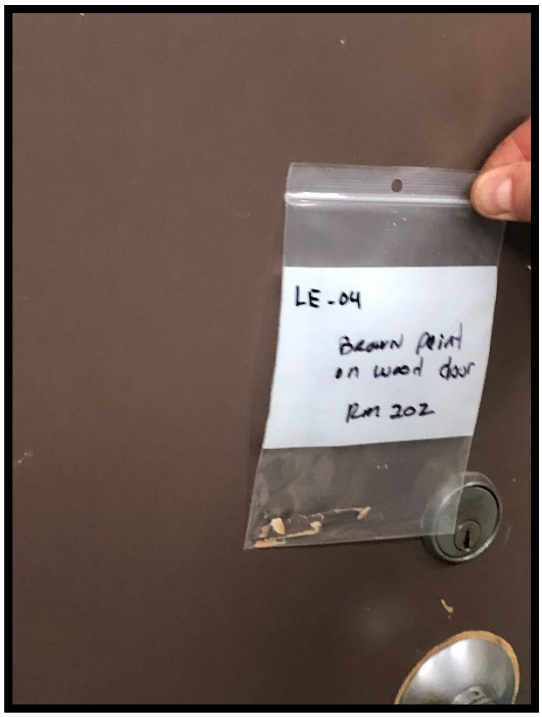
P26	SAMPLE I.D	LOCATION	DESCRIPTION	Total Lead results (% by weight)
	LE-01	Boiler Rm 205	Red Floor Paint	0.32



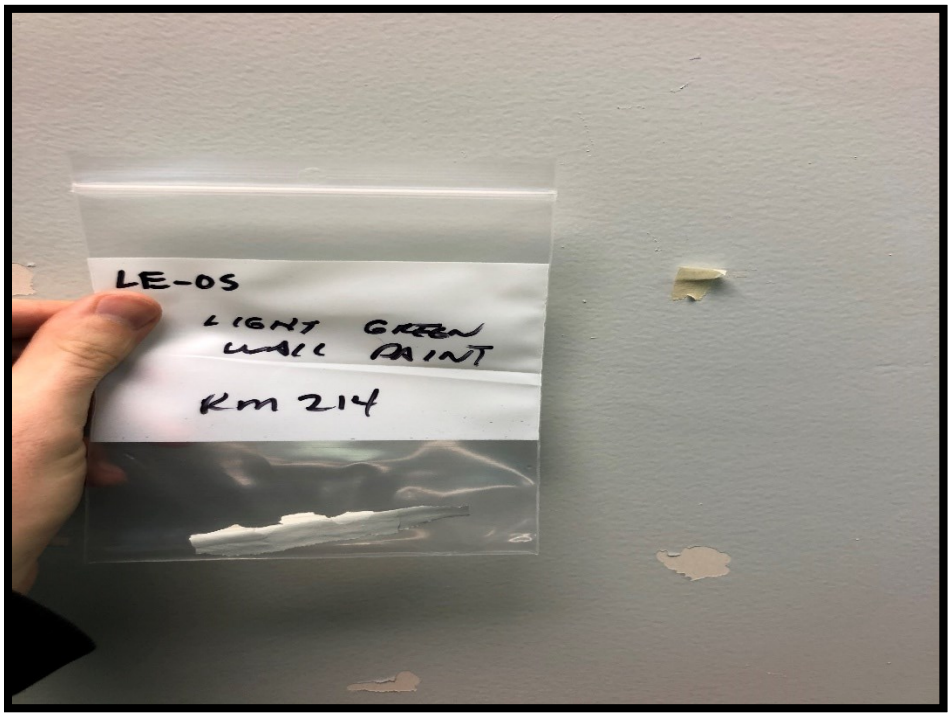
P27	SAMPLE I.D	LOCATION	DESCRIPTION	Total Lead results (% by weight)
	LE-02	Boiler Room 205	Silver Paint on Boiler breeching stack	<0.019



P28	SAMPLE I.D	LOCATION	DESCRIPTION	Total Lead results (% by weight)
	LE-03	Main Floor corridor	Cream Color Paint on Concrete	0.30



P29	SAMPLE I.D	LOCATION	DESCRIPTION	Total Lead results (% by weight)
	LE-04	Main Floor – Room 202	Brown Paint on Wood Door	0.10



P30	SAMPLE I.D	LOCATION	DESCRIPTION	Total Lead results (% by weight))
	LE-05	Main Floor Room 214	Light Green Wall Paint	<0.0075

P31	SAMPLE I.D	LOCATION	DESCRIPTION	Total Lead results (% by weight)
	LE-06	2nd Floor Room 320	Brown Paint on Door	0.22

N/A

P32	SAMPLE I.D	LOCATION	DESCRIPTION	Total Lead results (% by weight)
	LE-07	2nd Floor corridor	Beige Wall Paint on Concrete	0.089

P33	LOCATION	DESCRIPTION
	Boiler Room	Straight runs of pipe insulation visually observed as fibreglass

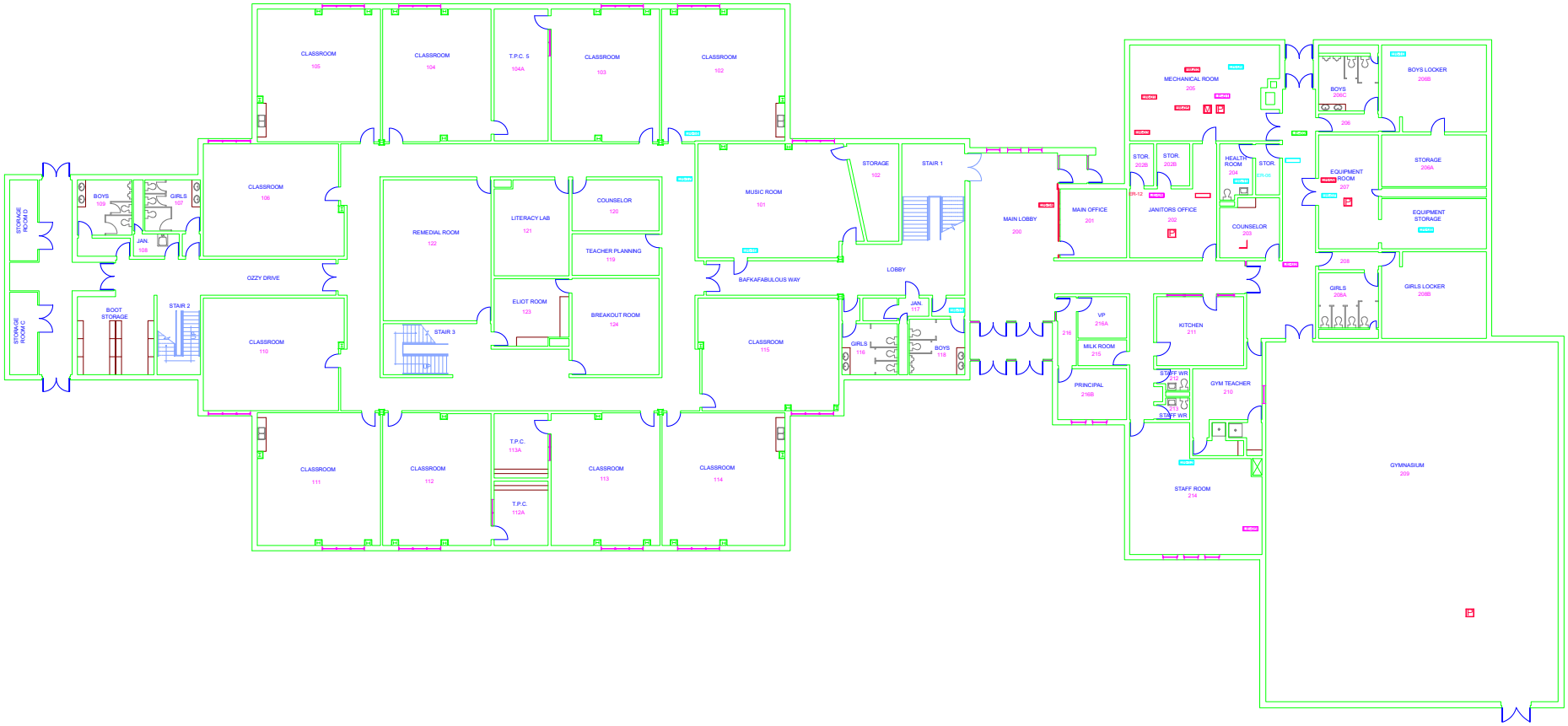
P34	LOCATION	DESCRIPTION
	Penthouse, Generator Rm	Straight runs of pipe insulation visually observed as fibreglass with painted ends

P35	LOCATION	DESCRIPTION
	Pipe chase by equipment storage	Straight runs of pipe insulation visually observed as fiberglass. Concrete wall design

P36	LOCATION	DESCRIPTION
	2nd Level	Main structural deck steel / metal

APPENDIX IV

Site Drawings with sample locations and markings



NOTE 1:
This drawing has been produced from a sketch and is not to scale. The room sizes and their locations are only approximations of the as-built dimensions.

NOTE 2:

ALL-TECH
ENVIRONMENTAL SERVICES LIMITED
4-70 NICHOLAS LN
CHARLOTTETOWN, PE.
C1E 3J5
TEL : (902) 569-0172
FAX : (902) 569-5453

ASBESTOS LEGEND

= CEILING
= FLOOR
= CEILING AND FLOOR
= UNSURVEYED AREA
A = APPLIANCE
M = MECHANICAL
P = PIPE MATERIAL
D = DUCT WORK
E = ELECTRICAL
W = WALL
MC-00 = SAMPLE NUMBER ASBESTOS DETECTED
MC-00 = SAMPLE NUMBER ASBESTOS NON-DETECT
LM-00 = SAMPLE NUMBER LEAD DETECTED
LM-00 = SAMPLE NUMBER LEAD NON-DETECT

PROJECT
HAZARDOUS MATERIALS ASSESSMENT
ELIOT RIVER SCHOOL

SITE
ELIOT RIVER SCHOOL
28 TERRY FOX PL
CORNWALL, PE

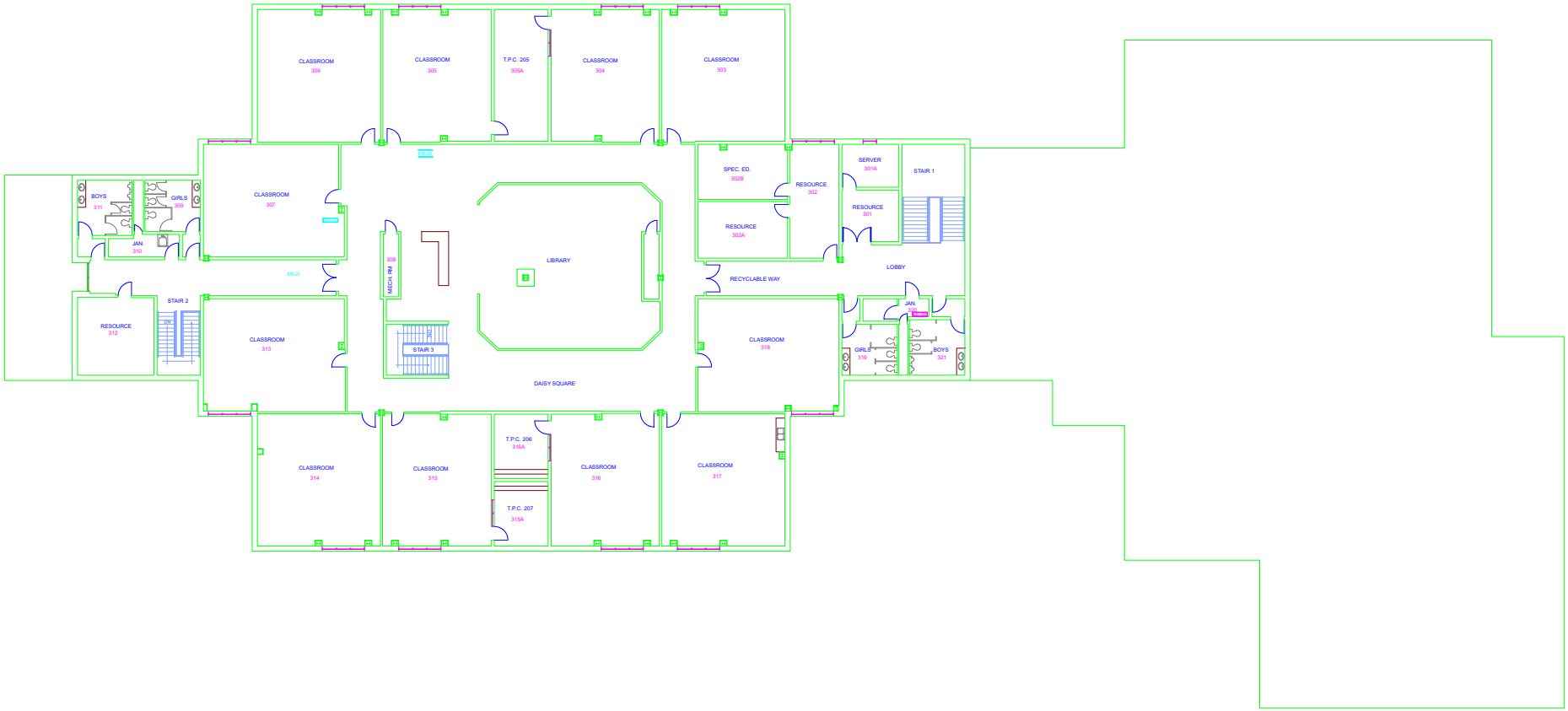
DRAWN BY:	T. DeROCHE	DATE:	21-12-20
CHECKED BY:		DATE:	
APPROVED BY:		DATE:	
SCALE:	NOT TO SCALE		

A DETAIL NO.
B LOCATION DRAWING NO.
C DRAWING NO. WHERE DETAILED

JOB TITLE
PE283
ELIOT RIVER SCHOOL
HAZMAT

DRAWING TITLE
MAIN FLOOR

DRAWING NO.	SHEET NO.	REV.
	1 OF 3	0



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PROJECT
HAZARDOUS MATERIALS ASSESSMENT
ELIOT RIVER SCHOOL

SITE
ELIOT RIVER SCHOOL
28 TERRY FOX PL
CORNWALL, PE

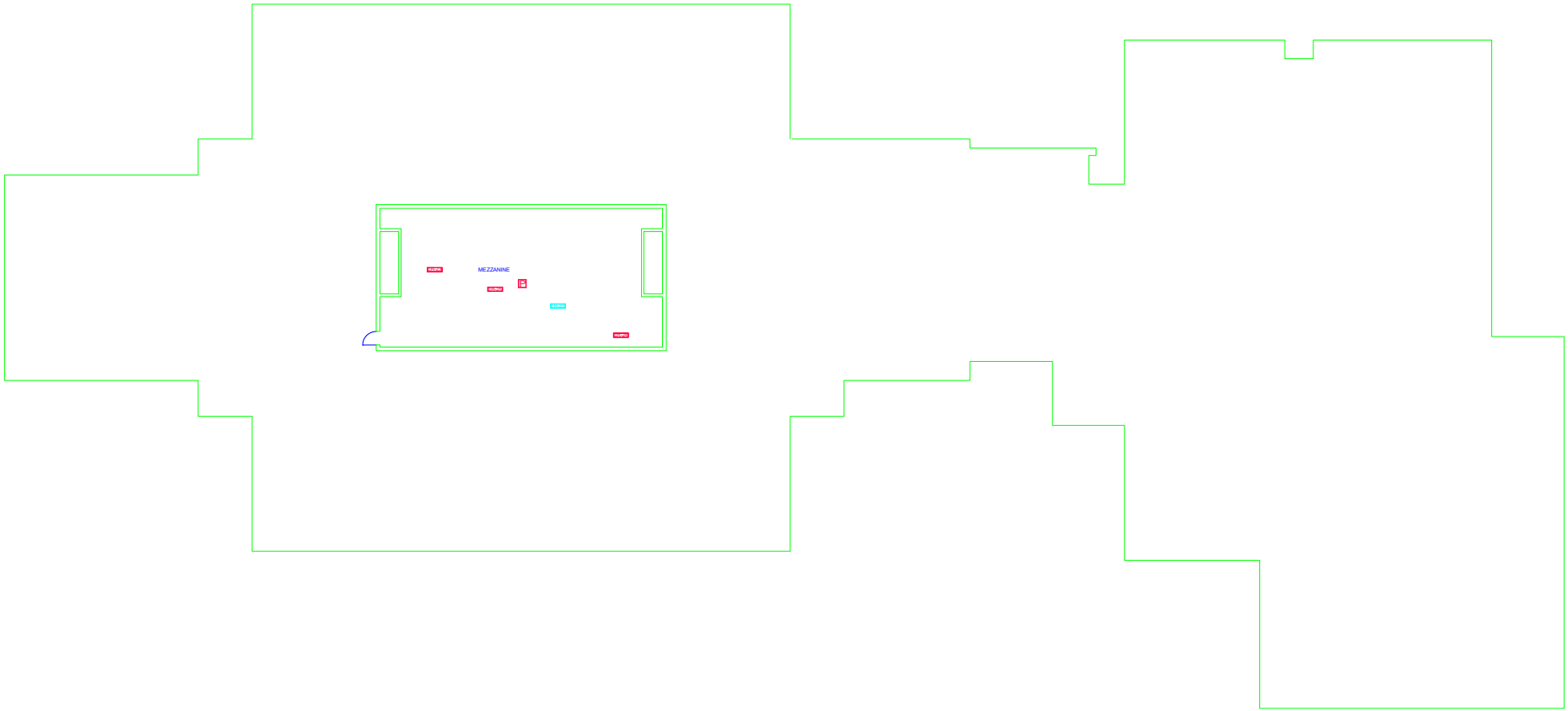
DRAWN BY: T. DeROCHE DATE: 21-12-20
CHECKED BY: DATE:
APPROVED BY: DATE:
SCALE: NOT TO SCALE

A DETAIL NO.
B LOCATION DRAWING NO.
C DRAWING NO. WHERE DETAILED

JOB TITLE
PE283
ELIOT RIVER SCHOOL
HAZMAT

DRAWING TITLE
SECOND FLOOR

DRAWING NO.	SHEET NO.	REV.
	2 OF 3	0



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ENVIRONMENTAL SERVICES LIMITED
4-70 NICHOLAS LN
CHARLOTTETOWN, PE.
C1E 3J5
TEL : (902) 569-0172
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ASBESTOS LEGEND

= CEILING
= FLOOR
= CEILING AND FLOOR
= UNSURVEYED AREA
A = APPLIANCE
M = MECHANICAL
P = PIPE MATERIAL
D = DUCT WORK
E = ELECTRICAL
W = WALL

MC-00 = SAMPLE NUMBER ASBESTOS DETECTED
MC-00 = SAMPLE NUMBER ASBESTOS NON-DETECT
LM-00 = SAMPLE NUMBER LEAD DETECTED
LM-00 = SAMPLE NUMBER LEAD NON-DETECT

PROJECT
HAZARDOUS MATERIALS ASSESSMENT
ELIOT RIVER SCHOOL

SITE
ELIOT RIVER SCHOOL
28 TERRY FOX PL
CORNWALL, PE

DRAWN BY:	T. DeROCHE	DATE:	21-12-20
CHECKED BY:		DATE:	
APPROVED BY:		DATE:	
SCALE:	NOT TO SCALE		

A DETAIL NO.
B LOCATION DRAWING NO.
C DRAWING NO. WHERE DETAILED

JOB TITLE
PE283
ELIOT RIVER SCHOOL
HAZMAT

DRAWING TITLE
PENTHOUSE

DRAWING NO.	SHEET NO.	REV.
	3 OF 3	0

APPENDIX V

Estimated ACM Quantities in Accessible Areas

Estimated Quantities of Asbestos-Containing Materials
Eliot River School - December 2020

Location	Item	Descriptor (size, color, more details)	Quantity (units)			Total
			Good	Fair	Poor	
Main Lobby 200	roof drain parging cement	above ceiling tile	1			1
Janitor Room 202	elbows	Parging cement - 8"	3	1		4
Boiler Room 205	elbows	Parging cement various sizes	60	5		65
	boiler ports (ER-02)	6" opening covered with parging	18			18
Equipment Storage Room 207	roof drains / pipe parging	accessible ladder height	2			2
Gymnasium 209	roof drains / pipe parging	Parging cement various sizes	14			14
		Totals:	98	6	0	104

Estimated Quantities of Asbestos-Containing Materials
Eliot River School - December 2020

Location	Item	Descriptor (size, color, more details)	Quantity (square feet)			Total
			Good	Fair	Poor	
Boiler Room 205	Water tank	Length - 10' / Diameter 4.5'	X			
Main Lobby 200	drywall joint compound	floor to ceiling	X			
		Totals:				

APPENDIX 'B'
COVID-19 AFFIDAVIT

Public Works and Planning Division
Transportation and Infrastructure

PO Box 2000
Charlottetown
Prince Edward Island
Canada C1A 7N8

Tel 902 368 5160
Fax 902 569 0590
princeedwardisland.ca

Appendix A

COVID-19 CONTRACTOR AFFIDAVIT

DTI Project: _____

The undersigned ("Contractor") hereby acknowledges the Province's concerns regarding safety at the worksite due to the COVID-19 pandemic. The Contractor agrees that it shall conduct its operations in strict compliance with all applicable regulations, guidelines, and requirements imposed by the Chief Public Health Office (CPHO), Worker's Compensation Board (WCB), and that it will comply with the Construction Association of PEI (CAPEI) "Pandemic Planning For The Construction Industry – A Guide" for all construction sites and workers at all Public Works locations.

The Contractor understands that it is the Contractor's responsibility to develop, maintain, and follow a written Covid-19 Operational Plan specifying how it will meet its obligations. The Contractor is to provide a copy of their Covid-19 Operational Plan upon request by the DTI representative.

The Contractor, if acting as the General, also certifies that each Subcontractor, Sub-subcontractor, and other parties that will perform work on their behalf, will also comply and will satisfy these requirements.

The Contractor acknowledges and agrees that non-compliance with any of the requirements above, including failure to abide by its own COVID-19 Operational Plan, may result in suspension or termination of any or all work in progress.

_____
Contractor/ Company Name (Please Print)

_____
Contractor/Company Email (Please Print)

_____
Contractor/Company Phone

Certification:

By signing below, on behalf of the Contractor/Company, I certify we have COVID-19 Operational Plan, all staff have read and acknowledged the plan and we agree to the foregoing.

_____
Contractor/Company Representative (Please Print)

_____
Contractor/Company Representative (Please Sign)

_____
Signature Date

Please email completed form to adminpwp@gov.pe.ca prior to construction activity.