NRC·CNRC Administrative Services and Property Management

SPECIFICATIONS

SOLICITATION #: 16-22087

BUILDING: M-58
1200 Montreal Road,
Ottawa, Ontario

PROJECT: Renovate the ground floor, east and west wing at M-58

PROJECT #: M-58 - 5189

Date: October 2016

National Research Council Canada | Conseil national de recherches Canada

Canada

SPECIFICATION

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NRC·CNRC

From **Discovery** to **Innovation...**

Directions to the Ottawa Research Facilities — Montreal Road

1200 Montréal Road
Ottawa, Ontario, Canada K1A 0R6

Tel: 613-993-9101

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By Road, from the OTTAWA International Airport

1. From the airport take the AIRPORT PARKWAY to RIVERSIDE DR EAST
2. Follow RIVERSIDE DR EAST to HIGHWAY 417 EAST
3. Take HIGHWAY 417 EAST, past the ST-LAURENT BLVD exit, where HIGHWAY 417 splits, continue LEFT on HIGHWAY 174 (ROCKLAND)
4. Exit HIGHWAY 174 on BLAIR RD NORTH
5. Proceed on BLAIR RD NORTH, cross OGILVIE RD, and continue on to the traffic lights at the intersection of BLAIR and MONTREAL RD
6. Turn left onto MONTREAL RD and take the first immediate right onto the ramp leading down to the traffic circle. Stop at Building M-1 on the north side of the traffic circle. Ask the commissionaires in M-1 for directions to the NRC building, institute or staff member you seek.

By Road, from MONTRÉAL

1. Take MÉTROPOLITAIN 40 WEST and follow signs for OTTAWA and HIGHWAY 417 WEST
2. Follow 417 WEST to reach OTTAWA
3. Exit at HIGHWAY 174 EAST (ROCKLAND) when entering OTTAWA
4. Follow 174 EAST and exit at BLAIR RD NORTH (first exit after entering 174 EAST)
5. Follow BLAIR RD NORTH, cross OGILVIE RD, and continue on to the traffic lights at the intersection of BLAIR and MONTREAL RD
6. Turn left onto MONTREAL RD and take the first immediate right onto the ramp leading down to the traffic circle. Stop at Building M-1 on the north side of the traffic circle. Ask the commissionaires in M-1 for directions to the NRC building, institute or staff member you seek.


1 Sussex Facilities
2 Montreal Road Facilities
3 Uplands Facilities
4 NRC-CSTT
N
GATINEAU
OTTAWA
QUÉBEC
ONTARIO
Outaouais
Aylmer
Taché
Rockcliffe
Montréal
Vanier
Aviation
Blair
Sussex
Wellington
Bank
Bronson
Island Park
Ottawa River
Carling
Fisher
Prince of Wales
Walkley
Heron
Hawthorne
Hunt Club
Baseline
Riverside
Conroy
Airport
Uplands
Lester
Davidson
Albion
Hunt Club (W)
Merivale
Woodroffe
Greenbank
Fallowfield
Leitrim
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NRC Institute
Trans Canada HWY
Major HWY
Secondary HWY
Airport
Train Station
Ferry
Bus Station
Metro


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Mackenzie
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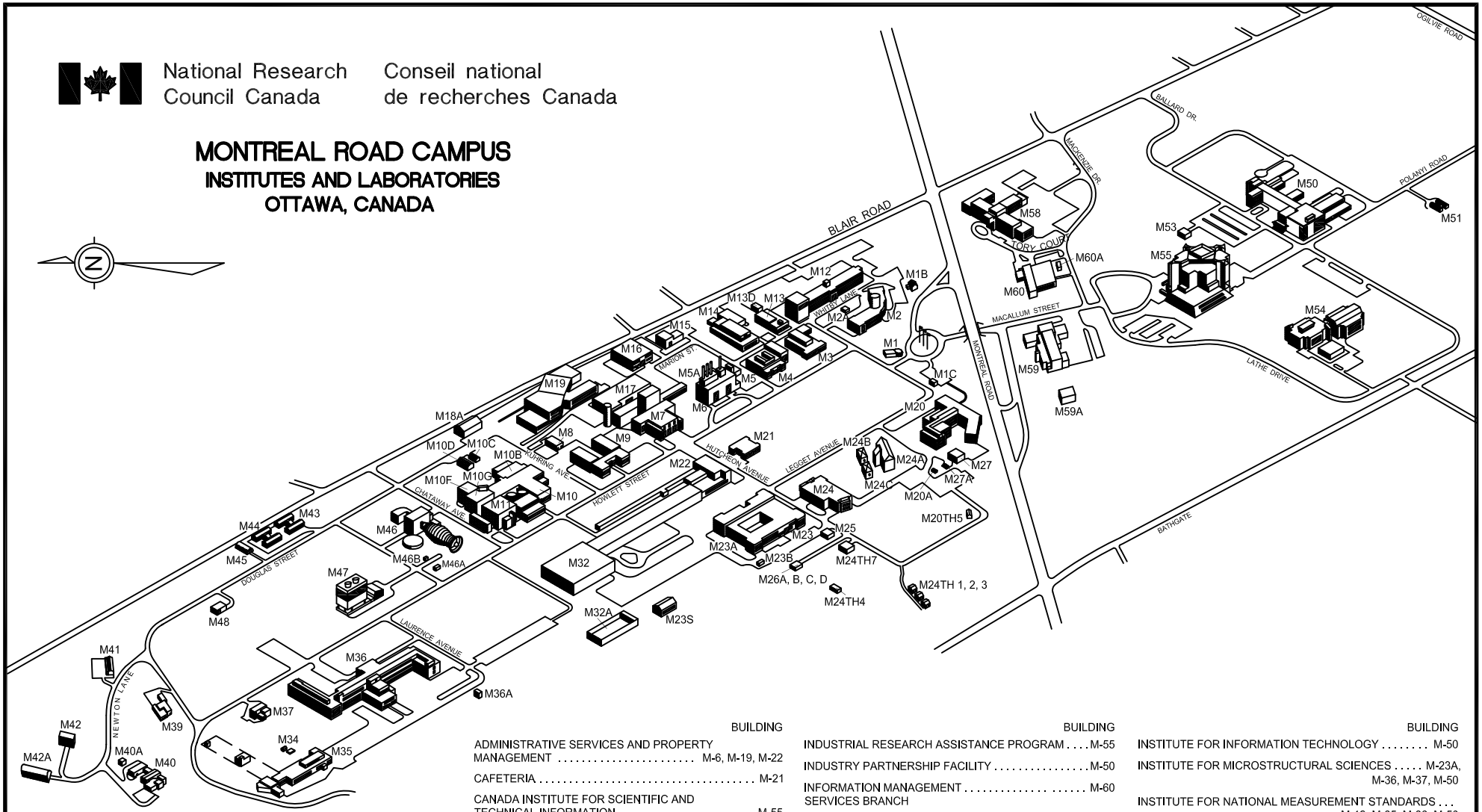
Airport
Ferry
Metro
Trans Canada HWY
Secondary HWY
Train Station
Bus Station

National Research Council Canada | Conseil national de recherches Canada

MONTREAL ROAD CAMPUS
INSTITUTES AND LABORATORIES
OTTAWA, CANADA



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Updated: July 2008

National Research Council Canada	Conseil national de recherches Canada
Administrative Services & Property management Branch (ASPM)	Direction des services administratif et gestion de l'immobilier (SAGI)

Construction Tender Form

Project Identification **Renovate the ground floor, east and west wing at M-58**

Tender No.: **16-22087**

1.2 **Business Name and Address of Tenderer**

Name_____

Address_____

_____

Contact Person(Print Name)_____

Telephone (_____) _____ **Fax**: (_____) _____

1.3 Offer

I/We the Tenderer, hereby offer to Her Majesty the Queen in Right of Canada (hereinafter referred to as "Her Majesty") represented by the National Research Council Canada to perform and complete the work for the above named project in accordance with the Plans and Specifications and other Tender Documents, at the place and in the manner set out therein for the Total Tender Amount (to be expressed in numbers only) of**: $_____. _____ in lawful money of Canada (excluding GST/HST)**

The above amount is inclusive of all applicable (*) Federal, Provincial and Municipal taxes except that in the event of a change in any tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property, that occurs

.1 after the date this tender was mailed or delivered, or
.2 if this tender is revised, after the date of the last revision

the amount of this offer shall be decreased or decreased in the manner provided for in GC22 of the General Conditions of the Contract Documents.

1.3.1 Offer (continued)

(*) For the purpose of this tender, the Goods and Services Tax (GST) is not to be considered as an applicable tax.

In the province of Quebec, the Quebec Sales Tax is not to be included in the tender amount because the Federal Government is exempt from this tax. Tenderers shall make arrangements directly with the provincial Revenue Department to recover any tax they may pay on good and servives acquired in the performance of this contract. However, tenderers should include in their tender amount Quebec Sales Tax for which an Input Tax Refund is not available.

1.4 Acceptance and Entry into Contract

I/We undertake, within fourteen (14) days of notification of acceptance of my/our offer, to sign a contract for the performance of the work provided I/we are notified, by the Department, of the acceptance of my/our offer within 30 days of the tender closing date.

1.5 Construction Time

I/We Agree to complete the work within the time stipulated in the specification from the date of notification of acceptance of my/our offer.

1.6 Bid Security

I/We herewith enclose tender security in accordance with Article 5 of the General Instruction to Tenderers.

I/We understand that if a security deposit is furnished as tender security and if I/we refuse to enter into a contract when called upon to do so, my/our security deposit shall be forfeited but the Minister may, if it is in the public interest, waive the right of Her Majesty to forfeit the security deposit.

I/We understand that if the security furnished is not in the approved from as described in Article 5 of the General Instructions to Tenderers, my/our tender is subject to disqualification.

1.7 Contract Security

Within fourteen (14) days after receipt of written notification of the acceptance of my/our offer, I/we will furnish contract security in accordance with the Contract Conditions "F" of the Contract Documents.

I/We understand that the contract security referred to herein, if provided in the form of a bill of exchange, will be deposited into the Consolidated Revenue Fund of Canada.

1.8 Appendices

This Tender Form includes Appendix No. _____N/A_____.

1.9 Addenda

The Total Tender Amount provides for the Work described in the following Addenda:

NUMBER	DATE	NUMBER	DATE

(Tenderers shall enter numbers and dates of addenda)

1.10 Execution of Tender

The Tenderer shall refer to Article 2 of the General Instructions to Tenderers.

SIGNED, ATTESTED TO AND DELIVERED on the _____day of _____on behalf of

_____

(Type or print the business name of the Tenderer)

AUTHORIZED SIGNATORY (IES)

_____

(Signature of Signatory)

_____

(Print name & Title of Signatory)

_____

(Signature of Signatory)

_____

(Print name & Title of Signatory)

SEAL

BUY AND SELL NOTICE

Renovate the ground floor, east and west wing at M-58

The National Research Council Canada, 1200 Montreal Road Ottawa, ON has a requirement for a project that includes:

Renovate the ground floor, east and west wing at M-58. Workplace 2.0 office. New windows, lighting, power systems, mechanical systems.

1. GENERAL

Questions regarding any aspect of the project are to be addressed to and answered only by the Departmental Representative (or his designate) or the Contracting Authority.

Any information received other than from the Departmental Representative (or his designate) or the Contracting Authority will be disregarded when awarding the contract and during construction.

Firms intending to submit tenders on this project should obtain tender documents through the Buyandsell.gc.ca TMA services provider. Addenda, when issued, will be available from the Buyandsell.gc.ca TMA service provider. Firms that elect to base their bids on tender documents obtained from other sources do so at their own risk and will be solely responsible to inform the tender calling authority of their intention to bid. Tender packages are not available for distribution on the actual day of tender closing.

2. MANDATORY SITE VISIT

It is mandatory that the bidder attends one of the site visits at the designated date and time. At least one representative from proponents that intend to bid must attend.

The site visits will be held on Oct. 18th and Oct. 20th 2016 at **9:00** . Meet Mark O'Connor at Building M-58, Main Entrance, 1200 Montreal Road Ottawa, ON. Bidders who, for any reason, cannot attend at the specified date and time will not be given an alternative appointment to view the site and their tenders, therefore, will be considered as non-responsive. **NO EXCEPTIONS WILL BE MADE.**

As proof of attendance, at the site visit, the Contracting Authority will have an Attendance Form which MUST be signed by the bidder's representative. It is the responsibility of all bidders to ensure they have signed the Mandatory Site Visit Attendance form prior to leaving the site. Proposals submitted by bidders who have not attended the site visit or failed to sign the Attendance Form will be deemed non-responsive.

3. CLOSING DATE

Closing date is Nov. 15th , 2016 at 14:00.

4. TENDER RESULTS

Following the Tender closing, the tender results will be sent by facsimile to all Contractors who submitted a tender

5. SECURITY REQUIREMENT FOR CANADIAN CONTRACTORS

5.1 MANDATORY SECURITY REQUIREMENT:

This procurement contains a mandatory security requirement as follows:

1 The Contractor must, at all times during the performance of the Contract, hold a valid Designated Organization Screening (DOS), issued by the Canadian Industrial Security Director (CISD), Public Works Government Services Canada.

2 The Contractor personnel requiring access to sensitive work site(s) must EACH hold a valid RELIABILITY STATUS, granted or approved by CISD/PWGSC.

3 The Contractor must comply with the provisions of the:
   a. Security Requirements Checklist attached at Appendix "D"
   b. Industrial Security Manual (Latest Edition) available at: http://ssi-iss.tpsgc-pwgsc.gc.ca/ssi-iss-services/eso-oss-eng.html

5.2 VERIFICATION OF SECURITY CLEARANCE AT BID CLOSING

1 The Bidder must hold a valid Designated Organization Screening (DOS) issued by the Canadian Industrial Security Directorate (CISD), Public Works and Government Services Canada (PWGSC), TO BE INCLUDED WITH THEIR TENDER OR PROVIDED WITHIN 48 HOURS FROM THE DATE AND TIME OF TENDER CLOSING. Verifications will be made through CISD to confirm the security clearance status of the Bidder. Failure to comply with this requirement will render the bid non-compliant and no further consideration will be given to the bid.

2 Within 72 hours of tender closing, the General Contractor must name all of his sub-contractors, each of whom must hold a valid RELIABILITY STATUS, granted or approved by CISD/PWGSC, or any other Federal Department or Agency along with the names and birthdates or security clearance certificate numbers of all personnel who will be assigned to the project.

3 It is to be noted that any subcontractor required to perform any part of the work during the performance of the subsequent contract must also adhere to the mandatory security requirement of the contract. As well, no personnel without the required level of security will be allowed on site. It will be the responsibility of the successful bidder to ensure that the security requirement is met throughout the performance of the contract. The Crown will not be held liable or accountable for any delays or additional costs associated with the contractor's non-compliance to the mandatory security requirement. Failure to comply with the mandatory security requirement will be grounds for being declared in default of contract.

4 For any enquiries concerning the project security requirement during the bidding period, the Bidder/Tenderer must contact the Security Officer @ 613-993-8956.

6.0 WSIB (WORKPLACE SAFETY AND INSURANCE BOARD)

1 All Bidders must provide a valid WSIB certificate with their Tender or prior to contract award.

7.0 OFFICE OF THE PROCUREMENT OMBUDSMAN

1 Dispute Resolution Services
The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will, on request or consent of the parties to participate in an alternative dispute resolution process to resolve any dispute between the parties respecting the interpretation or application of a term and condition of this contract and their consent to bear the cost of such process, provide to the parties a proposal for an alternative dispute resolution process to resolve their dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca.

2 Contract Administration
The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will review a complaint filed by [*the supplier or the contractor or the name of the entity awarded this contract*] respecting administration of this contract if the requirements of Subsection 22.2(1) of the *Department of Public Works and Government Services Act* and Sections 15 and 16 of the *Procurement Ombudsman Regulations* have been met, and the interpretation and application of the terms and conditions and the scope of the work of this contract are not in dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca.

3 The Office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under $25,000 for goods and under $100,000 for services. You have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca. You can also obtain more information on the OPO services available to you at their website at www.opo-boa.gc.ca.

The Departmental Representative or his designate for this project is: **Mark O'Connor**
Telephone: **613 301-3576.**

Contracting Authority for this project is: **Collin Long collin.long@nrc-cnrc.gc.ca**
Telephone**: 613 993-0431.**

INSTRUCTIONS TO BIDDERS

Article 1 – Receipt of Tender

1a) Tenders must be received not later than the specified tender closing time. Tenders received after this time are invalid and shall not be considered, regardless of any reason for their late arrival.

1b) A letter of printed telecommunication from a bidder quoting a price shall not be considered as a valid tender unless a formal tender has been received on the prescribed Tender Form.

1c) Bidders may amend their tenders by letter or printed telecommunication provided that such amendments are received not later than the specified tender closing time.

1d) Any amendments to the tender which are transmitted by telefax must be signed and must clearly identify the tenderer.

All such amendments are to be addressed to:
National Research Council of Canada
Collin Long, Procurement Officer
Building M-22
Montreal Road, Ottawa, Ontario
K1A 0R6

Fax: (613) 991-3297

Article 2 – Tender Form & Qualifications

1) All tenders must be submitted on the Construction Tender Form and the tender must be signed in compliance with the following requirements:

a) Limited Company: The full names of the Company and the name(s) and status of the authorized signing officer(s) must be printed in the space provided for that purpose. The signature(s) of the authorized officer(s) and the corporate seal must be affixed.

b) Partnership: The firm name and the name(s) of the person(s) signing must be printed in the space provided. One or more of the partners must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.

c) Sole Proprietorship : The business name and the name of the sole proprietor must be printed in the space provided. The sole proprietor must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.

2) Any alterations in the printed part of the Construction Tender Form or failure to provide the information requested therein, may render the tender invalid.

3) All space in the Construction Tender Form must be completed and any handwritten or typewritten corrections to the parts so completed must be initialed immediately to the side of the corrections by the person or persons executing the tender on behalf of the the tenderer.

4) Tenders must be based on the plans, specifications and tender documents provided.

Article 3 - Contract

1) The Contractor will be required to sign a contract similar to the Standard Contract Form for Fixed Price Construction Contracts, a blank specimen of which is enclosed in the package for reference purposes.

Article 4 – Tender Destination

1a) Tenders are to be submitted in sealed envelopes to:
National Research Council Canada
Administrative Services and Property Management Branch
1200 Montreal Road
Building M-22
Ottawa, ON
K1A 0R6

Endorsed "Tender for (insert title of work as it appears in the drawings and specifications)" and must bear the name and address of the tenderer.

1b) Unless otherwise specified, the only documents required to be submitted with the tender are the Tender form and the Bid Security.

Article 5 - Security

1a) Bid Security is required and must be submitted in one of the following forms:

i) a certified cheque payable to the Receiver General for Canada and drawn on a member of the Canadian Payments Association or a local cooperative credit society that is a member of a central cooperative credit society having membership in the Canadian Payments Association; **OR**

ii) bonds of the Government of Canada, or bonds unconditionally guaranteed as to principal and interest by the Government of Canada; **OR**

iii) a bid bond.

1b) Regardless of the Bid Security submitted, it should never be more than $250,000 maximum, calculated at 10% of the first $250,000 of the tendered price, plus 5% of any amount in excess of $250,000.

2a) Bid Security shall accompany each tender or, if forwarded separately from the tender, shall be provided not later than the specified tender closing time. Bid Security must be in the ORIGINAL form. Fax or photocopies and NOT acceptable. FAILURE TO PROVIDE THE REQUIRED BID SECURITY SHALL INVALIDATE THE TENDER.

2b) If the tender is not accepted, the Bid Security submitted pursuant to Article 8 shall be returned to the tenderer.

3a) The successful tenderer is required to provide security within 14 days of receiving notice of tender acceptance. The tenderer must furnish EITHER:

i) a Security Deposit as described in 1(b) above together with a Labour and Material Payment Bond in the amount of at least 50% of the amout payable under the contract, OR

ii) a Performance Bond and a Labour and Material Payment Bond – each in the amount of 50% of the amount payable under the contract.

3b) Should it not be possible to obtain a Labour Material Payment Bond as required under 3(a) above, on making application thereof to at least two acceptable Bonding Companies, an additional Security Deposit of a straight 10% of the amount payable under the contract must be furnished.

3c) Where a tender has been accompanied by a Security Deposit, as described in 1(b) above, the amount of the Security Deposit required under 3(a) above may be reduced by the amount of the Security Deposit which accompanied the tender.

3d) Bonds must be in an approved form and from the companies whose

bonds are acceptable to the Government of Canada. Samples of the approved form of Bid Bond, Performance Bond and Labour and Material Payment Bond and a list of acceptable Bonding Companies may be obtained from the Contracting Officer, National Research Council, Building M-22, Montreal Road, Ottawa, Ontario, K1A 0R6.

Article 6 – Interest On Security Deposits

1) Tenderers are notified that they must make their own arrangements with their bankers as to the interest, if any, on the amount of the certified cheque accompanying their tender. The Council will not pay interest on said cheque pending the awarding of the contract nor be responsible for the payments of interest under any arrangement made by the tenderers.

Article 7 – Sales Tax

1) The amount of the tender shall include all taxes as levied under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act or the Customs Tariff, in force or applicable at the time.

2) In Quebec, the Provincial Sales Tax should not be included in the Tender Price as the Federal Government is exempt. Tenderers should contact the Provincial Revenue Minister to recover all taxes paid for goods and services rendered under this contract.

Tenderers must include in their Tender Price the amount of Provincial Sales Tax for which the exemption does not apply.

Article 8 – Examination of Site

1) All parties tendering shall examine the sites of the proposed work before sending in their tender and make themselves thoroughly acquainted with the same and obtain for themselves any and all information that may be necessary for the proper carrying out of the Contract. No after claim will be allowed or entertained for any work or material that may be requisite and necessary for the proper execution and completion of this Contract with the exception of that provided for under GC 35 in the General Conditions of the General Specification.

Article 9 – Discrepancies, Omissions, Etc.

1a) Bidders finding discrepancies in, or omissions from, drawings, specifications or other documents, or having any doubt as to the meaning or intent of any part thereof, should at once notify the Engineer who will send written instructions or explanation to all bidders.

1b) Neither the Engineer nor the Council will be responsible for oral instructions.

1c) Addenda or corrections issued during the time of the bidding shall be covered in the proposal. However, the contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work and made prior to the date of the contract.

Article 10 – No additional Payments for Increased Costs

1) The only other adjustments in the contract price allowed are those specified in the General Conditions of the General Specification. The contract price will not be amended for change in freight rates, exchange rates, wage rates or cost of materials, plant or services.

Article 11 – Awards

1a) The Council reserves the power and right to reject tenders received from parties who cannot show a reasonable acquaintance with and preparation for the proper performance of the class of work herein specified and shown on plans. Evidence of such competence must be furnished by the tenderers if required to do so.

1b) A tenderer may be required to furnish to the Contracting Office, National Research Council of Canada, Building M-22, 1200 Montreal Road, Ottawa, Ontario, K1A 0R6, Canada, unsigned copies of the insurance requirements as covered by the Insurance Conditions of the General Specification.

1c) The Council does not bind itself to accept the lowest or any tender.

Article 12 – Harmonized Sales Tax

1) The Harmonized Sales Tax (HST) which in now in effect shall be considered an applicable tax for the purpose of this tender. However, the bidder shall NOT include any amount in the bid price for said HST. The successful contractor will indicate on each application for payment as a separate amount the appropriate HST the Owner is legally obliged to pay. This amount will be paid to the Contractor in addition to the amount certified for payment under the Contract in addition to the amount certified for payment under the Contract and will therefore not affect the Contract Price. The Contractor agrees to remit any HST collected or due to Revenue Canada.

Non-resident contractors

RST guide 804
Published August 2006
ISBN: 1-4249-2007-8 (Print), **1-4249-2009-4 (PDF), 1-4249-2008-6 (HTML)**

Publication Archived

Notice to the reader: For Retail Sales Tax (RST) – On July 1, 2010 the 13 per cent Harmonized Sales Tax (HST) took effect in Ontario replacing the existing provincial Retail Sales Tax (RST) and combining it with the federal Goods and Services Tax (GST). As a result, RST provisions described on this page and in other publications ended on June 30, 2010.

Effective July 1, 2010 this publication was archived for RST purposes **only**. Use caution when you refer to it, since it reflects the law in force for RST at the time it was released and may no longer apply.

- The information in this Guide explains the Retail Sales Tax (RST) responsibilities of a non-resident contractor who is awarded a construction contract to perform work in Ontario and their Ontario customers. Please note that this Guide replaces the previous version dated March 2001.

Non-Resident Contractor Defined

A non-resident contractor is a contractor located outside Ontario who has been awarded a construction contract to perform work in Ontario, and who has not maintained a permanent place of business in Ontario continuously for twelve months immediately prior to signing the contract, or which is not a company incorporated under the laws of Ontario. A construction contract is a contract for the erection, remodelling or repair of a building or other structure on land.
A contractor is a person who is in the business of constructing, altering, repairing or improving real property and includes, but is not limited to,

1. a general contractor and subcontractor,
2. a carpenter, bricklayer, stonemason, electrician, plasterer, plumber, painter, decorator, paver, and bridge builder,
3. a sheet metal, tile and terrazzo, heating, air conditioning, insulation, ventilating, papering, road, roofing and cement contractor, who installs or incorporates items into real property. (See RST Guide 206 - Real Property and Fixtures).

Registration and Guarantee Deposit

Non-resident contractors who are awarded a construction contract in Ontario are required to register with the Ministry of Finance (ministry), Centralized Programs Unit and post a guarantee equal to 4 per cent of the total of each Ontario contract. The guarantee can be paid in cash, by certified cheque (payable to the Minister of Finance), letter of credit or by a guarantee bond.

To register with the ministry and to obtain further information on posting a guarantee, contractors should contact the ministry's Centralized Programs Unit, 33 King Street West, PO Box 623, Oshawa, Ontario, L1H 8H7, toll-free 1 866 ONT-TAXS (1 866 668-8297) or fax to 905 435-3617.

Non-resident contractors who sell taxable goods on a supply only basis to Ontario customers, or provide taxable services in Ontario, may obtain a regular Vendor Permit to collect and remit RST on their sales. Non-resident contractors who have been issued a regular Vendor Permit must still register separately with the ministry and post a guarantee if they are awarded a construction contract in Ontario.

Letter of Compliance

After receiving the guarantee, the ministry mails out two copies of a "letter of compliance" to the contractor certifying the Retail Sales Tax (RST) requirements have been met. Contractors must give a copy of the letter to their customers.

If a copy of the compliance letter is not provided, the customer must withhold 4 per cent of all amounts payable to the non resident contractor and pay the withheld amounts to the Minister of Finance (minister). Details relating to the contract should be sent along with the payments to the Centralized Programs Unit. Customers may give the minister a guarantee bond equal to 4 per cent of the total contract price instead of making the 4 per cent payments.

Note: Customers who do not follow these requirements may be held liable for 4 per cent of all amounts payable to the non resident contractor or any other amount that the Ministry deems to be the RST payable resulting from the performance of the contract.

Calculation of RST

Fair Value

RST is payable on the "fair value" of materials, purchased or brought into Ontario, to be used for work performed in Ontario. "Fair value" includes:

- the purchase price in Canadian funds;
- all charges by the supplier for handling and delivery, and
- any federal customs duties and excise taxes paid (but not the federal Goods and Services Tax (GST)).

Contractors are also required to pay RST to Ontario suppliers on the purchase, rental or lease of taxable services, materials, machinery, or equipment.

Machinery and Equipment - Leased

If machinery or equipment is leased from a supplier outside Ontario and brought into the province, RST is payable on the lease payments for the period the machinery or equipment is in Ontario.

Machinery and Equipment - Owned by Contractor

If machinery or equipment is owned by the contractor, RST may be calculated in one of the following ways:

a. If a contractor brings machinery and equipment into Ontario for less than 12 months' use, RST is to be calculated using the following formula:

   1/36 × net book value at date of import × number of months in Ontario × tax rate

   For the purpose of this formula, RST is payable for each month or part of a month that the goods are in Ontario. A month is considered 31 consecutive days and a part month is considered more than 12 days. The RST payable is based on the number of days the machinery and equipment are located in Ontario and not the number of days the items are actually used.

Example: Equipment is brought into Ontario on March 28 and taken out on May 8. The items were in the province for 41 days. RST is payable on the first 31 days' temporary stay in Ontario vs. use of the equipment. Since the remainder (10 days) is not considered part of a month, no RST is payable on this portion.

b. If, at the time the goods are brought into Ontario, it is expected that the machinery or equipment will be in Ontario for more than twelve months, contractors must pay Retail Sales Tax (RST) on the following basis:

   net book value at date of import × tax rate

   If, at the time of import, the length of time is not known, vendors may use the formula under (a). If they later find it necessary to keep the machinery and equipment in Ontario for more than 12 months, the RST paid under (a) may be deducted from the RST payable under (b).

Using formula (a) or (b) above, contractors will calculate and remit the RST payable on the return that is filed when the contract is finished.

(See Completion of Contract section)

Manufacturing for Own Use

Contractors may need to manufacture items, such as doors and windows, for their construction contracts. Manufacturing is work done in a factory away from a construction site, or in a mobile unit or workshop that is on or near the construction site. Manufacturing occurs when raw materials are changed into manufactured goods for use in real property contracts.

Contractors are considered to be manufacturing contractors if they produce goods:
1. for their own use in real property contracts, and
2. the manufactured cost of the goods is more than $50,000 a year.

(See RST Guide 401 - Manufacturing Contractors)

Contracts with the Federal Government

Where a non-resident contractor enters into a construction contract with the federal government, for the construction of a building and/or the installation of equipment, the nature of the equipment will determine whether the contract should be let on a tax-included or tax excluded basis.

Contracts for the construction of a building and the installation of equipment that directly services that building (i.e., elevators, escalators, light fixtures, central heating and air conditioning, etc.) should be tendered on a tax -included basis. Contractors are the consumers of the materials used in fulfilling these contracts and must pay or account for RST on the materials used to complete the contracts. There is NO exemption just because the contract is with the federal government.

Contracts for the installation of equipment that becomes a fixture and does not directly service a building (i.e., material handling equipment, production machinery, communication equipment, training equipment) may be tendered on a tax-excluded basis. Contractors engaged in contracts of this nature are permitted to make tax exempt purchases of such equipment by issuing a valid Purchase Exemption Certificate (PEC) to their supplier. Only non-resident contractors who have registered with the ministry and posted a guarantee may issue a PEC.

Exemptions

Contractors may supply and install equipment or materials for certain customers that may be entitled to an exemption from RST (e.g., manufacturers, Indian band councils, farmers and diplomatic organizations). The equipment or materials, when installed, becomes real property if it is permanently attached to land, or a fixture if it is permanently attached to a building or real property structure. Since

contractors are liable for RST, they should contact the ministry to find out if the customer qualifies for exemption before tendering the contract on a tax-excluded basis.

Status Indians, Indian Bands and Band Councils

Non-resident contractors may purchase building materials exempt from Retail Sales Tax (RST) for certain buildings and structures situated on reserves. The cost of such projects must be paid by the band council, and the buildings must provide a community service for the reserve. Contracts for the construction of an exempt community building project should be made on an RST-excluded basis. Non-resident contractors may purchase the materials exempt from RST by providing suppliers with a valid Purchase Exemption Certificate (PEC). As noted previously, only non-resident contractors who have registered with the ministry and posted a guarantee may issue a PEC. (See RST Guide 204 - Purchase Exemption Certificates).

Non-resident contractors must pay RST on items purchased for incorporation into a building or structure built for individual status Indians on a reserve. (See RST Guide 808 - Status Indians, Indian Bands and Band Councils).

Completion of Contract

When a contract is completed, non-resident contractors who were required to post a guarantee must complete a Non-Resident Contractor Retail Sales Tax Return [PDF - 92 KB] that is provided by the ministry.

If a contractor's guarantee was given in cash or by certified cheque, the amount of the deposit can be deducted from the RST liability owed by the contractor. If the liability is greater than the deposit, the amount remaining must be paid by the contractor. If the deposit is more than the liability, the contractor will receive a refund.

If a guarantee bond was posted instead of cash, the bond will be discharged once the RST liability is paid in full.

All returns are subject to audit.

Legislative References

- Retail Sales Tax Act, Subsections 19(2) and 39(3)(4) and (5)
- Regulation 1012 under the Act, Subsections 15.3(1)(2)(5)(6) and (7)
- Regulation 1013 under the Act, Sections 1 and 3

For More Information

The information contained in this publication is only a guideline. For more information, please contact the Ontario Ministry of Finance at 1 866 ONT-TAXS (1 866 668-8297) or visit our website at ontario.ca/finance.

Acceptable Bonding Companies

Published September 2010

The following is a list of insurance companies whose bonds may be accepted as security by the government.

1. Canadian Companies

- ACE INA Insurance
- Allstate Insurance Company of Canada
- Ascentus Insurance Ltd. (Surety only)
- Aviva Insurance Company of Canada
- AXA Insurance (Canada)
- AXA Pacific Insurance Company
- Canadian Northern Shield Insurance Company
- Certas Direct Insurance Company (Surety only)
- Chartis Insurance Company of Canada (formerly AIG Commercial Insurance Company of Canada)
- Chubb Insurance Company of Canada
- Commonwealth Insurance Company
- Co-operators General Insurance Company
- CUMIS General Insurance Company
- The Dominion of Canada General Insurance Company
- Echelon General Insurance Company (Surety only)
- Economical Mutual Insurance Company
- Elite Insurance Company
- Everest Insurance Company of Canada
- Federated Insurance Company of Canada
- Federation Insurance Company of Canada
- Gore Mutual Insurance Company
- Grain Insurance and Guarantee Company
- The Guarantee Company of North America
- Industrial Alliance Pacific General Insurance Corporation
- Intact Insurance Company
- Jevco Insurance Company (Surety only)
- Lombard General Insurance Company of Canada
- Lombard Insurance Company
- Markel Insurance Company of Canada
- The Missisquoi Insurance Company
- The Nordic Insurance Company of Canada
- The North Waterloo Farmers Mutual Insurance Company (Fidelity only)
- Novex Insurance Company (Fidelity only)
- The Personal Insurance Company
- Pilot Insurance Company
- Quebec Assurance Company
- Royal & Sun Alliance Insurance Company of Canada
- Saskatchewan Mutual Insurance Company
- Scottish & York Insurance Co. Limited
- The Sovereign General Insurance Company
- TD General Insurance Company
- Temple Insurance Company
- Traders General Insurance Company

- Travelers Guarantee Company of Canada
- Trisura Guarantee Insurance Company
- The Wawanesa Mutual Insurance Company
- Waterloo Insurance Company
- Western Assurance Company
- Western Surety Company

2. Provincial Companies

Surety bonds issued by the following companies may be accepted provided that the contract of suretyship was executed in a province in which the company is licensed to do business as indicated in brackets.

- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
- ALPHA, Compagnie d'Assurances Inc. (Que.)
- Canada West Insurance Company (Ont., Man., Sask, Alta., B.C., N.W.T.) (Surety only)
- The Canadian Union Assurance Company (Que.)
- La Capitale General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., Que.(Surety only), Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- Coachman Insurance Company (Ont.)
- Continental Casualty Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- GCAN Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- The Insurance Company of Prince Edward Island (N.S., P.E.I., N.B.)
- Kingsway General Insurance Company (N.S., N.B., Que., Ont., Man., Sask., Alta., and B.C.)
- Liberty Mutual Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- Manitoba Public Insurance Corporation (Man.)
- Norgroupe Assurance Générales Inc.
- Orleans General Insurance Company (N.B., Que., Ont.)
- Saskatchewan Government Insurance Office (Sask.)
- SGI CANADA Insurance Services Ltd. (Ont., Man., Sask., Alta.)
- L'Unique General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., N.B., Que.(Surety only), Ont.(Surety only), Man., Sask., Alta., B.C.(Surety only), Nun., N.W.T., Yuk.)

3. Foreign Companies

- Aspen Insurance UK Limited
- Compagnie Française d'Assurance pour le Commerce Extérieur (Fidelity only)
- Eagle Star Insurance Company Limited
- Ecclesiastical Insurance Office Public Limited Company (Fidelity only)
- Lloyd's Underwriters
- Mitsui Sumitomo Insurance Company, Limited
- NIPPONKOA Insurance Company, Limited
- Sompo Japan Insurance Inc.
- Tokio Marine & Nichido Fire Insurance Co., Ltd.
- XL Insurance Company Limited (Surety only)
- Zurich Insurance Company Ltd

Articles of Agreement

Standard Construction Contract – Articles of Agreement
(23/01/2002)

A1 Contract Documents

A2 Date of Completion of Work and Description of Work

A3 Contract Amount

A4 Contractor's Address

A5 Unit Price Table

A r t i c l e s o f A g r e e m e n t

These Articles of Agreement made in duplicate this day of .

Between

Her Majesty the Queen, in right of Canada (referred to in the contract documents as " Her Majesty") represented by the National Research Council Canada (referred to in the contract documents as the "Council")

and

(referred to in the contract documents as the "Contractor")

Witness that in consideration for the mutual promises and obligations contained in the contract, Her Majesty and the Contractor covenant and agree as follows:

A1 Contract Documents

(23/01/2002)

1.1 Subject to A1.4 and A1.5, the documents forming the contract between Her Majesty and the Contractor, referred to herein as the contract documents, are

1.1.1 these Articles of Agreement,

1.1.2 the document attached hereto, marked "A" and entitled "Plans and Specifications", referred to herein as the Plans and Specifications,

1.1.3 the document attached hereto, marked "B" and entitled "Terms of Payment", referred to herein as the Terms of Payment,

1.1.4 the document attached hereto, marked "C" and entitled "General Conditions", referred to herein as the General Conditions,

1.1.5 the document attached hereto, marked "D" and entitled "Labour Conditions", referred to herein as the Labour Conditions,

1.1.6 the document attached hereto, marked "E" and entitled "Insurance Conditions", referred to herein as the Insurance Conditions,

1.1.7 the document attached hereto, marked "F" and entitled "Contract Security Conditions", referred to herein as the Contract Security Conditions, and

1.1.8 any amendment or variation of the contract documents that is made in accordance with the General Conditions.

1.1.9 the document entitled Fair Wage Schedules for Federal Construction Contracts referred to herein as Fair Wage Schedules

1.1.10

The Council hereby designates of
of the Government of Canada as the Engineer for the purposes of the contract, and for all purposes of or incidental to the contract, the Engineer's address shall be deemed to be:

1.2 **In the contract**

1.3.1 " Fixed Price Arrangement" means that part of the contract that prescribes a lump sum as payment for performance of the work to which it relates; and

1.3.2 " Unit Price Arrangement" means that part of the contract that prescribes the product of a price multiplied by a number of units of measurement of a class as payment for performance of the work to which it relates.

1.3 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Unit Price Arrangement are not applicable to any part of the work to which a Fixed Price Arrangement is applicable.

1.4 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Fixed Price Arrangement are not applicable to any part of the work to which a Unit Price Arrangement is applicable.

A2 Date of Completion of Work and Description of Work

(23/01/2002)

2.1 The contractor shall, between the date of these Articles of Agreement and the **,** , in the careful and workmanlike manner, diligently perform and complete the following work:

which work is more particularly described in the Plans and Specifications.

A3 Contract Amount

(23/01/2002)

3.1 Subject to any increase, decrease, deduction, reduction or set-off that may be made under the Contract, Her Majesty shall pay the Contractor at the times and in the manner that is set out or referred to in the Terms of Payment

3.1.1 the sum of (GST/HST extra), in consideration for the performance of the work or the part thereof that is subject to Fixed Price Arrangement, and

3.1.2 a sum that is equal to the aggregate of the products of the number of units of Measurement of each class of labour, plant and material that is set out in a Final Certificate of Measurement referred to in GC44.8 multiplied in each case by the appropriate unit price that is set out in the Unit Price Table in consideration for the performance of the work or the part thereof that is subject to a Unit Price Arrangement.

3.2 For the information and guidance of the Contractor and the persons administering the contract on behalf of Her Majesty, but not so as to constitute a warranty , representation or undertaking of any nature by either party, it is estimated that the total amount payable by Her Majesty to the Contractor for the part of the work to which a Unit Price Arrangement is applicable will be approximately $N/A

3.3 A3.1.1 is applicable only to a Fixed Price Arrangement.

3.4 A3.1.2 and A3.2 applicable only to a Unit Price Arrangement.

A4 Contractor's Address

(23/01/2002)

4.1 For all purposes of or incidental to the contract, the Contractor's address shall be deemed to be:

A5 Unit Price Table

(23/01/2002)

5.1 Her Majesty and the Contractor agree that the following table is the Unit Price Table for the purposes of the contract.

Column 1 Item	**Column 2** Class of Labour Plant Or Material	**Column 3** Unit of Measurement	**Column 4** Estimated Total Quantity	**Column 5** Price per Unit	**Column 6** Estimated Total Price
		N/A			

5.2 The Unit Price Table that is set out in A5.1 designates the part of the work to which a Unit Price Arrangement is applicable.

5.3 The part of the work that is not designated in the Unit Price Table referred to in A5.2 is the part of the work to which a Fixed Price Arrangement is applicable.

Articles of Agreement

Signed on behalf of Her Majesty by

_____

as Senior Contracting Officer

and_____

as_____

of the **National Research Council Canada**

on the_____

day of _____

Signed, sealed and delivered by

_____

as_____and
Position

by_____

as_____
Position

Seal

of

on the_____

day of_____

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.2 5189-A00 DEMOLITION PLAN
.3 5189-A01 NEW CONSTRUCTION PLAN
.4 5189-A02 REFLECTED CEILING DEMOLITION PLAN
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.6 5189-A04 DEMOLITION ELEVATIONS, SECTIONS & DETAILS
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.11 5189-A09 NEW WALL FINISH PLAN
.12 5189-A10 NEW FLOOR FINISH PLAN
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3. COMPLETION

.1 Complete all work by June 30 2017.

4. GENERAL

.1 The word "provide" in this Specification means to supply and install.

.2 Provide items mentioned in either the drawings or the specification.

5. SPECIFIED ACCEPTABLE & ALTERNATIVE EQUIPMENT & MATERIALS

.1 Materials and equipment scheduled and/or specified on the drawings or in the specifications have been selected to establish a performance and quality standard. In most cases, acceptable manufacturers are stated for any material or equipment specified by manufacturer's name and model number. Contractors may base their tender price on

materials and equipment supplied by any of the manufacturers' names as acceptable for the particular material or equipment.

.2 In addition to the manufacturers specified or named as acceptable, you may propose alternative manufacturers of materials or equipment to the Departmental Representative for acceptance. For a product to be considered as an alternative product substitute, make a written application to the Departmental Representative during the tender period, not later than ten (10) working days before tender closing.

.3 Certify in writing that the alternative meets all requirements of the specified material or equipment. In addition, it shall be understood that all costs required by or as a result of acceptance or proposed alternatives, will be borne by the contractor.

.4 Approval of alternatives will be signified by issue of an Addendum to the Tender Documents.

.5 Any alternative manufacturers or materials submitted which are incomplete and cannot be evaluated, or are later than ten (10) working days before tender closing date or after the tender period, will not be considered.

6. MINIMUM STANDARDS

.1 Conform to or exceed minimum acceptable standards of the various applicable federal, provincial and municipal codes such as The National Building Code, The National Fire Code, Canadian Plumbing Code, Canadian Electrical Code, Canadian Code for Construction Safety and the Provincial Construction Safety Act.

.2 Work to conform to referenced standards and codes as reaffirmed or revised to date of specification.

7. WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS)

.1 The general contractor shall comply with Federal and Provincial legislation regarding the WHMIS. The contractor's responsibilities include, but are not limited to the following:

.1 To ensure that any controlled product brought on site by the contractor or sub-contractor is labeled;

.2 To make available to the workers and the Departmental Representative, Material Safety Data Sheets (MSDS) for these controlled products;

.3 To train own workers about WHMIS, and about the controlled products that they use on site;

.4 To inform other contractors, sub-contractors, the Departmental Representative, authorized visitors and outside inspection agency personnel about the presence and use of such products on the site.

.5 The site foreman or superintendent must be able to demonstrate, to the satisfaction of the Departmental Representative, that he/she has had WHMIS training and is knowledgeable in its requirements. The Departmental Representative can require

replacement of this person if this condition or implementation of WHMIS is not satisfactory.

8. REQUIREMENTS OF BILL 208, SECTION 18(a)

Under the requirements of Bill 208 of the Ontario Ministry of Labour Occupational Health & Safety Act, the following designated substances may be encountered while performing the work described in these contract documents:

.1 Lead, Asbestos, Mercury, Silica

.1 It is the responsibility of the general contractor to ensure that each prospective subcontractor for this project has received a copy of the above list.

.2 Refer to Hazardous Building Materials Assessment by Pinchin Ltd. Included with this report for additional details.

9. COST BREAKDOWN

.1 Submit, for approval by the Departmental Representative, a cost breakdown of tender 72 hours after the contract is awarded.

.2 Use the approved cost breakdown as the basis for submitting all claims.

.3 Request Departmental Representative's verbal approval to amount of claim prior to preparing and submitting the claim in its final form.

10. SUB-TRADES

.1 Submit no later than 72 hours after tender closing, a complete list of sub trades for the Departmental Representative's review.

11. PERSONNEL SECURITY AND IDENTIFICATION

.1 All persons employed by the contractor, or by any subcontractor and present on the site must be security cleared in accordance with the requirements of the Section entitled Special Instructions to Tenderers.

.2 All such persons must wear and keep visible identification badges as issued by the Security Office of NRC.

12. WORKING HOURS AND SECURITY

.1 Normal working hours on the NRC property are from 8:00 a.m. until 4:30 p.m., Monday to Friday inclusive, except statutory holidays.

.2 At all other times, special written passes are required for access to the building site.

~~.3~~ Before scheduling any work outside normal working hours, obtain permission from the Departmental Representative to perform the specific tasks.

.4 An escort will be required whenever working outside normal hours. Contractor to bear the associated costs for any required escorts other than the after-hours work required by section 49 of this specification section.

13. SCHEDULE

.1 The contractor shall prepare a detailed schedule, fixing the date for commencement and completion of the various parts of the work and update the said schedule. Such schedule shall be made available to the Departmental Representative not later than two weeks after the award of the contract and prior to commencement of any work on site.

.2 Notify Departmental Representative in writing of any changes in the schedule.

.3 10 days before the scheduled completion date, arrange to do an interim inspection with the Departmental Representative.

14. PROJECT MEETINGS

.1 Hold regular project meetings at times and locations approved by the Departmental Representative.

.2 Notify all parties concerned of meetings to ensure proper coordination of work.

.3 Departmental Representative will set times for project meetings and assume responsibility for recording and distributing minutes.

15. SHOP DRAWINGS

.1 Submit to Departmental Representative for review, shop drawings, product data and samples specified within 2 weeks after contract award.

.2 Submit to Departmental Representative for review a complete list of all shop drawings, product data and samples specified and written confirmation of corresponding delivery dates within one (1) week after shop drawings, product data and samples approval date. This list shall be updated on a weekly basis and any changes to the list shall be immediately notified in writing to the Departmental Representative.

.3 Review shop drawings, data sheets and samples prior to submission.

.4 Submit electronic copy of all shop drawings and product data and samples for review, unless otherwise specified.

.5 Review of shop drawings and product data by the Departmental Representative does not relieve the contractor of the responsibility for errors and omissions and for the conformity with contract documents.

16. SAMPLES AND MOCK-UPS

.1 Submit samples in sizes and quantities as specified.

.2 Where colour, pattern or texture is criterion, submit full range of samples.

.3 Construct field samples and mock-ups at locations acceptable to Departmental Representative.

.4 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on the project.

17. MATERIALS AND WORKMANSHIP

.1 Install only new materials on this project unless specifically noted otherwise.

.2 Only first class workmanship will be accepted, not only with regard to safety, efficiency, durability, but also with regard to neatness of detail and performance.

18. WORK & MATERIALS SUPPLIED BY OWNER

.1 Work and materials not included in this contract are described on drawings and in this specification.

.2 Deliver to a storage place, as directed by the Departmental Representative, all materials returned to the Owner.

.3 Unless otherwise specified, accept owner-supplied materials at their storage location and provide all transportation as required.

.4 General Contractor's duties:

.1 Unload at site.
.2 Promptly inspect products and report damaged or defective items.
.3 Give written notification to the Departmental Representative for items accepted in good order.
.4 Handle at site, including uncrating and storage.
.5 Repair or replace items damaged on site.
.6 Install, connect finished products as specified.

19. SITE ACCESS

.1 Make prior arrangements with the Departmental Representative before starting work or moving materials and equipment on site.

.2 Obtain approval of Departmental Representative for regular means of access during the construction period. **The lobby may not be used for construction access.**

.3 Obtain approval of Departmental Representative before temporarily suspending operations on site; before returning to the site and before leaving the site at the end of the job.

.4 Provide and maintain access to site.

.5 Build and maintain temporary roads and provide snow removal during period of work.

.6 Make good any damage and clean up dirt, debris, etc., resulting from contractor's use of existing roads.

20. USE OF SITE

.1 Restrict operations on the site to the areas approved by the Departmental Representative

.2 Locate all temporary structures, equipment, storage, etc., to the designated areas.

.3 Restrict parking to the designated areas.

21. ACCEPTANCE OF SITE

.1 Inspect the site before commencing work, review any unexpected conditions with the Departmental Representative.

.2 Commencement of work will imply acceptance of existing conditions.

22. SITE OFFICE & TELEPHONE

.1 Contractor to erect a temporary site office at his own expense.

.2 Install and maintain a telephone, if necessary.

.3 Use of NRC phones is not permitted unless in the case of an emergency.

23. SANITARY FACILITIES

.1 Obtain permission from the Departmental Representative to use the existing washroom facilities in the building.

24. TEMPORARY SERVICES

.1 A source of temporary power will be made available in the area. Bear all costs to make connections to the power source and perform distribution on site.

.2 Provide all load centres, breakers, conduit, wiring, disconnects, extension cords, transformers, as required from the source of power.

.3 Power is to be used only for power tools, lighting, controls, motors, and not for space heating.

.4 A source of temporary water will be made available if required.

.5 Bear all costs associated with distributing the water to the required locations.

.6 Comply with NRC requirements when connecting to existing systems in accordance with the articles entitled "Co-operation" and "Service Interruptions" of this section.

25. DOCUMENTS REQUIRED AT WORK SITE

.1 The contractor shall keep on the site, one (1) up-to-date copy of all contract documents, including specifications, drawings, addenda, shop drawings, change notices, schedule and any reports or bulletins pertaining to the work, in good order, available to the Departmental Representative and to his / her representatives at all times.

.2 At least one (1) copy of specifications and drawings shall be marked by the contractor to show all work "As Built" and shall be provided to the Departmental Representative with the Application for Payment and for the Final Certificate of Completion.

26. CO-OPERATION

.1 Co-operate with NRC staff in order to keep disruption of normal research work to an absolute minimum.

.2 Work out in advance, a schedule for all work which might disrupt normal work in the building.

.3 Have schedule approved by the Departmental Representative.

.4 Notify the Departmental Representative in writing, 72 hours prior to any intended interruption of facilities, areas, corridors, mechanical or electrical services and obtain requisite permission.

27. PROTECTION AND WARNING NOTICES

.1 Provide all materials required to protect existing equipment.

.2 Erect dust barriers to prevent dust and debris from spreading through the building.

.3 Provide tent isolation for exterior caulking abatement.

.4 Place dust protection in the form of cover sheets over equipment and furniture and tape these sheets to floors, to ensure no dust infiltration.

.5 Repair or replace any and all damage to Owner's property caused during construction, at no cost to the Owner and to the satisfaction of the Departmental Representative.

.6 Protect the buildings, roads, lawns, services, etc. from damage which might occur as a result of this work.

.7 Plan and co-ordinate the work to protect the buildings from the leakage of water, dust, etc.

.8 Ensure that all doors, windows, etc., that could allow transfer of dust, noise, fumes, etc., to other areas of the building are kept closed.

.8 Be responsible for security of all areas affected by the work under the Contract until acceptance by NRC. Take all necessary precautions to prevent entry to the work area by unauthorized persons and guard against theft, fire and damage by any cause. Secure working area at the end of each day's work and be responsible for same.

.9 Provide and maintain adequate safety barricades around the work sites to protect NRC personnel and the public from injury during the construction.

.10 Post warnings, in all instances where possible injury could occur such as Work Overhead, Hard Hat Areas, etc. or as required by the Departmental Representative.

.11 Provide temporary protective enclosures over building entrances and exits to protect pedestrians. All enclosures to be structurally sound against weather and falling debris.

28. BILINGUALISM

.1 Ensure that all signs, notices, etc. are posted in both official languages.

.2 Ensure that all identification of services called for by under this contract are bilingual.

29. LAYOUT OF WORK

.1 Location of equipment, fixtures, outlets and openings indicated on drawings 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 the manufacturer's recommendations for safety, access and maintenance.

.3 Employ competent person to lay out work in accordance with the contract documents.

30. DISCREPANCIES & INTERFERENCES

.1 Prior to the start of the work, examine drawings and specifications. Report at once to the Departmental Representative, any defects, discrepancies, omissions or interferences affecting the work.

.2 Contractor to immediately inform the Departmental Representative in writing, of any discrepancies between the plans and the physical conditions so the Departmental Representative may promptly verify same.

.3 Any work done after such a discovery, until authorized, is at the contractor's risk.

.4 Where minor interferences as determined by the Departmental Representative are encountered on the job and they have not been pointed out on the original tender or on the plans and specifications, provide offsets, bends or reroute the services to suit job conditions at no extra cost.

.5 Arrange all work so as not to interfere in any way with other work being carried out.

31. MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.2 Notify the Departmental Representative in writing of any conflict between these specifications and manufacturer's instruction. Departmental Representative will designate which document is to be followed.

32. TEMPORARY HEATING AND VENTILATING

.1 Bear the costs of temporary heat and ventilation during construction including costs of installation, fuel, operation, maintenance, and removal of equipment.

.2 Use of direct-fired heaters discharging waste products into the work areas will not be permitted unless prior approval is given by the Departmental Representative.

.3 Furnish and install 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 Reduce moisture condensation on surfaces to an acceptable level.

.4 Provide ambient temperature and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for a safe working environment.

.4 Maintain minimum temperature of 10 ^{o}C (50 ^{o}F) or higher where specified as soon as finishing work is commenced and maintain until acceptance by the Departmental Representative. Maintain ambient temperature and humidity levels as required for comfort of NRC personnel.

.5 Prevent hazardous or unhealthy accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction including also, storage areas and sanitary facilities.

.1 Dispose of exhaust materials in a manner that will not result in a harmful or unhealthy exposure to persons.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment.

.1 Enforce conformance with applicable codes and standards.

.2 Comply with instructions of the Departmental Representative including provision of full-time watchman services when directed.

.3 Enforce safe practices.

.4 Vent direct-fired combustion units to outside.

.7 Submit tenders assuming existing or new equipment and systems will not be used for temporary heating and ventilating.

.8 After award of contract, Departmental Representative may permit use of the permanent system providing agreement can be reached on:

.1 Conditions of use, special equipment, protection, maintenance, and replacement of filters.

.2 Methods of ensuring that heating medium will not be wasted and in the case of steam, agreement on what is to be done with the condensate.

.3 Saving on contract price.

.4 Provisions relating to guarantees on equipment.

33. CONNECTIONS TO AND INTERRUPTIONS TO EXISTING SERVICES

.1 Where work involves breaking into or connecting to existing services, carry out work at times and in the manner agreed to by the Departmental Representative and by authorities having jurisdiction, with minimum disruption to NRC Personnel and vehicular traffic and minimum service interruption. Do not operate any NRC equipment or plant.

.2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.3 Submit a schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility; allow minimum 72 hours notice. Adhere to approved schedule and provide notice to the Departmental Representative.

.4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.5 Provide detours, bridges, alternate feeds, etc., as required to minimize disruptions.

.6 Protect existing services as required and immediately make repairs if damage occurs.

.7 Remove any abandoned service lines as indicated on the contract documents and as approved by the Departmental Representative; cap or otherwise seal lines at cut-off points. Record and provide a copy to the Departmental Representative of locations of maintained, re-routed and abandoned service lines.

34. CUTTING AND PATCHING

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove all items as shown or specified.

.3 Patch and make good with identical materials, the surfaces that have been disturbed, cut or damaged, to the satisfaction of the Departmental Representative.

.4 Where new pipes pass through existing construction, core drill an opening. Size openings to leave 12mm (1/2") clearance around the pipes or pipe insulation. Do not drill or cut any surface without the approval of the Departmental Representative.

.5 Obtain written approval of the Departmental Representative before cutting openings through existing or new structural members.

.6 Seal all openings where cables, conduits or pipes pass through walls with an acoustic sealant conforming to CAN/CGSB-19.21-M87.

.7 Where cables, conduits and pipes pass through fire rated walls and floors, pack space between with compressed glass fibres and seal with fire stop caulking in accordance with CAN/CGSB-19.13-M87 AND NBC 3.1.7.

35. FASTENING DEVICES

.1 Do not use explosive actuated tools, without first obtaining permission from the Departmental Representative.

.2 Comply with the requirements of CSA A-166 (Safety Code for Explosive Actuated Tools).

.3 Do not use any kind of impact or percussion tool without first obtaining permission from the Departmental Representative.

36. OVERLOADING

.1 Ensure that no part of the building or work is subjected to a load which will endanger safety or cause permanent deformation or structural damage.

37. DRAINAGE

.1 Provide temporary drainage and pumping as required to keep excavations and site free of water.

38. ENCLOSURE OF STRUCTURES

.1 Construct and maintain all temporary enclosures as required to protect foundations, sub-soil, concrete, masonry, etc., from frost penetration or damage.

.2 Maintain in place until all chances of damage are over and proper curing has taken place.

.3 Provide temporary weather tight enclosures for exterior openings until permanent sash and glazing and exterior doors are installed.

.4 Provide lockable enclosures as required to maintain the security of NRC facilities and be responsible for the same.

.5 Provide keys to NRC security personnel when required.

.6 Lay out the work carefully and accurately and verify all dimensions and be responsible for them. Locate and preserve general reference points.

.7 Throughout the course of construction, keep continuously acquainted with field conditions, and the work being developed by all trades involved in the project. Maintain an awareness of responsibility to avoid space conflict with other trades.

.8 Conceal all services, piping, wiring, ductwork, etc., in floors, walls or ceilings except where indicated otherwise.

39. STORAGE

.1 Provide storage as required to protect all tools, materials, etc., from damage or theft and be responsible for the same.

.2 Do not store flammable or explosive materials on site without the authorization of the Departmental Representative.

40. GENERAL REVIEW

.1 Periodic review of the contractor's work by the Departmental Representative does not relieve the contractor of the responsibility of making the work in accordance with contract documents. Contractor shall carry out his own quality control to ensure that the construction work is in accordance with contract documents.

.2 Inform the Departmental Representative of any impediments to the installation and obtain his / her approval for actual location.

41. INSPECTION OF BURIED OR CONCEALED SERVICES

.1 Prior to concealing any services that are installed, ensure that all inspection bodies concerned, including NRC, have inspected the work and have witnessed all tests. Failure to do so may result in exposing the services again at the contractor's expense.

42. TESTING

.1 On completion, or as required by local authority inspectors and/or Departmental Representative during progress of work and before any services are covered up and flushing is complete, test all installations in the presence of the Departmental Representative.

.2 Obtain and hand to the Departmental Representative all acceptance certificates or test reports from authority having jurisdiction. The project will be considered incomplete without the same.

43. PARTIAL OCCUPANCY

.1 NRC may request partial occupancy of the facility if the contract extends beyond the expected completion date.

.2 Do not restrict access to the building, routes, and services.

.3 Do not encumber the site with materials or equipment.

44. DISPOSAL OF WASTES

.1 Dispose of waste materials including volatiles, safely off NRC property. Refer to the section entitled "General and Fire Safety Requirements" included as part of this specification.

45. CLEAN-UP DURING CONSTRUCTION

.1 On a daily basis, maintain project site and adjacent area of campus including roofs, free from debris and waste materials.

.2 Provide on-site dump containers for collection of waste materials and rubbish.

46. FINAL CLEAN-UP

.1 Upon completion do a final clean-up to the satisfaction of the Departmental Representative.

.2 Clean all new surfaces, lights, existing surfaces affected by this work, replace filters, etc.

.3 Clean all resilient flooring and prepare to receive protective finish. Protective finish applied by NRC

47. WARRANTY AND RECTIFICATION OF DEFECTS IN WORK

.1 Refer to General Conditions "C", section GC32.

.2 Ensure that all manufacturers' guarantees and warranties are issued in the name of the **General** Contractor and the National Research Council.

48. MAINTENANCE MANUALS

.1 Provide three (3) bilingual copies of maintenance manuals or two English and two French maintenance manuals immediately upon completion of the work and prior to release of holdbacks.

.2 Manuals to be neatly bound in hard cover loose leaf binders.

.3 Manuals to include operating and maintenance instructions, all guarantees and warranties, shop drawings, technical data, etc., for the material and apparatus supplied under this contract.

49. WORK RESTRICTIONS

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with NRC Departmental Representative to facilitate work as stated.

.2 Any work to be performed by the general contractor and/or its sub-contractors generating excessive noise, odors and/or any kind of discomfort to building occupants shall be executed outside of the building's normal business hours, at the discretion of the NRC Departmental Representative.

.3 Confirm in writing with NRC Departmental Representative scope and schedule of any work to be performed outside of normal business hours to meet this requirement.

.4 If unsure, check with NRC Departmental Representative prior to performing any work that may cause a disturbance to building users.

.5 The contractor will be held responsible to compensate NRC for any financial losses as a result of non-compliance with this section.

END OF SECTION

1. GENERAL CONSTRUCTION SAFETY REQUIREMENTS

.1 The Contractor shall take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract.

.2 The Contractor shall be solely responsible for the construction safety of both its employees and those of its sub-contractors at the work site, and for initiating, maintaining and supervising safety precautions, programs and procedures in connection with the performance of the work.

.3 The Contractor shall comply with all Federal, Provincial and Municipal safety codes and regulations and the Occupational Health and Safety Act and the Workplace Safety and Insurance Board. In the event of any conflict between any provisions in legislation or codes, the most stringent provisions shall apply.

.4 Periodic review of the contractor's work by the Departmental Representative, using the criteria of the contract documents, does not relieve the contractor of his safety responsibilities in carrying out the work in accordance with the contract documents. The contractor shall consult with the Departmental Representative to ensure that this responsibility is carried out.

.5 The Contractor shall ensure that only competent personnel are permitted to work on site. Throughout the term of the contract, any person will be removed from the site who is not observing or complying with the safety requirements.

.6 All equipment shall be in safe operating condition and appropriate to the task.

.7 Following a project and site hazard assessment, the Contractor shall develop a Site Specific Safety Plan based on the following minimum requirements:

- .1 Provide a safety board mounted in a visible location on the project site, with the following information included thereon:
  - .1 Notice of Project
  - .2 Site specific Safety Policy
  - .3 Copy of Ontario Health and Safety Act
  - .4 Building Schematic showing emergency exits
  - .5 Building emergency procedures
  - .6 Contact list for NRC, Contractor and all involved sub-contractors
  - .7 Any related MSDS sheets
  - .8 NRC Emergency phone number

.8 The Contractor shall provide competent personnel to implement its safety program and those of any Health and Safety Act legislation applicable at this project location, and to ensure they are being complied with.

.9 The Contractor shall provide safety orientation to all its employees as well as those of any subcontractors under its jurisdiction.

.10 The Departmental Representative will monitor to ensure that safety requirements are met and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the contract to be cancelled and the Contractor or sub-contractors removed from the site.

.11 The Contractor will report to the Departmental Representative and jurisdictional authorities, any accident or incident involving Contractor or NRC personnel or the public and/or property arising from the Contractor's execution of the work.

.12 If entry to a laboratory is required as part of the work of the Contractor, a safety orientation shall be provided to all his employees as well as those of any subcontractors regarding lab safety requirements and procedures, as provided by the Researcher or the Departmental Representative.

2. FIRE SAFETY REQUIREMENTS

.1 Authorities

1. The Fire Commissioner of Canada (FC) is the authority for fire safety at NRC.
2. For the purpose of this document, "Departmental Representative" will be deemed as the NRC person in charge of the project and who will enforce these Fire Safety Requirements.
3. Comply with the following standards as published by the Office of the Fire Commissioner of Canada:
    a. Standard No. 301 - June 1982 "Standard for Construction Operations";
    b. Standard No. 302 - June 1982 "Standard for Welding and Cutting".

.2 Smoking

.1 Smoking is prohibited inside all NRC buildings, as well as roof areas.

.2 Obey all "NO SMOKING" signs on NRC premises.

.3 Hot Work

.1 Prior to commencement of any "Hot Work" involving welding, soldering, burning, heating, use of torches or salamanders or any open flame, obtain a Hot Work Permit from the Departmental Representative.

.2 Prior to commencement of "Hot Work", review the area of hot work with the Departmental Representative to determine the level of fire safety precautions to be taken.

.4 Reporting Fires

.1 Know the exact location of the nearest Fire Alarm Pull Station and telephone, including the emergency phone number.

.2 REPORT immediately, all fire incidents as follows:

.1 Activate nearest fire alarm pull station and;

.2 Telephone the following emergency phone number as appropriate:

FROM AN NRC PHONE	**333**
FROM ANY OTHER PHONE	**(613) 993-2411**

4. When reporting a fire by phone, give the location of fire, building number and be prepared to verify location.
5. The person activating fire alarm pull station must remain at a safe distance from the scene of the fire but readily available to provide information and direction to the Fire Department personnel.

.5 Interior and Exterior Fire protection & Alarm Systems

.1 DO NOT OBSTRUCT OR SHUT OFF FIRE PROTECTION EQUIPMENT OR SYSTEMS, INCLUDING BUT NOT LIMITED TO FIRE ALARM SYSTEMS, SMOKE/HEAT DETECTORS, SPRINKLER SYSTEM, PULL STATIONS, EMERGENCY CALL BUTTONS AND PA SYSTEMS, WITHOUT AUTHORIZATION FROM THE DEPARTMENTAL REPRESENTATIVE.

.2 WHEN ANY FIRE PROTECTION EQUIPMENT IS TEMPORARILY SHUT DOWN, ALTERNATIVE MEASURES AS PRESCRIBED BY THE DEPARTMENTAL REPRESENTATIVE SHALL BE TAKEN TO ENSURE THAT FIRE PROTECTION IS MAINTAINED.

.3 DO NOT LEAVE FIRE PROTECTION OR ALARM SYSTEMS INACTIVE AT THE END OF A WORKING DAY WITHOUT NOTIFICATION AND AUTHORISATION FROM THE DEPARTMENTAL REPRESENTATIVE. THE DEPARTMENTAL REPRESENTATIVE WILL ADVISE THE (FPO) OF THE DETAILS OF ANY SUCH EVENT.

.4 DO NOT USE FIRE HYDRANTS, STANDPIPES AND HOSE SYSTEMS FOR OTHER THAN FIRE FIGHTING PURPOSES UNLESS AUTHORISED BY DEPARTMENTAL REPRESENTATIVE.

.6 Fire Extinguishers

.1 Provide a minimum of 1-20 lb. ABC Dry Chemical Fire Extinguisher at each hot work or open flame location.

.2 Provide fire extinguishers for hot asphalt and roofing operations as follows:

a. Kettle area - 1-20 lb. ABC Dry Chemical;
b. Roof - 1-20 lb. ABC Dry Chemical at each open flame location.

.3 Provide fire extinguishers equipped as below:

c. Pinned and sealed;

d. With a pressure gauge;

e. With an extinguisher tag signed by a fire extinguisher servicing company.

.4 Carbon Dioxide (C02) extinguishers will not be considered as substitutes for the above.

.7 Roofing Operations

.1 Kettles:

.1 Arrange for the location of asphalt kettles and material storage with the Departmental Representative before moving on site. Do not locate kettles on any roof or structure and keep them at least 10m (30 feet) away from a building.

.2 Equip kettles with 2 thermometers or gauges in good working order; a hand held and a kettle-mounted model.

.3 Do not operate kettles at temperatures in excess of 232^{o}C (450 ^{o}F).

.4 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire. Provide fire extinguishers as required in article 2.6.

.5 Demonstrate container capacities to Departmental Representative prior to start of work.

.6 Store materials a minimum of 6m (20 feet) from the kettle.

.2 Mops:

.1 Use only glass fibre roofing mops.

.2 Remove used mops from the roof site at the end of each working day.

.3 Torch Applied Systems:

.1 DO NOT USE TORCHES NEXT TO WALLS.

.2 DO NOT TORCH MEMBRANES TO EXPOSED WOOD OR CAVITY

.3 Provide a Fire Watch as required by article 2.9 of this section.

.4 Store all combustible roofing materials at least 3m (10 feet) away from any structure.

.5 Keep compressed gas cylinders a minimum of 6m (20 feet) away from the kettle, protected from mechanical damage and secured in an upright position.

.8 Welding / Grinding Operations

.1 Contractor to provide fire blankets, portable fume extraction devices, screens or similar equipment to prevent exposure to welding flash, or sparks from grinding.

.9 **Fire Watch**

.1 Provide a fire watch for a minimum of one hour after the termination of any hot work operation.

.2 For temporary heating, refer to General Instructions Section 00 010 00.

.3 Equip fire watch personnel with fire extinguishers as required by article 2.6.

.10 Obstruction of access/egress routes-roadways, halls, doors, or elevators

.1 Advise the Departmental Representative in advance of any work that would impede the response of Fire Department personnel and their apparatus. This includes violation of minimum overhead clearance, erection of barricades and the digging of trenches.

.2 Building exit routes must not be obstructed in any way without special permission from the Departmental Representative, who will ensure that adequate alternative routes are maintained.

.3 The Departmental Representative will advise the FPO of any obstruction that may warrant advanced planning and communication to ensure the safety of building occupants and the effectiveness of the Fire Department.

.11 Rubbish and Waste Materials

.1 Keep rubbish and waste materials to a minimum and a minimum distance of 6m (20 feet) from any kettle or torches.

.2 Do not burn rubbish on site.

.3 Rubbish Containers

.1 Consult with the Departmental Representative to determine an acceptable safe location for any containers and the arrangement of chutes etc. prior to bringing the containers on site.

.2 Do not overfill the containers and keep area around the perimeter free and clear of any debris.

.4 Storage

.1 Exercise extreme care when storing combustible waste materials in work areas. Ensure maximum possible cleanliness, ventilation and that all safety standards are adhered to when storing any combustible materials.

.2 Deposit greasy or oily rags or materials subject to spontaneous combustion in CSA or ULC approved receptacles and remove at the end of the work day or shift, or as directed.

.12 Flammable Liquids

.1 The handling, storage and use of flammable liquids is 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 litres (10 imp gal), provided they are stored in approved safety cans bearing the ULC seal of approval and kept away from buildings, stockpiled combustible materials etc. Storage of quantities of flammable liquids exceeding 45 litres (10 imp gal) for work purposes, require the permission of the Departmental Representative.

.3 Flammable liquids are not to be left on any roof areas after normal working hours.

.4 Transfer of flammable liquids is prohibited within buildings.

.5 Do not transfer flammable liquids in the vicinity of open flames or any type of heat producing device.

.6 Do not use flammable liquids having a flash point below 38 ^{o}C (100 ^{o}F) such as naphtha or gasoline as solvents or cleaning agents.

.7 Store flammable waste liquids for disposal in approved container located in a safe, ventilated area. Waste flammable liquids are to be removed from the site on a regular basis.

.8 Where flammable liquids, such as lacquers or urethane are used, ensure proper ventilation and eliminate all sources of ignition. Inform the Departmental Representative prior to, and at the cessation of such work.

3. Questions and/or clarifications

.1 Direct any questions or clarification on Fire or General Safety, in addition to the above requirements, to the Departmental Representative.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 CSA International

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

1.3 SITE CONDITIONS

.1 Review "Designated Substance Report" and take precautions to protect environment.

.2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.

.3 Proceed only after receipt of written instructions have been received from Departmental Representative.

.4 Notify Departmental Representative before disrupting building access or services.

Part 2 PRODUCTS

2.1 NOT USED

.1 Not used.

Part 3 EXECUTION

3.1 EXAMINATION

.1 Inspect building with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Cooperate with and coordinate all trades in marking out required locations of floor and wall penetrations necessary to accommodate installation of new services.

.3 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.4 Notify and obtain approval of utility companies before starting demolition.

.5 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.6 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.

.7 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PREPARATION

.1 Protection of In-Place Conditions:

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required.

.2 Demolition/Removal:

.1 Remove parts of existing building to permit new construction.

3.3 CUTTING AND CORING

.1 Coordinate layout and marking of all required coring and cutting locations of existing slabs and walls with all sub-trades.

.2 Locate existing reinforcement and conduit before coring or cutting existing slabs and walls. Retain an independent testing company to locate existing reinforcement and conduit in the areas of proposed openings and to mark locations on the surfaces of slabs on which the cores and cuts are to be started. X-ray concrete unless other methods can be shown by Contractor to accurately locate reinforcement and conduit. Mark locations and sizes of cores and openings and locations of reinforcement and conduit using indelible markers with red for top bars, green for bottom bars and black for cores, openings and conduit.

.3 Coring: Do not cut existing reinforcement and conduit when coring existing concrete unless approved in advance by the Departmental Representative. Save the complete

length of all cores. Label each core with location taken. Make all cores available for review by Departmental Representative. Dispose of cores only with approval of Departmental Representative.

.4 Cutting: Do not cut existing reinforcement and conduit when cutting existing concrete unless approved in advance by the Departmental Representative. Core the corners of all openings prior to cutting sides. Saw cut sides. Do not over cut openings. Chip corners square if necessary.

.5 Wet coring is not acceptable in normally occupied areas of building.

.6 Carry out all cutting, coring, and drilling activities after normal business hours. Provide minimum 10 days notification to Departmental Representative for such work.

3.4 DISPOSAL

.1 Dispose of removed materials, to appropriate recycling facilities or reuse facilities except where specified otherwise, in accordance with authority having jurisdiction.

3.5 CLEANING

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 Regulatory Requirements

.1 This report of Designated Substances present at this project is to fulfil the Engineer's requirements under Section 18, An Act to Amend the Occupational Health and Safety Act and the Workers Compensation Act, June 1990 (Bill 208).

.2 The disturbance of asbestos materials on construction projects is controlled by Ontario Regulation 278/05, Asbestos on Construction Projects and in Buildings and Repair Operations.

.3 The Revised Regulations of Ontario (1990), Regulation 843 (formerly Ontario Ministry of Labour Regulation 536/81) as amended by O.Reg. 519/92 under the Occupational Health and Safety Act outlines the requirements to control airborne lead in industrial establishments. Exposure levels and respiratory protection in this regulation also apply to construction projects at a workplace where workers are likely to be exposed to lead. The disturbance of lead on construction projects is also governed by the Ministry of Labour, Lead on Construction Projects Guideline issued in 2011.

.4 The Revised Regulations of Ontario (1990), Regulation (formerly Ontario Ministry of Labour Regulation Respecting Silica 769/83) 845 as amended by O.Reg.521/92 which amends the Occupational Health and Safety Act, outlines the requirements to control airborne silica in industrial establishments. Exposure levels and respiratory protection in this regulation also apply to construction projects at a workplace where workers are likely to be exposed to silica. The disturbance of silica on construction projects is also governed by the Ministry of Labour, Silica on Construction Projects Guideline issued in 2011.

.5 Disposal of construction debris and waste is controlled by The Revised Regulations of Ontario (1990), Regulation 347 (formerly Regulation 309 as amended under the Environmental Protection Act).

.6 Notification:

.1 All contractors requesting tenders from subcontractors shall furnish this report to subcontractors.

.2 Contractors are required, on the Ontario Ministry of Labour Notice of Project form, to list all Designated Substances that may be used, handled or disturbed by work on the project. This includes Designated Substances already present as

part of the structure or finishes as well as Designated Substances brought to the project site by the contractor.

1.2 Scope and Validity Date

.1 The survey for this report was completed in September 2016. Since that time, Hazardous Materials may have been removed from or added to the project area.

.2 Prior to beginning work, confirm with Engineer that additional hazardous materials have not been brought to project area.

PART 2 HAZARDOUS MATERIALS

2.1 Asbestos

.1 Friable sprayed fireproofing containing amosite asbestos is present within all project locations with the exception of the basement. Remnants of this fireproofing are also present in previous areas of abatement.

.1 Based on the presence of asbestos-containing fireproofing in the building, all HVAC equipment and ducts are to be removed and cleaned as asbestos.

.2 Cleaned materials may be disposed of as regular waste/recycling.

.2 Mechanical Insulations:

.1 Straight sections of pipes are insulated with a mixture of the following materials:

.1 Non-asbestos fibreglass.

.2 Friable “Aircell” corrugated paper containing chrysotile asbestos is present throughout all locations of work inside the ceiling space and servicing all heating radiators.

.3 Friable layered sweatwrap insulation containing chrysotile asbestos in the brown paper layer is present throughout on chilled water and drain lines.

.2 Pipe fittings (elbows, valves, tees, hangers, etc.) are insulated with a mixture of the following materials:

.1 Non-asbestos fibreglass.

.2 Friable parging cement pipe fittings containing chrysotile asbestos are present throughout the work area inside the ceiling space and servicing all heating radiators.

.3 Domestic hot and cold water pipe insulations are concealed above ceilings and inside some columns. Contractor remove the ceiling to expose and remove all asbestos insulation.

.4 Square rigid ducts in the ground floor ceiling space are insulated with non-asbestos fibreglass covered with a non-friable black tar that contains chrysotile asbestos.

.5 Round ducts are either insulated with non-asbestos fibreglass with a non-friable black tar sealant containing chrysotile asbestos.

.6 Mechanical equipment is insulated with non-asbestos fibreglass or not insulated.

.3 Non-friable burgundy sealant containing chrysotile asbestos is present on joints on ducts within the ceiling space throughout the ground floor.

.4 White sealant present on foil over fibreglass insulation on ducts in the pipe chases does not contain asbestos.

.5 Non-asbestos acoustic ceiling tiles (24”x48”) are present throughout the ground floor.

.6 Rough cast and smooth plasters throughout work areas does not contain asbestos; however the top inch of plaster walls and the surface of plaster bulkheads throughout the work area should be considered impacted with amosite asbestos.

.7 Drywall joint compound present on wall and ceiling finishes throughout work area does not contain asbestos.

.8 Asbestos cement (Transite) products are not present.

.9 Vermiculite insulation is not present.

.10 Non-friable 9”x9” vinyl floor tiles containing chrysotile asbestos are present in Rooms EG02, EG08, and EG17.

.11 Non-friable black mastic containing chrysotile asbestos is present underneath 9”x9 and 12”x12” vinyl floor tiles throughout the east wing of the ground floor:

.1 12”x12” vinyl floor tiles do not contain asbestos but must be disposed as asbestos waste due to the presence of asbestos-containing mastic.

.12 Non-friable perimeter sealants, both grey and black, containing chrysotile asbestos, are present around doors and windows throughout the building exterior.

.13 Non-friable grey caulking containing chrysotile asbestos is present on exterior window flashing throughout the work area on the ground floor.

.14 White stucco, red arch detail and exterior plaster with stone inclusions on the exterior of the building in the work area does not contain asbestos.

2.2 Lead

.1 Paint finishes containing greater than 0.1 % or 1,000 ug/g lead is present in the following:

.1 Green (0.104 %) and beige (0.110) paints on plaster walls throughout west wing of the ground floor work area.

Beige (0.204 %) and grey (0.299 %) paint on plaster throughout the east wing of the ground floor work area.

.2 Items painted with paints containing elevated levels of lead may be a hazardous waste. It is the contractor's responsibility to test lead-painted materials for leachable lead prior to disposal. Well adhered paints containing elevated levels of lead on metal substrates do not require leachable lead analysis as the materials can be recycled with the paint intact.

.3 Based upon the historic use of lead in building construction, lead is also present in the following materials:

.1 Batteries in emergency lighting.

.2 Solder joints on copper piping.

.3 Caulking in bell and spigot joints in cast iron drain pipes.

.4 Ceramic tiles.

2.3 Mercury

.1 Mercury vapour is present inside each tube in the fluorescent light fixtures present throughout the building.

.2 Liquid mercury is present inside thermostats present throughout the building.

2.4 Silica

.1 Based on the historic composition of building materials, crystalline silica is present in:

.1 Concrete, terrazzo and cement.

.2 Masonry blocks and mortar.

.3 Plaster.

2.5 Isocyanates

.1 Isocyanates are not present.

2.6 Vinyl Chloride Monomer

.1 Vinyl chloride monomer is not present.

2.7 Benzene

.1 Benzene is not present.

2.8 Acrylonitrile

.1 Acrylonitrile is not present.

2.9 Coke Oven Emissions

.1 Coke Oven Emissions

2.10 Arsenic

.1 Arsenic or arsenic compounds are not present.

2.11 Ethylene Oxide

.1 Ethylene oxide is not present.

2.12 Polychlorinated Biphenyls (PCBs)

.1 Ballasts from all fluorescent light fixtures present throughout the work areas potentially contain PCBs.

End of Section 02 61 33

1.1 General and Related Work

.1 Read this section in conjunction with all other sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.

.2 Related Work Specified Elsewhere:

Division 2,	Section 02 41 46	Demolition
Division 13	Section 02 61 33	Hazardous Materials
Division 13,	Section 02 82 12	Asbestos Abatement - Type 3
Division 13,	Section 02 82 13	Asbestos Abatement - Glove Bag
Division 13,	Section 02 84 10	Mercury and PCB Packaging and Disposal

.3 The site conditions identify the location and condition of all known asbestos-containing materials (ACM) to be disturbed by the work of this section. The specification fulfils the requirements of the report required by Ontario Regulation 278/05.

.4 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal or decontamination of all ACM and all materials which have been contaminated by ACM either during or prior to work of this section.

1.2 Site Conditions

.1 Refer to Section 02 61 33 Hazardous Materials.

1.3 Outline of Work

.1 Use Type 1 procedures to remove and dispose of the following:

.1 Non-friable 9”x9” vinyl floor tiles containing chrysotile asbestos are present in Rooms EG02, EG08, and EG17.

.2 Non-friable black mastic containing chrysotile asbestos is present underneath 9”x9 and 12”x12” vinyl floor tiles throughout the east wing of the ground floor.

.3 12”x12”vinyl floor tiles throughout the east wing of the ground floor.

.4 Non-friable perimeter sealants, both grey and black, around doors and windows throughout the work area.

.5 Non-friable caulking on exterior window flashing throughout the work area on the ground floor.

1.4 Schedule

.1 All work is to be performed within the terms of the General Conditions.

1.5 Definitions

.1 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including: actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.

.2 Asbestos Abatement Consultant: Owner's Representative providing inspection and air monitoring.

.3 Asbestos Abatement Contractor: Contractor or sub-contractor performing work of this section.

.4 Asbestos-Containing Material(s) (ACM): Material(s) identified under Site Conditions including debris, fallen material and settled dust.

.5 Asbestos Work Area: rea where work takes place which will, or may, disturb ACM.

.6 Authorized Visitors: Prime Contractor, Building Owner or Representatives, Asbestos Abatement Consultant, and persons representing regulatory agencies.

.7 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.

.8 Friable Material: means a material when dry can be crumbled, pulverized or powdered by hand pressure or is crumbled, pulverized or powdered.

.9 HEPA Filter: High Efficiency Particulate Arresting filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.

.10 PCM: Phase Contrast Microscopy.

.11 Polyethylene: Either polyethylene sheeting or rip-proof polyethylene sheeting (as specified) with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from damage, and to prevent escape of asbestos fibres through sheeting into Occupied Areas.

.12 Occupied Area: Any area of the building outside the Asbestos Work Area.

.13 Personnel: All contractors employees, sub-contractors employees, supervisors.

.14 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).

.15 TEM: Transmission Electron Microscopy.

1.6 Submittals

.1 Submit prior to starting work:

.1 Workplace Safety and Insurance Board Clearance Certificate.

.2 Insurance certificates.

.3 Copy of Company Health and Safety Policy and applicable Programs.

.4 Copy of Certificate of Approval for transportation of asbestos waste and location of landfill.

.5 Pre-removal survey of damage in all areas where asbestos abatement will take place or waste will be transported.

.2 Submit the following information regarding personnel prior to starting work:

.1 Resumes of the supervisory personnel.

.2 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal (2 day minimum duration) or are certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.

.3 WHMIS training certificates for all personnel.

.4 Written statement that personnel have had instruction on hazards of asbestos exposure, the use of respirator, protective clothing, worker and waste decontamination procedures, and all aspects of work procedures and protective measures.

.5 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.

.3 Submit performance data on HEPA filtered vacuums including HEPA challenge integrity leak tests no more than 3 months old prior to isolating the work area or commencing asbestos abatement.

.4 Submit the following prior to isolating the work area:

.1 Material Safety Data Sheets for chemicals or material used in the course of the Asbestos Abatement Project.

.5 Submit the following upon completion of the work.

.1 Manifests, waybills, bills of ladings etc. as applicable for each type of waste.

1.7 Regulations

.1 Comply with Federal, provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed. Regulations include but are not limited to the following:

.1 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.

.2 Ministry of Transportation Regulations for the transport of asbestos waste, including the Transportation of Dangerous Goods Act.

.3 Ministry of the Environment Regulations for the disposal of asbestos waste, including R.R.O. 1990, Reg. 347 as amended.

1.8 Supervision

.1 Provide on site, a supervisor, with authority to oversee all aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.

.2 The supervisor must be on site at all times during work. Failure to comply with this requirement may result in a stoppage of work, at no cost to the NRCC.

.3 Provide a minimum of one supervisor for every 10 workers.

.4 Replace supervisory personnel, with approved replacements, within 3 working days of a written request from the Asbestos Abatement Consultant. Asbestos Abatement Consultant reserves the right to request replacement of supervisory personnel without explanation.

.5 Do not replace supervisory personnel without written approval from the Asbestos Abatement Consultant.

1.9 Quality Assurance

.1 Ensure the removal and handling of ACM or asbestos contaminated materials is performed by persons experienced in the methods, procedures and industry practices of asbestos abatement.

.2 Complete work so that at no time airborne asbestos, visible solid residue, or water runoff contaminates areas outside Asbestos Work Area. Asbestos Abatement Consultant is empowered to order a shutdown of work when a leak has occurred or is likely to occur. Cost of additional work by Asbestos Abatement Contractor and/or Asbestos Abatement Consultant to rectify unsatisfactory conditions shall be charged to the Asbestos Abatement Contractor.

.3 Perform all work involving other trades such as electrical, mechanical, carpentry, glazing etc. using licensed persons experienced and qualified for the work required.

.4 The Asbestos Abatement Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs required for the Work in accordance with the applicable construction safety legislation, other regulations or general construction practice. The Asbestos Abatement Consultant will not be responsible for or have control or charge over the acts or omissions of the Asbestos Abatement Contractor, his Subcontractors or their agents, employees or other persons performing any of the Work.

1.10 Notification

.1 Notify Sanitary Landfill site as per Ontario Regulation 347 as amended.

.2 Inform all sub trades of the presence of ACM identified in the contract documents.

.3 Notify the NRCC or Pinchin, the Joint Occupational Health and Safety Committee and the Ontario Ministry of Labour, as required by Regulation 278/05, if suspected asbestos-containing materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

1.11 Insurance

.1 Maintain a Commercial General Liability Policy with an insurance company acceptable to NRCC. The intent of this policy is to hold NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.

.2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to NRCC. The intent of these policies is to hold Pinchin Ltd. and the NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.

.3 Maintain a Pollution Liability Policy (or asbestos liability policy or specific coverage under the CGL for asbestos abatement) with an insurance company acceptable to NRCC. The intent of this policy is to hold NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of asbestos abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations including asbestos abatement.

.4 Forward all certificates to NRCC before work is commenced, showing NRCC as additional insured as their interest may appear.

.5 The NRCC may request a certified true copy of the policies.

.6 The limits will not be less than:

.1	Commercial General Liability	$5,000,000.00
.2	Automobile	$2,000,000.00
.3	Pollution Policy (Asbestos Liability)	$5,000,000.00

1.12 Instruction and Training

.1 Provide instruction and training to all workers including the following:

.1 Hazards of asbestos.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section.

.2 Instruction and training must be provided by a competent person.

1.13 Personal Protection

.1 Provide non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters when requested by personnel.

.2 Respirators shall be:

.1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.

.2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Asbestos Work Area has facial hair which affects the seal between respirator and face.

.3 Assigned to a worker for their exclusive use.

.4 Maintained in accordance with manufacturer's specifications.

.5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.

.6 Repaired or have damaged or deteriorated parts replaced.

.7 Stored in a clean and sanitary location.

.8 Provided with new filters as necessary, according to manufacturer's instructions.

.9 Personnel must have respirators fit checked by qualitative or quantitative fit-testing. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.

.3 As per the requirements of Regulation 278/05, when requested by personnel, provide protective clothing which:

.1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres.

.2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.

.3 Is replaced or repaired if torn or ripped.

.4 Decontaminate clothing or protective clothing by using a HEPA Vacuum, or by damp wiping prior to leaving the Asbestos Work Area:

.1 Dispose of as ACM.

.5 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Asbestos Work Area.

.6 Prohibit smoking, eating, drinking, chewing in the Asbestos Work Area.

.7 Use hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

1.14 Authorized Visitor Protection

.1 Provide clean protective clothing and equipment, to Authorized Visitors.

.2 Ensure Authorized Visitors have received required training prior to granting entry into Asbestos Work Area.

1.15 Inspection

.1 From commencement of work until completion of clean-up operations, the Asbestos Abatement Consultant may be present periodically on site both inside and outside the Asbestos Work Area.

.2 Inspection of the Asbestos Work Area will be performed to confirm the Asbestos Abatement Contractor's compliance with the requirements of the contract documents and governing authorities. Any deviations from these requirements, that have not been approved in writing, may result in a stoppage of work at no additional cost to the NRCC.

.3 If the Asbestos Work Area is found unacceptable by the standards specified or required by governing authorities, the remedial work required to meet these standards and obtain consent to proceed from the Asbestos Abatement Consultant, shall be performed at no additional cost to the NRCC.

.4 The following Milestone Inspections may take place, at the NRCC's cost:

.1 Milestone Inspection A - Visual Clearance:

.1 Inspection of Asbestos Work Area after removal of all asbestos, but prior to application of lock-down agent.

.5 The Asbestos Abatement Consultant is empowered by NRCC to inspect for final cleanliness at completion. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level specified shall be at no additional cost.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

.1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials.

.2 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.

.3 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.

.4 Asbestos Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment comprised of one of the following:

.1 A 6 mil (0.15 mm) labelled yellow sealed polyethylene bag, inside a second clear 6 mil (0.15 mm) sealed polyethylene bag.

.2 A 6 mil (0.15 mm) sealed polyethylene bag, positioned inside or outside a rigid sealed container of sufficient strength to prevent perforation of the container during filling, transportation and disposal.

.3 Labelled containers as required by the Ontario Ministry of the Environment Reg. 347 as amended and Regulation 278/05.

.5 HEPA Vacuum: High Efficiency Particulate Arresting (HEPA) filtered vacuum equipment with a filter system capable of collecting and retaining spherical particles greater than 0.3 microns at 99.97% efficiency.

.6 Hose: Leak-proof, minimum busting strength of 500 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.

.7 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified in sheet size to minimize joints. New materials only.

.8 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.

.9 Protective Clothing: Disposable full body coveralls complete with hoods manufactured of a material which does not permit penetration of asbestos fibres. Coveralls to fit snugly at ankles, wrists and neck. Rip-Proof Polyethylene Sheeting: Minimum requirements 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and 2 layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps. New materials only.

.10 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.

.11 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.

.12 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

2.2 Signage

.1 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:

.1 CONTAINS ASBESTOS FIBRES.

.2 Avoid Creating Dust and Spillage.

.3 Asbestos May be Harmful to Your Health.

.4 Wear Approved Protective Equipment.

.2 Place placards in accordance with Transportation of Dangerous Goods Act.

PART 3 EXECUTION

3.1 Site Preparation

.1 Perform pre-removal damage survey and submit to Asbestos Abatement Consultant.

.2 Remove stored or non-fixed items from the Asbestos Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by NRCC.

.3 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.4 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping.

.5 Install one layer of 6 mil polyethylene sheeting on walls, finishes, millwork, electrical equipment, equipment and furnishings remaining in the Asbestos Work Area.

.6 Install polyethylene drop sheets below areas of work.

.7 Provide amended water for wetting ACM, and adequate method of wetting (garden sprayers, airless sprayers, etc).

3.2 Maintenance of Asbestos Work Area

.1 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.2 Maintain Asbestos Work Area in tidy condition.

.3 Remove any standing water on polyethylene/floor at the end of every shift.

.4 Turn off water supply to any hoses and reduce pressure in hose, prior to leaving the Asbestos Work Area at end of shift.

3.3 Asbestos Removal - General

.1 Do not use powered tools or non-hand held tools.

.2 Do not use compressed air to clean or remove dust or debris.

.3 Do not break, cut, drill, abrade, grind, sand or vibrate ACM if it cannot be wetted. Type 2 procedures would be required if the material cannot be wetted due to hazard or damage.

.4 Wet ACM prior to work and keep ACM wet throughout the removal process.

.5 Frequently and at regular intervals during the work, clean up dust and waste using HEPA vacuums and/or wet sweeping or mopping.

.6 Frequently and at regular intervals, place all waste in asbestos waste containers.

.7 Immediately upon completion of work, clean area with HEPA vacuum and/or wet sweeping or mopping.

3.4 Asbestos Removal - Vinyl Asbestos Tile

.1 Wedge a heavy duty scraper in seam of two adjoining tiles and gradually force edge of one tile up and away from floor. Do not break off pieces of tile, but continue to force balance of tile up.

.2 Place tile, without breaking into smaller pieces, into Asbestos Waste Container.

.3 Force scraper through tightly adhered areas by striking scraper handle with a hammer.

.4 Heat tile thoroughly with a hot air gun until heat penetrates through tile and softens adhesive in areas where scraper will not remove tile.

.5 Scrape up adhesive remaining on floor with a hand scraper until only a thin smooth film remains.

.6 Use a hot air gun where deposits are heavy or difficult to scrape.

.7 Use of a chemical mastic stripper is not permitted.

.8 If scraping is unsuccessful in removing mastic, grinding or scarifying the concrete floor may be required for complete removal. Grinding or scarifying concrete will require Type 3 removal procedure. Type 2 procedures are permitted with the use of an acceptable dust collection device on the grinder or scarifying tool.

.9 Deposit scrapings into asbestos waste disposal bag.

.10 HEPA vacuum floor on completion of work in area.

3.5 Asbestos Removal - Removal of Other Non-Friable Asbestos Materials

.1 Wet all material to be disturbed.

.2 Undo fasteners if necessary to remove material.

.3 Break material only if unavoidable, and wet material if broken during work.

.4 Use only non-powered hand-held tools to remove ACM.

.5 Caulking may be removed separately or the windows may be removed with caulking in place.

.6 Scrape to remove material adhered to substrates (including building finishes flashings, and window frames).

.7 Waste is to be streamed to minimize asbestos waste.

.8 Place removed ACM directly into an asbestos waste container.

3.6 Waste and Material Handling

.1 Waste bins must be placed on grade or in receiving.

.2 All bins must be locked and covered when waste transfer is not being performed.

.3 Ensure redundant non-ACM, rubble, debris, etc. removed during contaminated work are treated, packaged, transported and disposed of as asbestos waste.

.4 Clean and wash equipment prior to removal from Asbestos Work Area if removed prior to completion.

.5 Place all equipment, tools and unused materials that cannot be cleaned in Asbestos Waste Containers.

.6 As work progresses, and at regular intervals, transport the sealed and labelled asbestos waste containers from the Asbestos Work Area to waste bin.

.7 Place items in bins according to waste classification. Place asbestos waste, metals, non-asbestos waste, etc. in separate bins.

.8 Removal of waste containers and decontaminated tools and materials from the Asbestos Work Area shall be performed as follows:

.1 Remove any visible contamination from the surface of the non-porous or sealable item being removed from the Asbestos Work Area. If the item can be cleaned, remove it from the site. If it cannot be cleaned thoroughly, place it in an Asbestos Waste Container.

.2 Place waste or item in Asbestos Waste Container and seal closed.

.3 Wet wipe outside of Asbestos Waste Container.

.4 At entrance to Asbestos Work Area, place in second Asbestos Waste Container. Seal closed.

.5 Remove the item from the Asbestos Work Area.

.9 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with the NRCC. Use a closed, covered cart to transport through Occupied Areas.

.10 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled ACM in the case of a rupture of an Asbestos Waste Container.

.11 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the NRCC's operations.

.12 Transport asbestos contaminated waste to landfill licensed by Ontario Ministry of the Environment.

.13 Co-operate with Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the NRCC.

3.7 Asbestos Work Area Dismantling

.1 Wash or HEPA vacuum equipment used in Asbestos Work Area, seal vacuum hoses and fittings.

.2 Place tools and equipment used in contaminated work site but not cleaned in 6 mil polyethylene bags prior to removal from Asbestos Work Area.

.3 Clean polyethylene sheeting and drop sheets which with HEPA vacuum or wet cleaning methods at completion of work.

.4 Wet drop sheets and polyethylene sheeting.

.5 Carefully roll drop sheets toward the centre and over onto itself.

.6 Remove remaining polyethylene sheeting.

.7 Seal openings in HEPA vacuums.

.8 Place polyethylene sheeting, drop sheets, seals, tape, clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

3.8 Re-Establishment of Items

.1 Upon completion of work:

.1 Clean, mop and vacuum Asbestos Work Area.

End of Section 02 82 10

PART 1 GENERAL

1.1 General and Related Work

.1 Read this section in conjunction with all other sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.

.2 Related Work Specified Elsewhere:

Division 2,	Section 02 41 46	Demolition
Division 13,	Section 02 61 33	Hazardous Materials
Division 13,	Section 02 82 10	Asbestos Abatement - Type 1
Division 13,	Section 02 82 13	Asbestos Abatement - Glove Bag
Division 13,	Section 02 84 10	Mercury and PCB Packaging and Disposal

.3 The site conditions identify the location and condition of all known asbestos-containing materials (ACM) to be disturbed by the work of this section. The specification fulfils the requirements of the report required by Ontario Regulation 278/05.

.4 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal or decontamination of all ACM included in work of this section and all materials which have been contaminated by ACM either during or prior to work of this section.

1.2 Site Conditions

.1 Refer to Section 02 61 33 Hazardous Materials.

1.3 Outline of Work

.1 Remove and dispose all asbestos containing materials present in the work areas identified in Drawings 1 through 3, unless removed under Type 1 or Glove Bag procedures.

1.4 Schedule

.1 All work is to be performed within the terms and General Conditions.

1.5 Definitions

.1 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.

.2 Asbestos Abatement Consultant: Owner's Representative providing inspection and air monitoring.

.3 Asbestos Abatement Contractor: Contractor or sub-contractor performing work of this section.

.4 Asbestos-Containing Material(s) (ACM): Material(s) identified under Site Conditions including debris, fallen material and settled dust.

.5 Asbestos Work Area: Area where work takes place which will, or may, disturb ACM.

.6 Authorized Visitors: Prime Contractor, Building Owner or Representatives, Asbestos Abatement Consultant, and persons representing regulatory agencies.

.7 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.

.8 DOP Testing (or HEPA Integrity Test): Testing performed on HEPA Filtered Negative Pressure Machines and HEPA vacuums using DOP or equivalent. Testing shall ensure that total penetration from the unit does not exceed 0.03%, or 99.97% efficient of airborne particulate removal. DOP Testing must be in compliance with ASME N510-1989 (1995) and must be performed using a Temporary Mixing Chamber with installed baffles to allow uniform mixing of challenge aerosol.

.9 Fitting: Section of pipe other than straight uninterrupted sections including elbows, valves, tees, hangers, nipples, union or ends.

.10 Friable Material: means a material when dry can be crumbled, pulverized or powdered by hand pressure or is crumbled, pulverized or powdered.

.11 HEPA Filter: High Efficiency Particulate Arresting filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.

.12 PCM: Phase Contrast Microscopy.

.13 Polyethylene: Either polyethylene sheeting or rip-proof polyethylene sheeting (as specified) with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from damage, and to prevent escape of asbestos fibres through sheeting into Occupied Areas.

.14 Personnel: All contractors' employees, sub-contractors employees, supervisors.

.15 Occupied Area: Any area of the building outside the Asbestos Work Area.

.16 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).

.17 TEM: Transmission Electron Microscopy.

1.6 Submittals

.1 Submit prior to starting work:

.1 Ministry of Labour Notice of Project form.

.2 Copy of Certificate of Approval for transportation of asbestos waste and location of landfill.

.3 Pre-removal survey of damage in all areas where asbestos abatement will take place or waste will be transported.

.2 Submit the following information regarding personnel prior to starting work:

.1 Resumes of the supervisory personnel.

.2 Proof in the form of a certificate that supervisory personnel have been certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.

.3 Proof in the form of a certificate that workers have been certified under the Ministry of Training, Colleges and Universities course 253W.

.4 WHMIS training certificates for all personnel.

.5 Certificate proving that each worker or supervisor on site has been fit tested for the respirator appropriate for the work being performed.

.3 Submit the following information regarding HEPA filtered devices prior to construction of enclosure or asbestos abatement:

.1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.

.2 Performance data on negative air units including DOP tests which must be no more than 3 months old if the unit is vented outdoors or which must be performed on site immediately prior to initial usage and when HEPA filters are changed, where the unit is vented indoors.

.3 DOP tests to be performed by an independent testing company:

.1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results, Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).

.2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.

.3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.

.4 Submit the following prior to isolating the work area:

.1 Written statement that the Ground Fault Interrupter Panels use CSA approved parts and have been inspected by the Electrical Safety Authority.

.2 Material Safety Data Sheets for chemicals or material used in the course of the Asbestos Abatement Project.

.5 Submit the following upon completion of the work.

.1 Manifests, waybills, bills of ladings etc. as applicable for each type of waste.

1.7 Regulations

.1 Comply with Federal, provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed. Regulations include but are not limited to the following:

.1 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.

.2 Ministry of Transportation Regulations for the transport of asbestos waste, including the Transportation of Dangerous Goods Act.

.3 Ministry of Environment Regulations for the disposal of asbestos waste, including R.R.O. 1990, Reg. 347 as amended.

1.8 Supervision

.1 Provide on site, a supervisor, with authority to oversee all aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.

.2 The supervisor must be on site at all times during work. Failure to comply with this requirement may result in a stoppage of work, at no cost to the NRCC.

.3 Provide a minimum of one supervisor for every 10 workers.

.4 Replace supervisory personnel, with approved replacements, within 3 working days of a written request from the Asbestos Abatement Consultant. Asbestos Abatement Consultant reserves the right to request replacement of supervisory personnel without explanation.

.5 Do not replace supervisory personnel without written approval from the Asbestos Abatement Consultant.

1.9 Quality Assurance

.1 Ensure the removal and handling of ACM or asbestos contaminated materials is performed by persons experienced in the methods, procedures and industry practices of asbestos abatement.

.2 Complete work so that at no time airborne asbestos, visible solid residue, or water runoff contaminates areas outside Asbestos Work Area. Asbestos Abatement Consultant is empowered to order a shutdown of work when a leak has occurred or is likely to occur. Cost of additional work by Asbestos Abatement Contractor and/or Asbestos Abatement Consultant to rectify unsatisfactory conditions shall be charged to the Asbestos Abatement Contractor.

.3 Perform all work involving other trades such as electrical, mechanical, carpentry, glazing etc. using licensed persons experienced and qualified for the work required.

.4 The Asbestos Abatement Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs required for the Work in accordance with the applicable construction safety legislation, other regulations or general construction practice. The Asbestos Abatement Consultant will not be responsible for or have control or charge over the acts or omissions of the Asbestos Abatement Contractor, his Subcontractors or their agents, employees or other persons performing any of the Work.

1.10 Notification

.1 Before commencing work, notify orally and in writing, an inspector at the office of the Ontario Ministry of Labour nearest the project site.

.2 Notify Sanitary Landfill site as per Ontario Regulation 347 as amended.

.3 Inform all sub trades of the presence of ACM identified in the contract documents.

.4 Notify the NRCC or Pinchin Ltd., the Joint Occupational Health and Safety Committee and the Ontario Ministry of Labour, as required by Regulation 278/05, if friable materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

1.11 Insurance

.1 Maintain a Commercial General Liability Policy with an insurance company acceptable to Pinchin Ltd. and the NRCC. The intent of this policy is to hold Pinchin Ltd. and the NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.

.2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to Pinchin Ltd. and the NRCC. The intent of these policies is to hold Pinchin Ltd. and the NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.

.3 Maintain a Pollution Liability Policy (or asbestos liability policy or specific coverage under the CGL for asbestos abatement) with an insurance company acceptable to Pinchin Ltd. and the NRCC. The intent of this policy is to hold Pinchin Ltd. and the NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of asbestos abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations including asbestos abatement.

.4 Forward all certificates to Pinchin Ltd. and the NRCC before work is commenced, showing Pinchin Ltd. and the NRCC as additional insured as their interest may appear.

.5 The NRCC may request a certified true copy of the policies.

.6 The limits will not be less than:

.1	Commercial General Liability	$5,000,000.00
.2	Automobile	$2,000,000.00
.3	Pollution Policy (Asbestos Liability)	$5,000,000.00

1.12 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.2 Provide the following respiratory protection to all personnel:

.1 Full Face Powered Air Purifying Respirators with P100 high efficiency (HEPA) cartridge filters during projects when performing wet abatement of non-surfacing asbestos-containing material in the basement and first floor.

.2 Supplied air respirators shall be worn when removing or disturbing Amosite-containing spray-applied fireproofing and all other materials within the ground floor Asbestos Work Area.

.3 Non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters for dismantling of Type 3 enclosures, using Type 2 Procedures.

.3 Respirators shall be:

.1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.

.2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Asbestos Work Area has facial hair which affects the seal between respirator and face.

.3 Assigned to a worker for their exclusive use.

.4 Maintained in accordance with manufacturer's specifications.

.5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.

.6 Repaired or have damaged or deteriorated parts replaced.

.7 Stored in a clean and sanitary location.

.8 Provided with new filters as necessary, according to manufacturer's instructions.

.9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.

.4 Provide protective clothing, to all personnel which:

.1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres.

.2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.

.3 Is replaced or repaired if torn or ripped.

.4 Is disposed of as ACM.

.5 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

.6 Provide site specific instruction to workers before allowing entry to Asbestos Work Area. Instruction shall include training on entry and exit from Asbestos Work Areas. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.

.7 Provide soap, shampoo and towels for use by all personnel when leaving the Asbestos Work Area.

.8 Prohibit smoking, eating, drinking, chewing in the Asbestos Work Area and Decontamination Facilities.

1.13 Asbestos Abatement Work Area Entry Procedures

.1 Use the following procedure to enter contaminated Asbestos Work Area:

.1 Remove street clothes in Clean Change Room.

.2 Put on respirator with new or tested filters, and protective clothing in Clean Change Room or clean side of Shower Room.

.3 Store all street clothes, uncontaminated footwear, towels, etc. in the Clean Change Room.

1.14 Asbestos Abatement Work Area Exit Procedures

.1 Use the following procedure to exit contaminated Asbestos Work Area:

.1 Remove gross contamination from protective clothing using HEPA vacuum or by wet wiping.

.2 Proceed to Contaminated Change Room and remove all contaminated clothing and equipment except respirator.

.3 Store contaminated footwear, hard hats, etc. in Contaminated Change Room.

.4 Proceed naked to shower while still wearing respirator.

.5 Shower, cleaning outside of respirator with soap and water. Thoroughly wet body, head and hair, remove respirator and wash body, head and hair. Wet clean inside of respirator face piece.

.6 Remove filters for testing or dispose of in container provided for this purpose. Remove after leaving the Shower but prior to entering the Clean Change Room.

.7 Proceed to the Clean Change Room, dry off and dress in street clothing.

.8 Maintain and disinfect respirator.

1.15 Authorized Visitor Protection

.1 Provide clean protective clothing and equipment, and approved respirators (supplied air only) to Authorized Visitors.

.2 Ensure Authorized Visitors have received required training prior to granting entry into Asbestos Work Area.

1.16 Air Monitoring

.1 Air monitoring will be performed following the National Institute for Occupational Safety and Health method 7400, Asbestos and other fibres by PCM (Phase Contrast Microscopy).

.2 Co-operate with the Asbestos Abatement Consultant in collection of air samples. Asbestos Abatement Contractor to exercise care with Asbestos Abatement Consultant's equipment. The NRCC reserves the right to back-charge the Asbestos Abatement Contractor for further collection of samples damaged by tampering or abuse. In addition, the Asbestos Abatement Contractor will be responsible for the cost of testing equipment repairs resulting from the actions of the Asbestos Abatement Contractor's forces.

.3 Results of air monitoring of 0.01 fibres per millilitre of air (fibre/mL) or greater, outside of Asbestos Work Area, will indicate asbestos contamination of these areas and result in the following actions:

.1 Suspend Work within the adjoining Asbestos Work Area until written authorization to resume Work has been received from the Asbestos Abatement Consultant.

.2 Isolate and clean area in the same manner applicable to the Asbestos Work Area.

.3 Maintain Work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.

.4 Install additional negative air units at locations specified in response to elevated fibre levels being detected in the Clean Change Room or Occupied Areas at the discretion of the Asbestos Abatement Consultant.

.4 Perform the following where results of air monitoring within the Asbestos Work Area show airborne fibre levels have exceeded the respirator protection factor:

.1 Immediately stop Work within the Asbestos Work Area.

.2 Instruct workers to exit the Asbestos Work Area via the Worker Decontamination Facility while observing specified personal decontamination procedures.

.3 Contractor's forces shall not re-enter the Asbestos Work Area until authorized by the Asbestos Abatement Consultant.

.4 Upon re-entry to the Asbestos Work Area, mist any fallen debris or exposed surfaces with amended water using an airless sprayer.

.5 If PCM monitoring shows repeated failure, change respiratory protection to suitable alternative and change unsatisfactory methods used.

.5 PCM samples will be collected from within the Asbestos Work Area, after the site has passed a visual inspection and an acceptable coat of post removal sealant has been applied. These airborne fibre levels must not exceed 0.01 fibre/mL, after forced air monitoring and PCM analysis (Air Monitoring Clearance Inspection). If these results show fibre levels in excess of 0.01 fibre/mL:

.1 Maintain Asbestos Work Area isolation.

.2 Re-clean entire Asbestos Work Area.

.3 Apply another acceptable coat of post removal sealant to exposed surfaces throughout the Work area.

.4 Repeat above measures until visually inspected and air monitoring results are at a level equal to that specified.

.5 Alternate to items 2-4 above, the Asbestos Abatement Contractor can pay for analysis of samples by Transmission Electron Microscopy (TEM). Laboratory performing TEM analysis is to be NVLAP accredited.

.6 Cost of additional inspection and sampling performed as a result of elevated fibre levels may be charged to the Asbestos Abatement Contractor at the NRCC's discretion.

1.17 Inspection

.1 From commencement of work until completion of clean-up operations, the Asbestos Abatement Consultant will be present periodically on site both inside and outside the Asbestos Work Area.

.2 The following Milestone Inspections will take place, at the NRCC's cost:

.1 Milestone Inspection A - Clean Site Preparation:

.1 Inspection of preparations and set-up prior to contaminated work in the Asbestos Work Area.

.2 Milestone Inspection D - Visual Clearance:

.1 Inspection of Asbestos Work Area after removal of all asbestos, but prior to application of lock-down agent.

.3 Milestone Inspection E - Air Monitoring Clearance:

.1 Inspection and air monitoring after the application of lock-down agent, but prior to removal of Polyethylene from within the Asbestos Work Area.

.3 Do not proceed with next phase of Work until written approval of each milestone is received from the Asbestos Abatement Consultant.

.4 In addition to the Milestone Inspections, inspection of the Asbestos Work Area may be performed to confirm the Asbestos Abatement Contractor's compliance with the requirements of the contract documents and governing authorities. Any deviations from these requirements that have not been approved in writing may result in a stoppage of work, at no additional cost to the NRCC.

.5 The Asbestos Abatement Consultant is empowered by the NRCC to inspect for final cleanliness at completion. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level specified shall be at no additional cost.

.6 Inspection and air monitoring performed as a result of Asbestos Abatement Contractor's failure to perform satisfactorily regarding quality, safety, or schedule may be charged to the Asbestos Abatement Contractor at the NRCC's discretion.

1.18 Differential Pressure Monitoring

.1 Install differential pressure monitor at a location chosen by the Asbestos Abatement Consultant.

.2 Replace damaged or non-functional equipment at the request of the Asbestos Abatement Consultant.

.3 Co-operate with the Asbestos Abatement Consultant in collection of pressure monitoring data.

.4 Maintain specified differential pressure at monitoring location. Negative air pressure is to be -0.02 inches of water, relative to the area outside the enclosed area

.5 Record data at start and end of shift and maintain records on file.

.6 Stop contaminated work and take corrective action if pressure differential drops below the specified level. Notify Asbestos Abatement Consultant immediately.

PART 2 PRODUCTS AND FACILITIES

2.1 Materials and Equipment

.1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials.

.2 Airless Sprayer: AC powered pressure washer that allows wetting agent to mix with water, uses no air or compressed air, and has a nozzle to regulate power and pressure.

.3 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.

.4 Asbestos Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment comprised of one of the following:

.1 A 6 mil (0.15 mm) labelled yellow sealed polyethylene bag, inside a clear 6 mil (0.15 mm) sealed polyethylene bag.

.2 A 6 mil (0.15 mm) sealed polyethylene bag, positioned inside or outside a rigid sealed container of sufficient strength to prevent perforation of the container during filling, transportation and disposal.

.3 Labelled containers as required by the Ontario Ministry of the Environment Reg. 347 as amended and Regulation 278/05.

.5 Differential Pressure Monitor: a high precision instrument for measuring and controlling pressure differences in the low range, between the Asbestos Work Area and occupied area. Acceptable Product: Magnehelic gauge (Cat. No. 2000-00) manufactured by Dwyer Instruments Inc. or equivalent. Calibrate regularly to manufacturer's instructions.

.6 Discharge Ducting: Polyethylene Tubing. Reinforced with wire. Diameter equal to negative pressure machine discharge. Not to be longer than required, or so long that negative pressure is compromised.

.7 Ground Fault Panel: Electrical panel as follows:

.1 Ground fault circuit interrupters of sufficient capacity to power temporary electrical equipment and lights in Asbestos Work Area.

.2 Interrupters to have a 5 mA ground fault protection.

.3 Necessary accessories including main switch disconnect, ground fault interrupter lights, test switch to ensure unit is working, and reset switch.

.4 Openings sealed to prevent moisture or dust penetration.

.5 Inspected by the Electrical Safety Authority.

.6 Panel uses CSA approved parts and been constructed, inspected and installed by a licensed electrician.

.8 HEPA Filtered Negative Pressure Machine: Portable air handling system which extracts air directly from the Asbestos Work Area and discharges the air to the exterior of the building. Equipped as follows:

.1 Prefilter and HEPA filter. Air must pass HEPA filter before discharge.

.2 Pressure differential gauge to monitor filter loading.

.3 Auto shut off and warning system for HEPA filter failure.

.4 Separate hold down clamps to retain HEPA filter in place during change of prefilter.

.9 HEPA Vacuum: High Efficiency Particulate Arresting (HEPA) filtered vacuum equipment with a filter system capable of collecting and retaining spherical particles greater than 0.3 microns at 99.97% efficiency.

.10 Hose: Leak-proof, minimum busting strength of 200 PSI or greater if required, abrasion resistant covering, reinforcing, and machined-brass couplings. Maintained and tested. Hose to be temperature resistant if it is to carry domestic hot water.

.11 OSB: Oriented Strand Board.

.12 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified in sheet size to minimize joints. New materials only.

.13 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.

.14 Protective Clothing: Disposable full body coveralls complete with hoods manufactured of a material which does not permit penetration of asbestos fibres. Coveralls to fit snugly at ankles, wrists and neck. Acceptable materials: Dupont Tyvek or Kimberly Clark Kleenguard.

.15 Rip-Proof Polyethylene Sheeting: Minimum requirements 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and 2 layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps. New materials only.

.16 Shower Hose: Water lines for supply of hot & cold water to shower facilities to be rated for use at 200 PSI (1380 kPa) or twice the working pressure whichever is greater. Supply lines to be continuous and free of fittings, joints or couplings.

.17 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.

.18 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.

.19 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

2.2 Hoarding Walls

.1 Type A Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of rip-proof polyethylene sheeting on each side of wall.

.2 Type B Hoarding Wall: 38 mm x 89 mm wood or metal studs at 400 mm o/c with continuous sill and top plate, covered with one layer of polyethylene sheeting on each side of wall. Install 13 mm OSB, plywood or gypsum board over polyethylene sheeting on Occupied Area side. Paint Occupied Area side of OSB, plywood or gypsum board with one coat of primer and one coat of flat white latex.

.3 Windows: Install sufficient transparent window areas in hoarding walls to allow observation of entire work area from outside the enclosure where existing solid walls do not make up the perimeter.

2.3 Decontamination Facilities

.1 Workers' Decontamination Facility: A decontamination facility comprised of three linked rooms, Contaminated Change Room, a Shower Room, and a Clean Change Room:

.1 Rooms, Occupied Areas and Asbestos Work Areas, shall be separated by curtained doorways at each door.

.2 Contaminated Change Room: Room between Shower Room and Asbestos Work Area:

.1 Locate on contaminated side of Shower Room.

.2 Install asbestos waste container for asbestos contaminated protective clothing.

.3 Install storage facilities for any personal protective equipment to be reused in Asbestos Work Area including boots, hard hats, etc., but excluding respirators.

.4 Install hooks and shelves as required for personal protective equipment.

.5 Minimum size of generally 2 m x 2 m. Increase size accordingly to accommodate number of workers.

.3 Shower Room: Room between Clean Change Room and Contaminated Change Room:

.1 Install one walk through shower unit for every six workers.

.2 Install constant supply of hot and cold water, controllable at each shower. Water supply must be sufficient to provide water at a minimum temperature of 40 degrees Celsius (maximum 50 degrees) in a volume required for all workers to properly decontaminate:

.1 Install individual hot and cold shut-off valves on water supply located on clean side of Shower Room. Connect shower to these valves.

.2 Install individual controls inside the shower to regulate water flow and temperature.

.3 Install rigid piping or Shower Hose with watertight connections for supply and drains.

.4 Install a sealed drip pan under and around the showers, 150 mm deep.

.5 Install sump pumps, sufficient for volume of waste shower water from showers and drip pan. Direct waste shower water to sanitary drains.

.6 Install ground fault protected power switch on clean side of shower for sump pumps, or timed for shut off.

.7 Provide adequate quantity of soap, shampoo, clean towels

.8 Install an Asbestos Waste Container for disposal of used respirator filters, on the contaminated side of the Shower Room.

.4 Clean Change Room: A room between the Shower Room and Occupied Areas:

.1 Install hooks and shelves on clean side of shower in clean Change Room for storage of respirators.

.2 Install lockers or hangers for workers' street clothes and personal belongings.

.3 Install hose bib on domestic cold water pipe for connection on clean side of Asbestos Work Area.

.4 Install electric hot water heater/tank for showers in decontamination facility.

.5 Provide ground fault protected power supply to hot water tanks, sump pump, battery chargers.

.6 Install a fire extinguisher, mount to wall.

.7 Minimum size of generally 2 m x 2 m. Increase size accordingly to accommodate number of workers.

.5 Waste and Equipment Decontamination Facility: Waste and Equipment Decontamination Facility comprised of three linked rooms: a Container Cleaning Room, a Holding Room and a Transfer Room:

.1 Purpose of Waste and Equipment Decontamination Facility is to provide a means to decontaminate asbestos waste containers, scaffolding, vacuums, and other tools and equipment and materials required in the Asbestos Work Area.

.2 Rooms, Occupied Areas and Asbestos Work Areas, shall be separated by curtained doorways at each door.

.6 Container Cleaning Room: Room between Asbestos Work Area and Holding Room of sufficient size to allow proper washing of equipment and waste containers or double bagging of asbestos waste. All wash water shall be treated as asbestos contaminated waste.

.7 Holding Room: Room between Container Cleaning Room and Transfer Room, of sufficient size to accommodate at least two asbestos waste containers and two workers double bagging waste, or for largest item of equipment used.

.8 Transfer Room: Room between Holding Room and Occupied Area, acting as an air lock for the transfer of waste.

.9 Construction of Decontamination Facilities:

.1 Install floor protection as follows:

.1 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting beneath entire decontamination facility.

.2 Turn 600 mm of polyethylene up the sides of the decontamination facility and overlap with the polyethylene sheeting covering the walls.

.2 Install walls as follows:

.1 Around all rooms, between all rooms, at entrance to Asbestos Work Area and at entrance to Occupied Area.

.2 Install 38 x 89 mm wood framing at 610 mm o/c with continuous top and sill plates.

.3 Install one layer rip-proof polyethylene sheeting on walls of Decontamination Facility.

.3 Install roof as follows:

.1 Install joists. Size of joists is to be determined by clear span. Consult Ontario building Code (Table A-1). For clear spans up to 2850 mm use SPF Select 38 x 140 mm wood joist at 400 mm o/c with continuous 38 x 140 mm wood headers, and install strapping beneath joists.

.2 At the Contaminated Change Room and where roof is exposed to the Asbestos Work Area, install 19 mm plywood or OSB over joists. Caulk and tape joints and install one layer rip-proof polyethylene sheeting over 2 layers of 6 mil polyethylene sheeting.

.3 Where roof is not exposed to the Asbestos Work Area, install one layer rip-proof polyethylene sheeting over joists.

.4 Turn 600 mm of polyethylene down the sides over polyethylene on the perimeter walls.

.5 Minimum interior clear height 2 m to underside of joist.

.10 Curtained Doorways

.1 Construct as follows:

.1 Install two flap doors, full width and height of door opening at all doors between chambers, facilities and Asbestos Work Area.

.2 Construct each flap door of two layers of polyethylene sheeting with all edges reinforced with tape. Use wood strapping to securely fasten flap doors to head and alternate jambs.

.3 Install weights attached to bottom edge of each door flap.

.4 Provide direction arrows on flaps to indicate opening.

2.4 Signage

.1 Work Area Signs: Post signs in both official languages at access points to the Asbestos Work Area and on hoarding walls as follows:

.1 CAUTION.

.2 Asbestos Dust Hazard Area.

.3 Unauthorized Entry Prohibited.

.4 Wear Assigned Protective Equipment.

.5 Breathing Asbestos Dust May Cause Serious Bodily Harm.

.2 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:

.1 CONTAINS ASBESTOS FIBRES.

.2 Avoid Creating Dust and Spillage.

.3 Asbestos May be Harmful to Your Health.

.4 Wear Approved Protective Equipment.

.3 Place placards in accordance with Transportation of Dangerous Goods Act.

PART 3 EXECUTION

3.1 Clean Site Preparation

.1 Perform pre-removal damage survey and submit to Asbestos Abatement Consultant.

.2 Remove stored or non-fixed items from the Asbestos Work Area, including but not limited to equipment, furniture, waste etc. Store in area provided by NRCC.

.3 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.4 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping using Type 2 Procedures as required by O. Reg. 278/05.

.5 Maintain emergency and fire exits from Asbestos Work Area, or establish alternative exits satisfactory to Provincial Fire Marshall and local authorities having jurisdiction. Maintain extra routes from occupied areas. Place emergency exit signs at locations to clearly mark exit route. Seal emergency exit doors so as not to impede use of door during emergency evacuation.

.6 Install Hoarding Walls between Asbestos Work Area and Occupied Area.

.7 Install Worker Decontamination facility:

.1 Worker Decontamination Facility to be located beside the Asbestos Work Area.

.8 Install Waste Decontamination facility:

.1 Waste Decontamination Facility to be located beside the Asbestos Work Area.

.9 Install signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.10 Post Ministry of Labour Notice of Project.

.11 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting so as to protect all equipment and finishes in the Asbestos Work Area that may be damaged. Items to remain include but are not limited to:

.1 Electrical Equipment.

.2 Mechanical Equipment.

.12 Seal openings in floor using tape, caulking, polyethylene, etc. Openings in floor are to be sealed independently prior to installation of polyethylene sheeting on floor. Include floors of duct and service shafts.

.13 Seal openings in walls using polyethylene, tape, caulking, etc. including but not limited to windows, doors, vents, diffusers, etc.

.14 Seal openings in ceilings or slabs, using polyethylene, tape, caulking, etc. including diffusers, grills, etc.

.15 Establish negative pressure in Asbestos Work Areas as follows:

.1 Install HEPA Filtered Negative Pressure Machines sufficient to maintain pressure differential of -0.02 inches of water between contaminated Asbestos Work Area and Occupied Areas.

.2 Arrange HEPA Filtered Negative Pressure Machines to maximize differential pressure in Asbestos Work Area.

.3 Install weighted flaps in perimeter Hoarding Walls as necessary to provide make-up air.

.4 Operate HEPA Filtered Negative Pressure Machines continuously from first disturbance of ACM until completion of dismantling.

.5 Replace prefilters frequently to maintain specified flow rate.

.6 Replace HEPA filters as required to maintain flow rate and integrity of unit.

.7 Discharge HEPA filtered negative pressure machines as follows:

.1 To building exterior:

.1 Remove existing glazing where necessary and replace with a 19 mm plywood panel.

.2 Install panel securely on the exterior side of the window frame and make weather-tight with caulking.

.3 For each negative pressure unit, provide a 300 mm diameter, duct opening through panel.

.4 Cover duct opening with chicken wire.

.5 Direct discharge away from building access points.

.6 Reinstall glazing to match existing upon completion of work.

.2 Install and make airtight all negative air discharge ducting.

.3 Discharge ducting is not to be longer than required, and to be straight, so that the length of the ducting does not reduce the flow from negative pressure machines.

.8 DOP test all HEPA Filtered Negative Pressure Machines.

.16 Provide a Ground Fault Panel in the Asbestos Work Area:

.1 Ground Fault Interrupter Panel to use CSA approved equipment and be inspected by the Electrical Safety Authority.

.2 Ensure safe installation by licensed electricians.

.3 Connect to building power at electrical panel outside Asbestos Work Area.

.4 Cable to be completely jacketed with no defects. Tag/mark cable as Live.

.5 All electrical equipment used during work shall be supplied power from a Ground Fault Panel.

.17 Install temporary lighting in all work areas at levels that will provide for a safe and efficient use of the work area.

.18 Isolate, at panel, and disconnect existing power supply to Asbestos Work Area. Power supply to remaining areas of building must not be disrupted during work of this section:

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Asbestos Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc.

.19 Install hose bib on domestic cold water pipe for connection of hoses for wetting:

.1 Install hoses with watertight connections and airless sprayers to wet asbestos-containing materials.

.20 Shut down HVAC systems serving the Asbestos Work Area.

.21 Seal openings in dormant rigid ductwork with rip-proof poly. Cap openings in live ducts with equal gauge metal and duct sealant.

.22 Clean and protect electrical systems in the Asbestos Work Area with polyethylene and tape. Include all communication, coaxial, triaxial, fire and public address systems, wiring, conduit, speakers, heat and smoke detectors, alarms, exit lights, junction boxes, etc.

.23 Install one layer of rip-proof polyethylene sheeting over two layers of 6 mil polyethylene sheeting, on floor surfaces in Asbestos Work Area, except where floor tiles are being removed:

.1 Extend floor protection a minimum of 300 mm up all vertical surfaces in the Asbestos Work Area.

.24 On walls within and forming the perimeter of the Asbestos Work Area install one layer of rip-proof polyethylene sheeting:

.1 At junction of floor and wall surface overlap floor polyethylene with wall polyethylene by a minimum of 300 mm at each layer.

.25 Notify Asbestos Abatement Consultant at least 24 hours prior to the need for Milestone Inspection A (Clean Site Preparation).

3.2 Maintenance of Contaminated Asbestos Work Area

.1 Inspect Asbestos Work Area at the beginning and end of each working period and once on each day work does not take place. Inspection must be performed by competent person.

.2 Inspect HEPA filtered negative pressure machines including discharge ducting at the beginning and end of each working period. Inspection must be performed by competent person.

.3 Perform Differential Pressure Monitoring on a frequent basis and record pressure at start and end of shift at a minimum.

.4 Inspect polyethylene sheeting and ensure it is effectively sealed and taped. Repair damage and remedy defects immediately.

.5 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Asbestos Work Area.

.6 Maintain Asbestos Work Area in tidy condition.

.7 Remove waste and debris frequently.

.8 Remove standing water on polyethylene/floor at the end of every shift.

.9 Turn off water supply to hoses and reduce pressure in hose, prior to leaving the Asbestos Work Area at end of shift.

.10 Turn off water supply to showers, at the end of every shift.

.11 Ensure shower pans are pumped out at the end of every use and shift.

3.3 Wet Removal

.1 Do not use compressed air to clean or remove dust or debris.

.2 Remove and dispose of remaining non-asbestos items before, during or after wet removal.

.3 ACM cannot be allowed to fall from one level to the next.

.4 Spray asbestos-containing materials with Amended Water using airless spray equipment.

.5 Remove pipe and mechanical insulations specified to be removed and clean substrate. Maintain exposed surfaces of insulation or lagging in a wet condition.

.6 Remove ducts within the work area. Cut ducts approximately 2” from mastic. Dispose of mastic as asbestos waste, and clean and recycle remaining lengths of ducts.

.7 Remove obstructions as required to remove the ACM:

.1 Notify asbestos abatement consultant if item is not specified to be removed and inhibits removal of ACM.

.2 Do not demolish any existing walls etc. that form the perimeter of the Asbestos Work Area without prior written permission from Asbestos Abatement Consultant.

.8 All dislodged ACM shall be maintained in wet state until placed in asbestos waste containers for disposal.

.9 As work progresses, and at regular intervals, place waste in asbestos waste containers and remove from the Asbestos Work Area.

.10 After completion of gross asbestos removal work, perform the following:

.1 Wet clean surfaces from which ACM has been removed with stiff bristle brushes, vacuums, wet-sponges etc. to remove all visible residue and asbestos-containing materials.

.2 Wet clean surfaces which ACM has fallen on using stiff bristle brushes, vacuums, wet-sponges etc. to remove all visible residue and asbestos-containing materials.

.3 Wet clean other surfaces in the Asbestos Work Area, including the decontamination facilities, scaffolding, equipment, polyethylene sheeting on floor and walls surfaces etc., ducts and similar items not covered with polyethylene sheeting.

.4 Remove wash water as contaminated waste.

.5 Remove waste.

.6 Level of cleanliness must be acceptable to Asbestos Abatement Consultant.

.7 Remove and dispose of the pre-filters from all negative air units as asbestos-contaminated waste.

.11 Notify Asbestos Abatement Consultant at least 48 hours prior to the need for Milestone Inspection D (Visual Clearance). Obtain written approval for this Milestone Inspection before proceeding.

3.4 Waste and Material Handling

.1 Waste bins must be placed on grade or in receiving.

.2 All bins must be covered and locked when waste transfer is not being performed.

.3 Ensure redundant non-ACM, rubble, debris, etc. which was not cleaned and which was removed during contaminated work are treated, packaged, transported and disposed of as asbestos waste.

.4 Clean, wash and apply Post Removal Sealant to metal waste prior to removal from Asbestos Work Area.

.1 Recycle metals or dispose of metals as clean waste.

.5 Clean, wash and apply Post Removal Sealant to non-porous materials prior to disposal as clean waste:

.1 Obtain prior written approval from the Asbestos Abatement Consultant for each individual type of material.

.6 Clean and wash equipment prior to removal from Asbestos Work Area if removed prior to completion.

.7 Place all equipment, tools and unused materials that cannot be cleaned in Asbestos Waste Containers.

.8 As work progresses, and at regular intervals, transport the sealed and labelled asbestos waste containers from the Asbestos Work Area to waste bin.

.9 Place items in bins according to waste classification. Place asbestos waste, metals, non-asbestos waste, etc. in separate bins.

.10 Removal of waste containers and decontaminated equipment and materials from the Asbestos Work Area shall be performed using the Waste and Equipment Decontamination Facility as follows:

.1 Prior to entering the Waste and Equipment Decontamination Facility Container Cleaning Room, the first worker (fully protected inside the Asbestos Work Area) shall remove any visible contamination from the surface of the item or waste container being removed from the Asbestos Work Area.

.2 The first worker then carries the item into the Container Cleaning Room and wet sponges the item prior to passing the item through the curtained doorway to a second worker in the Holding Room. (The second worker shall be fully protected with respirator and disposable clothing and may only leave the decontamination facility via the Asbestos Work Area.).

.3 The second worker in the Holding Room double bags or wraps and seals the item. Without entering the Transfer Room, the second worker passes the item through the curtained doorway into the Transfer Room.

.4 A third worker enters the Transfer Room from the clean area. (The third worker must never enter the Holding Room.) The third worker removes the item from the Transfer Room and transports it to the disposal bin.

.11 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with NRCC. Use a closed, covered cart to transport through Occupied Areas.

.12 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled ACM in the case of a rupture of an Asbestos Waste Container.

.13 Bin loading area and waste routes shall be kept clean at all times. Use Type 2 asbestos abatement procedures if appropriate or requested by NRCC's Representative.

.14 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the NRCC's operations.

.15 Transport asbestos contaminated waste to landfill licensed by Ontario Ministry of the Environment.

.16 Co-operate with Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the NRCC.

3.5 Application of Post Removal Sealant

.1 Obtain Asbestos Abatement Consultant's written permission to proceed.

.2 Apply one coat of Post Removal Sealant with an airless sprayer, in accordance with Manufacturer's Instructions, to cover all surfaces on all items in the Asbestos Work Area, including but not limited to polyethylene, ACM substrate, structural steel, and surfaces scheduled for demolition:

.1 Do not apply post removal sealant to materials that will be damaged by its application.

.3 Notify Asbestos Abatement Consultant at least 48 hours prior to the need for Milestone Inspection E (Air Monitoring Clearance). Obtain written approval of this Milestone Inspection before proceeding.

3.6 Air Clearance Monitoring

.1 Site must be dry prior to Air Clearance Monitoring.

.2 The number of Air Clearance Monitoring samples will be as follows:

.1 2 samples for less than 10 square metres.

.2 3 samples for 10 to 500 square metres.

.3 5 samples for more than 500 square metres.

.3 Restrict access to Asbestos Work Area and operate negative air units for a 12 hour period prior to Milestone Inspection E.

.4 The HEPA filtered negative pressure machines shall be in operation during clearance air monitoring.

.5 In the presence of the Asbestos Abatement Consultant, immediately prior to air clearance monitoring, use a leaf blower to dislodge loose fibre:

.1 Direct leaf blower against walls, ceilings, floors, and other surfaces.

.2 Perform this for at least five minutes per 1,000 sq. ft. of Asbestos Work Area.

.6 PCM samples will be collected as per Air Monitoring Section.

3.7 Asbestos Work Area Dismantling

.1 Use Type 2 worker precautions during dismantling.

.2 Operate negative air units during dismantling.

.3 Polyethylene, tape, cleaning material, etc. to be treated as asbestos waste.

.4 Wash remaining equipment and tools used in contaminated Asbestos Work Area to remove all asbestos contamination, or place in Asbestos Waste Containers prior to being removed from Asbestos Work Area.

.5 Clean Asbestos Work Area, Equipment and Access area, washing/Showering Room.

.6 Remove polyethylene sheeting as follows:

.1 Remove asbestos contaminated Polyethylene by carefully rolling away from walls to centre of Asbestos Work Area.

.2 Remove visible fibres or residue found during removal of polyethylene using a HEPA vacuum.

.3 Remove polyethylene protection and hoarding walls.

.7 Remove remaining polyethylene sheeting, tape and seals.

.8 Remove water hoses and shut off at source.

.9 Remove Signs, Hoarding Walls, Decontamination Facilities, Equipment Enclosures, Tunnels, Platforms.

.10 Seal vacuum hoses and fittings, flexible ductwork and all tools used in contaminated work site in 6 mil polyethylene bags prior to removal from Work Area.

.11 Remove temporary lights.

.12 Remove negative air unit prefilters. Dispose of as asbestos contaminated waste.

.13 Remove HEPA filtered negative pressure machines and discharge ducting.

.14 Immediately upon shutting down negative air units, seal air inlet grill and exhaust vent with polyethylene and tape.

3.8 Re-Establishment of Items

.1 Upon completion of work:

.1 Remove and disconnect Ground fault Panel, tags and locks from electrical panels and re-energize equipment and items.

.2 Remove hose bibs installed and repair pipe.

.3 Remove negative air discharge panel and reinstall glazing to match existing.

.4 Clean, mop and vacuum Asbestos Work Area and area beneath any Decontamination Facilities.

End of Section 02 82 12

PART 1 GENERAL

1.1 General and Related Work

.1 Read this section in conjunction with all other sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.

.2 Related Work Specified Elsewhere:

Division 2,	Section 02 41 46	Demolition
Division 13,	Section 02 61 33	Hazardous Materials
Division 13,	Section 02 82 10	Asbestos Abatement - Type 1
Division 13,	Section 02 82 12	Asbestos Abatement - Type 3
Division 13,	Section 02 84 10	Mercury and PCB Packaging and Disposal

.3 The site conditions identify the location and condition of all known friable asbestos-containing materials (ACM) to be disturbed by the work of this section. The specification fulfils the requirements of the report required by Ontario Regulation 278/05.

.4 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal or decontamination of all ACM included in work of this section and all materials which have been contaminated by ACM either during or prior to work of this section.

1.2 Site Conditions

.1 Refer to Section 02 61 33 Hazardous Materials.

1.3 Outline of Work

.1 Using Glove Bag procedures of this section, remove and dispose of asbestos-containing mechanical insulations in the basement Refer to drawing 1 of 3.

.2 In areas where it is more practical to remove and dispose of multiple sections of asbestos containing pipe insulation greater than 1 m^2, remove and dispose of asbestos-containing insulations as per Section 02 82 13 (Asbestos Abatement – Type 3)

1.4 Schedule

.1 All work is to be performed within the terms of the General Conditions.

1.5 Definitions

.1 Asbestos: Any of the fibrous silicates defined in Regulation 278/05 including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite.

.2 Asbestos Abatement Consultant: Owner's Representative providing inspection and air monitoring.

.3 Asbestos Abatement Contractor: Contractor or sub-contractor performing work of this section.

.4 Asbestos-Containing Material(s) (ACM): Material(s) identified under Site Conditions including debris, fallen material and settled dust.

.5 Asbestos Work Area: Area where work takes place which will, or may, disturb ACM.

.6 Authorized Visitors: Prime Contractor, Building Owner or Representatives, Asbestos Abatement Consultant, and persons representing regulatory agencies.

.7 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with Regulation 278/05 and the Occupational Health and Safety Act, and has knowledge of the potential or actual danger to health and safety in the work.

.8 DOP Testing (or HEPA Integrity Test): Testing performed on HEPA Filtered Negative Pressure Machines and HEPA vacuums using DOP or equivalent. Testing shall ensure that total penetration from the unit does not exceed 0.03%, or 99.97% efficient of airborne particulate removal. DOP Testing must be in compliance with ASME N510-1989 (1995) and must be performed using a Temporary Mixing Chamber with installed baffles to allow uniform mixing of challenge aerosol.

.9 Friable Material: means a material when dry can be crumbled, pulverized or powdered by hand pressure or is crumbled, pulverized or powdered.

.10 Fitting: Section of pipe other than straight uninterrupted sections including elbows, valves, tees, hangers, nipples, union or ends.

.11 Glove Bag: The glove bag shall be equipped with:

- .1 sleeves and gloves that are permanently sealed to the body of the bag to allow the worker to access and deal with the insulation and maintain a sealed enclosure throughout the work period,
- .2 valves or openings to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure,
- .3 a tool pouch with a drain,
- .4 a seamless bottom and a means of sealing off the lower portion of the bag, and
- .5 a high strength double throw zipper and removable straps, if the bag is to be moved during the removal operation.

.12 HEPA Filter: High Efficiency Particulate Arresting filter that is at least 99.97 percent efficient in collecting a 0.3 micrometre aerosol.

.13 PCM: Phase Contrast Microscopy.

.14 Polyethylene: Either polyethylene sheeting or rip-proof polyethylene sheeting (as specified) with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from damage, and to prevent escape of asbestos fibres through sheeting into Occupied Areas.

.15 Personnel: All contractors' employees, sub-contractors' employees, supervisors.

.16 Occupied Area: Any area of the building outside the Asbestos Work Area.

.17 Remove: Remove means remove and dispose of (as applicable type of waste) unless followed by other instruction (e.g. remove and turn over to Owner).

1.6 Submittals

.1 Submit prior to starting work:

.1 Ministry of Labour Notice of Project form.

.2 Copy of Certificate of Approval for disposal of asbestos waste and location of landfill.

.3 Pre-removal survey of damage in all areas where asbestos abatement will take place or waste will be transported.

.2 Submit the following information regarding personnel prior to starting work:

.1 Resumes of the supervisory personnel.

.2 Proof in the form of a certificate that supervisory personnel have attended a training course on asbestos removal (2 day minimum duration) or are certified as supervisors under the Ministry of Training, Colleges and Universities course 253S.

.3 WHMIS training certificates for all personnel.

.4 Written statement that personnel have had instruction on hazards of asbestos exposure, the use of respirator, protective clothing, worker and waste decontamination procedures, use of Glove Bags and all aspects of work procedures and protective measures.

.5 Certificate proving that each worker on site has been fit tested for the respirator appropriate for the work being performed.

.3 Prior to asbestos abatement, submit the following information regarding HEPA filtered devices:

.1 Performance data on HEPA filtered vacuums including DOP tests no more than 3 months old.

.2 DOP tests to be performed by an independent testing company:

.1 DOP testing company is required to submit a detailed technical report of testing protocol, including Introduction, Methodology, Results, Conclusions, and Recommendations, including results of the Air-Aerosol Mixing Uniformity test as per ASME N510-1989 (1995).

.2 DOP testing company must also provide calibration certificates from an independent calibration firm or from the manufacturer of the testing equipment for both the aerosol photometer and the pressure gauge on the aerosol generator dated within 1 calendar year from the on-site testing date.

.3 DOP testing company must also provide the National Sanitation Foundation (NSF) certification name and number of the on-site technician performing the testing.

.4 Submit the following prior to isolating the work area:

.1 Material Safety Data Sheets for chemicals or material used in the course of the Asbestos Abatement Project.

.2 Glove Bag manufacturer's product information.

.5 Submit the following upon completion of the work:

.1 Manifests, waybills, bills of ladings etc. as applicable for each type of waste.

1.7 Regulations

.1 Comply with Federal, provincial, and local requirements, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirements shall apply. Work shall be performed under regulations in effect at the time work is performed. Regulations include but are not limited to the following:

.1 Ministry of Labour Occupational Health and Safety Act Regulations for Construction Projects including Revised Statutes of Ontario 1990, Chapter 0.1 and Ontario Regulation 278/05.

.2 Ministry of Transportation Regulations for the transport of asbestos waste, including the Transportation of Dangerous Goods Act.

.3 Ministry of Environment Regulations for the disposal of asbestos waste, including R.R.O. 1990, Reg. 347 as amended.

1.8 Supervision

.1 Provide on site, a supervisor, with authority to oversee all aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.

.2 The supervisor must be on site at all times during work. Failure to comply with this requirement may result in a stoppage of work, at no cost to the NRCC.

.3 Provide a minimum of one supervisor for every 10 workers.

.4 Replace supervisory personnel, with approved replacements, within 3 working days of a written request from the Asbestos Abatement Consultant. Asbestos Abatement Consultant reserves the right to request replacement of supervisory personnel without explanation.

.5 Do not replace supervisory personnel without written approval from the Asbestos Abatement Consultant.

1.9 Quality Assurance

.1 Ensure the removal and handling of ACM or asbestos contaminated materials is performed by persons experienced in the methods, procedures and industry practices of asbestos abatement.

.2 Complete work so that at no time airborne asbestos, visible solid residue, or water runoff contaminates areas outside Asbestos Work Area. Asbestos Abatement Consultant is empowered to order a shutdown of work when a leak has occurred or is likely to occur. Cost of additional work by Asbestos Abatement Contractor and/or Asbestos Abatement Consultant to rectify unsatisfactory conditions shall be charged to the Asbestos Abatement Contractor.

.3 Perform all work involving other trades such as electrical, mechanical, carpentry, glazing etc. using licensed persons experienced and qualified for the work required.

.4 The Asbestos Abatement Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs required for the Work in accordance with the applicable construction safety legislation, other regulations or general construction practice. The Asbestos Abatement Consultant will not be responsible for or have control or charge over

the acts or omissions of the Asbestos Abatement Contractor, his Subcontractors or their agents, employees or other persons performing any of the Work.

1.10 Notification

.1 As more than 1 square metre of insulation will be removed during work of this section, before commencing work, notify orally and in writing, an inspector at the office of the Ontario Ministry of Labour nearest the project site.

.2 Notify Sanitary Landfill site as per Ontario Regulation 347 as amended.

.3 Inform all sub trades of the presence of ACM identified in the contract documents.

.4 Notify the NRCC or Pinchin Ltd., the Joint Occupational Health and Safety Committee and the Ontario Ministry of Labour, as required by Regulation 278/05, if suspected asbestos containing materials not identified in the contract documents are discovered during the course of the work. Stop work in these areas immediately.

1.11 Insurance

.1 Maintain a Commercial General Liability Policy with an insurance company acceptable to Pinchin Ltd. and the NRCC. The intent of this policy is to hold Pinchin Ltd. and the NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period.

.2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to Pinchin Ltd. and the NRCC. The intent of these policies is to hold Pinchin Ltd. and the NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.

.3 Maintain a Pollution Liability Policy (or asbestos liability policy or specific coverage under the CGL for asbestos abatement) with an insurance company acceptable to Pinchin Ltd. and the NRCC. The intent of this policy is to hold Pinchin Ltd. and the NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an "occurrence" basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period. Without limiting the generality of the foregoing, the policy shall insure the operations of asbestos abatement and shall not contain any environmental and/or health hazard exclusions relating to remediation operations including asbestos abatement.

.4 Forward all certificates to Pinchin Ltd. and the NRCC before work is commenced, showing Pinchin Ltd and the NRCC as additional insured as their interest may appear.

.5 The NRCC may request a certified true copy of the policies.

.6 The limits will not be less than:

.1	Commercial General Liability	$5,000,000.00
.2	Automobile	$2,000,000.00
.3	Pollution Policy (Asbestos Liability)	$5,000,000.00

1.12 Instruction and Training

.1 Provide instruction and training to all workers including the following:

- .1 Hazards of asbestos.
- .2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during abatement work, including:
  - .1 Limitations of equipment.
  - .2 Inspection and maintenance of equipment.
  - .3 Proper fitting of equipment.
  - .4 Disinfecting and cleaning of equipment.
- .3 Personal hygiene to be observed when performing the work.
- .4 The measures and procedures prescribed by this section including use of specific glove bag and decontamination of the worker.
- .5 Instruction and training must be provided by a competent person.

1.13 Personal Protection

.1 Protect all personnel at all times when possibility of disturbance of ACM exists.

.2 Provide workers, at a minimum, with non-powered half-face respirators with P100 high efficiency (HEPA) cartridge filters.

.3 Respirators shall be:

- .1 Certified by the National Institute of Occupational Safety and Health (NIOSH) or other testing agency acceptable to the Ministry of Labour.
- .2 Fitted so that there is an effective seal between the respirator and the worker's face. Ensure that no person required to enter an Asbestos Work Area has facial hair which affects the seal between respirator and face.

.3 Assigned to a worker for their exclusive use.

.4 Maintained in accordance with manufacturer's specifications.

.5 Cleaned, disinfected and inspected by a competent person after use on each shift, or more often if required.

.6 Repaired or have damaged or deteriorated parts replaced.

.7 Stored in a clean and sanitary location.

.8 Provided with new filters as necessary, according to manufacturer's instructions.

.9 Worn by personnel who have been fit checked by qualitative or quantitative fit-testing. Instruction must be provided by a competent person as defined by the Occupational Health and Safety Act.

.4 Provide protective clothing, to all personnel which:

.1 Is made of a material that does not readily retain nor permit penetration of asbestos fibres.

.2 Consists of head covering and full body covering that fits snugly at the ankles, wrists and neck.

.3 Is replaced or repaired if torn or ripped.

.5 Decontaminate protective clothing by using a HEPA Vacuum, or by damp wiping prior to leaving the Asbestos Work Area.

.1 Disposed of as asbestos waste.

.6 Wear hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

.7 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Asbestos Work Area:

.1 Ensure workers wash hands and face when leaving Asbestos Work Area.

.8 Prohibit smoking, eating, drinking, chewing in the Asbestos Work Area.

1.14 Authorized Visitor Protection

.1 Provide clean protective clothing and equipment, to Authorized Visitors.

.2 Ensure Authorized Visitors have received required training prior to granting entry into Asbestos Work Area.

1.15 Air Monitoring

.1 Air monitoring will be performed following the National Institute for Occupational Safety and Health method 7400, Asbestos and other fibres by PCM (Phase Contrast Microscopy).

.2 Co-operate with the Asbestos Abatement Consultant in collection of air samples. Asbestos Abatement Contractor to exercise care with Asbestos Abatement Consultant's equipment. The NRCC reserves the right to back-charge the Asbestos Abatement Contractor for further collection of samples damaged by tampering or abuse. In addition, the Asbestos Abatement Contractor will be responsible for the cost of testing equipment repairs resulting from the actions of the Asbestos Abatement Contractor's forces.

.3 Results of air monitoring of 0.01 fibres per millilitre of air (fibre/mL) or greater, outside of Asbestos Work Area, will indicate asbestos contamination of these areas and result in the following actions:

.1 Suspend Work within the adjoining Asbestos Work Area until written authorization to resume Work has been received from the Asbestos Abatement Consultant.

.2 Isolate and clean area in the same manner applicable to the Asbestos Work Area.

.3 Maintain Work area isolation, and repeat clean-up operations until visual inspection and air monitoring results are at a level equal to that specified.

.4 Cost of additional inspection and sampling performed as a result of elevated fibre levels may be charged to the Asbestos Abatement Contractor at the NRCC’s discretion.

1.16 Inspection

.1 From commencement of work until completion of clean-up operations, the Asbestos Abatement Consultant may be present periodically on site both inside and outside the Asbestos Work Area. The following milestone Inspection may take place at the NRCC’s cost:

.1 Milestone Inspection D - Visual Clearance

.1 Inspection of Asbestos Work Area after removal of all asbestos.

.2 Do not proceed with next phase of Work until written approval of each milestone is received from the Asbestos Abatement Consultant.

.3 In addition to the Milestone Inspections, inspection of the Asbestos Work Area may be performed to confirm the Asbestos Abatement Contractor's compliance with the

requirements of the contract documents and governing authorities. Any deviations from these requirements that have not been approved in writing, may result in a stoppage of work, at no additional cost to the NRCC.

.4 The Asbestos Abatement Consultant is empowered by the NRCC to inspect for final cleanliness at completion. Additional labour or materials expended by the Asbestos Abatement Contractor to provide satisfactory performance to the level specified shall be at no additional cost.

.5 Inspection and air monitoring performed as a result of Asbestos Abatement Contractor's failure to perform satisfactorily regarding quality, safety, or schedule may be charged to the Asbestos Abatement Contractor at the NRCC's discretion.

PART 2 PRODUCTS

2.1 Materials and Equipment

.1 All materials and equipment brought to work site must be in good condition and free of asbestos, asbestos debris, and fibrous materials.

.2 Amended Water: Water with wetting agent added for purpose of reducing surface tension to allow thorough wetting of ACM.

.3 Asbestos Waste Container: An impermeable container acceptable to disposal site and Ministry of the Environment comprised of one of the following:

.1 A sealed glove bag, inside a second 6 mil (0.15 mm) sealed polyethylene bag.

.2 Labelled containers as required by the Ontario Ministry of the Environment Reg. 347 as amended and Regulation 278/05.

.4 HEPA Vacuum: High Efficiency Particulate Arresting (HEPA) filtered vacuum equipment with a filter system capable of collecting and retaining spherical particles greater than 0.3 microns at 99.97% efficiency.

.5 Knife: Knife with fully retractable blade for use inside Glove Bag.

.6 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified in sheet size to minimize joints. New materials only.

.7 Post Removal Sealant (or Lockdown): Sealant that when applied to surfaces serves the function of trapping residual asbestos fibres or other dust. Product must have flame spread and smoke development ratings both less than 50. Product shall leave no stain when dry. Post Removal Sealant shall be compatible with replacement insulation or fireproofing where required and capable of withstanding service temperature of substrate. Apply to manufacturer's instructions.

.8 Protective Clothing: Disposable full body coveralls complete with hoods manufactured of a material which does not permit penetration of asbestos fibres. Coveralls to fit snugly at ankles, wrists and neck.

.9 Rip-Proof Polyethylene Sheeting: Minimum requirements 8 mil (0.20 mm) fabric made up from 5 mil (0.13 mm) weave and 2 layers of 1.5 mil (0.05 mm) poly laminate or approved equal. In sheet size to minimize on-site seams and overlaps. New materials only.

.10 Securing Straps: For some types of Glove Bag, reusable nylon straps at least 1" wide with metal tightening buckle for sealing ends of bags around pipe and/or insulation.

.11 Sprayer: Garden type portable manual sprayer or water hose with spray attachment if suitable.

.12 Tape: Duct tape or tape suitable for sealing polyethylene to surfaces under both dry and wet conditions in the presence of Amended Water.

.13 Wetting Agent: Non-sudsing surfactant added to water to reduce surface tension and increase wetting ability.

2.2 Signage

.1 Work Area Signs: Post signs in both official languages at access points to the Asbestos Work Area and on barriers and caution tape as follows:

.1 CAUTION.

.2 Asbestos Dust Hazard Area.

.3 Unauthorized Entry Prohibited.

.4 Wear Assigned Protective Equipment.

.5 Breathing Asbestos Dust May Cause Serious Bodily Harm.

.2 Vehicles, Bins and Asbestos Waste Containers: Post signs on both sides of every vehicle used for the transportation of asbestos waste and on every asbestos waste container. Signs must display thereon in large, easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than ten centimetres in height and the words:

.1 CONTAINS ASBESTOS FIBRES

.2 Avoid Creating Dust and Spillage

.3 Asbestos May be Harmful to Your Health

.4 Wear Approved Protective Equipment.

.3 Place placards in accordance with Transportation of Dangerous Goods Act.

PART 3 EXECUTION

3.1 Site Preparation

.1 Perform pre-removal damage survey and submit to Asbestos Abatement Consultant.

.2 Remove stored or non-fixed items from the Asbestos Work Area including but not limited to equipment, furniture, waste etc. Store in area provided by NRCC.

.3 Moving of equipment, tools, supplies, and stored materials that can be performed without disturbing ACM will be performed by others.

.4 Post Notice of Project.

.5 Remove visible dust and friable material from all surfaces in the work area including those to be worked on, using HEPA Vacuums or wet wiping using Type 2 Procedures as required by O. Reg. 278/05.

.6 Shut down HVAC systems serving the Asbestos Work Area.

.1 Install polyethylene sheeting over openings in ducts and at diffusers and seal.

.2 System shall remain inoperative until completion of work, unless ducts can be effectively capped.

.3 Perform work at scheduled times after shutting down HVAC systems affecting the Asbestos Work Area.

.7 Provide Amended Water for wetting ACM, in garden sprayers. Provide one garden sprayer for each worker.

.8 Do not used compressed air to clean or remove and dust or debris when completing work of this section.

.9 Cover walls, floors, finishes, millwork, equipment and furnishings below the pipe to be worked on in the Asbestos Work Area with polyethylene drop sheets before disturbing ACM. Drop sheets shall extend a minimum of 6‘ from pipe.

.10 Install barricades, fencing, walls or other suitable means, around Asbestos Work Area where existing walls are not present to isolate Asbestos work Area from the workplace.

.11 Install Signage in clearly visible locations and in sufficient numbers to adequately warn of an asbestos dust hazard.

.12 Use existing lighting or install temporary lighting to a level that will provide for safe and efficient use of work area - minimum 550 LUX.

.13 Place HEPA Vacuum in Asbestos Work Area for each worker.

.14 Place required tools to complete the abatement within the Asbestos Work Area.

3.2 Maintenance of Asbestos Work Area

.1 Inspect electrical panels and ensure locks and tags are on panels prior to entering the Asbestos Work Area.

.2 Maintain Asbestos Work Area in tidy condition.

3.3 Glove Bag Removal

.1 Do not use Glove Bags on hot pipes that may damage Glove Bag. Refer to manufacturers limitations.

.2 Prior to use of Glove Bag on damaged or unjacketed insulation:

.1 Spray any areas of damaged insulation jacketing with mist of Amended Water.

.2 Tape over damaged insulation to provide temporary repair.

.3 Mist areas of insulation with no jacketing and wrap with polyethylene sheeting and seal with tape.

.3 Place any tools necessary to remove insulation in tool pouch built into Glove Bag.

.4 Inspect the Glove Bag for damage and defects:

.1 Immediately before it is attached to the pipe or, duct, or other.

.2 At regular intervals during its use.

.3 If damage or defects are observed prior to use of the Glove Bag, dispose of Glove Bag.

.4 If damage or defects are observed during the use of the Glove Bag, which cannot be readily repaired with tape and not affect the integrity or strength of the glove bag:

.1 Discontinue use of Glove Bag.

.2 Wash inner surface of Glove Bag.

.3 Wet insulation.

.4 Insert nozzle of HEPA Vacuum into bag through valve and evacuate air from bag.

.5 Seal valve cover on valve Glove Bags.

.6 Pull an Asbestos Waste Container over Glove Bag before removing from pipe. Remove securing straps. Unfasten zipper.

.7 Remove Glove Bag and seal with tape.

.8 Seal the Asbestos Waste Container with tape.

.9 Place in a second Asbestos Waste Container and seal with tape.

.10 Clean immediate area with a HEPA Vacuum prior to resuming work.

.5 Install Glove Bag as per manufacturer's instructions.

.6 Remove metal jacketing or banding carefully. Do not damage the Glove Bag.

.7 Remove insulation from pipe as per manufacturer's directions:

.1 Volume and weight of insulation must not exceed capacity of the Glove Bag or supports.

.2 Arrange insulation in the Glove Bag to maximize use of the Glove Bag.

.8 Only glove bags designed to be moved may be re-used on other sections of pipe or moved down same section of pipe (e.g. Safe-T-Strip).

.9 If bag is to be moved along pipe for use on adjacent section of insulation:

.1 Wash inner surface of Glove Bag.

.2 Wash tools and place tools in pouch.

.3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.

.4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.

.5 Seal closure strip.

.6 Loosen securing straps to maintain a loose seal of Glove Bag to insulation or pipe.

.7 Use double throw zipper as necessary to pass hangers.

.8 Tighten straps once bag is in new position and continue insulation removal until Glove Bag is full, work is completed on the pipe or an obstruction prevents further movement of the bag.

.10 If bag is to be removed from a pipe for use on a new section of pipe, perform the following:

.1 Wash inner surface of Glove Bag.

.2 Wash tools and place tools in pouch.

.3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.

.4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.

.5 Seal valve cover on valve Glove Bags.

.6 Seal closure strip.

.7 Wash top section of Glove Bag and tool pouch thoroughly.

.8 Undo securing straps, unfasten zipper and carefully move bag to new section of pipe.

.11 To remove bag after completion of insulation removal operation:

.1 Wash inner surface of Glove Bag.

.2 Wash and place all tools in one hand (glove), pull hand out inverted, twist to create a separate pouch, tape inverted hand at two separate locations 25 mm apart so as to seal pouch:

.1 Remove inverted hand and tools by cutting between the two tape seals.

.2 Place inverted hand pouch and tools into the next clean Glove Bag to be used or into a water bucket, open pouch underwater and clean tools.

.3 Wet surface of insulation in lower section of bag and any exposed end of asbestos insulation remaining on pipe with Amended Water.

.4 Insert nozzle of HEPA filtered vacuum cleaner into bag through valve and evacuate air from bag.

.5 Seal valve cover on valve Glove Bags.

.6 Seal closure strip if equipped with one.

.7 Pull an Asbestos Waste Container over Glove Bag before removing from pipe. Undo securing straps. Unfasten zipper:

.1 Seal Glove Bag with tape.

.2 Seal Asbestos Waste Container with tape.

.8 Ensure pipe is clean of all residue after removal of Glove Bag. If necessary, after removal of each section of asbestos, vacuum all surfaces of pipe, using HEPA vacuum or wipe with wet cloth.

.12 Seal all surfaces of freshly-exposed pipe with Post Removal Sealer. Cover exposed ends of any remaining asbestos insulation with canvas and lagging using Type 2 Procedures.

3.4 Waste and Material Handling

.1 Waste bins must be placed on grade or in receiving.

.2 All bins must be locked and covered when waste transfer is not being performed.

.3 As work progresses, and at regular intervals, transport the sealed and labelled Asbestos Waste Containers from the Asbestos Work Area to asbestos waste bin.

.4 Transport waste and materials via the predetermined routes and exits. Arrange waste transfer route with NRCC. Use a closed, covered cart to transport through Occupied Areas.

.5 Limit transportation of waste and materials through Occupied Areas of the building to Quiet Hours.

.6 Provide workers transporting waste with means to access full personal protective equipment and all tools required to properly clean up spilled ACM in the case of a rupture of an Asbestos Waste Container.

.7 Pick-up and drop off of garbage bin shall be at pre-approved times, and must not interfere with the NRCC's operations.

.8 Removal of waste containers and decontaminated tools and materials from the Asbestos Work Area shall be performed as follows:

.1 Remove any visible contamination from the surface of the non-porous or sealable item being removed from the Asbestos Work Area. If the item can be cleaned, remove it from the site. If it cannot be cleaned thoroughly, place it in an Asbestos Waste Container.

.2 Place waste or item in Asbestos Waste Container and seal closed.

.3 Wet wipe outside of Asbestos Waste Container.

.4 At entrance to Asbestos Work Area, place in second Asbestos Waste Container. Seal closed.

.5 Remove the item from the Asbestos Work Area.

.9 Transport asbestos contaminated waste to landfill licensed by Ontario Ministry of the Environment.

.10 Co-operate with Ministry of the Environment inspectors and immediately carry out instructions for remedial work at dump to maintain environment, at no additional cost to the NRCC.

3.5 Clean-Up and Dismantling

.1 Notify Asbestos Abatement Consultant at least 24 hours prior to the need for Milestone Inspection D (Visual Clearance). Obtain written approval for this Milestone Inspection before proceeding.

.2 Remove barricades, fencing, caution tape, signs, etc.

.3 Seal openings in HEPA vacuums.

.4 Do not empty HEPA vacuums on site unless a Type 2 Enclosure is constructed.

.5 Remove equipment and tools.

.6 Remove temporary lighting if used.

.7 Remove polyethylene seals from HVAC systems.

.8 Place polyethylene sheeting, drop sheets, seals, tape, clothing and other contaminated waste in asbestos waste containers, wet wipe and place in second asbestos waste container.

.9 Clean Asbestos Work Area with HEPA vacuums or wet wiping/mopping.

3.6 Re-Establishment of Items

.1 Upon completion of work:

.1 Move all items that were removed from Asbestos Work Area prior to work, back into same location within Asbestos Work Area.

.2 Clean and vacuum Asbestos Work Area.

End of Section 02 82 13

PART 1 GENERAL

1.1 General and Related Work

.1 Read this section in conjunction with all other sections so as to comply with the requirements of Division 1 and the General Conditions of the Contract.

.2 Related Work Specified Elsewhere:

Division 2,	Section 02 41 46	Demolition
Division 13,	Section 02 61 33	Hazardous Materials
Division 13	Section 02 82 10	Asbestos Abatement – Type 1
Division 13,	Section 02 82 12	Asbestos Abatement –Type 3
Division 13,	Section 02 82 13	Asbestos Abatement – Glove Bag

.3 Unless otherwise shown or specified it is the intent that work performed as per this section will result in the removal and disposal of PCB-containing ballasts and removal and recycling of mercury containing materials.

1.2 Site Conditions

.1 Fluorescent light ballasts within the scope of the project are assumed to contain PCBs.

.2 Mercury vapour is present in fluorescent lamps throughout the building.

.3 Thermostats and switches contain liquid mercury throughout the project work areas.

1.3 Outline of Work

.1 Throughout the project ground floor project area, remove the following:

.1 Lenses at light fixtures.

.2 Fluorescent lamps and bulbs.

.3 Mercury vapour lamps.

.4 Mercury containing thermostats.

.5 Light fixtures.

.6 Ballasts.

.2 Identify ballasts as either non-PCB or PCB containing.

.3 Recycle or dispose of non-PCB ballasts.

.4 Package PCB-containing ballasts.

.5 Package and recycle mercury containing lamps and bulbs.

.6 Remove mercury-containing thermostats.

.7 Transport packaged mercury waste to a MOE (Ministry of the Environment) approved recycling facility and recycle. Contractor to assume all costs incurred including recycling, transport, permits, approvals and record keeping.

.8 Transport packaged PCB waste to a MOE (Ministry of the Environment) approved incineration facility and destroy. Contractor to assume all costs incurred including destruction, transport, permits, approvals and record keeping.

1.4 Work Hours

.1 All work is to be performed within the terms of the General Conditions.

1.5 Definitions

.1 Competent Worker: A worker who is qualified because of knowledge, training and experience to perform the work, is familiar with the Occupational Health and Safety Act and Environmental Protection Act, has knowledge of the potential or actual danger to health and safety in the work.

.2 Mercury Waste: Equipment, materials or items containing mercury or contaminated with mercury.

.3 Polyethylene: Either polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from damage.

.4 PCBs: Monochlorinated or Polychlorinated Biphenyls (or any mixture of both).

.5 PCB Material: Means material containing PCBs at a concentration of more than fifty milligrams per kilogram or 50 parts per million, whether the material is liquid or not.

.6 PCB Waste: PCB Equipment, PCB Material, PCB Liquids and materials or items contaminated with PCBs.

.7 Personnel: All contractors' employees, sub-contractors employees, supervisors.

.8 Work Area: Area of building from which PCB or mercury-containing items are being removed.

1.6 Submittals

.1 Prior to starting work, the Contractor performing work of this section shall submit:

.1 Workplace Safety and Insurance Board Clearance Certificate.

.2 Insurance certificates.

.3 Certificate of Approval for transportation of mercury waste and location of recycling facility.

.4 Certificate of Approval for transportation of PCB waste and location of destruction facility.

.5 Material Safety Data Sheets for chemicals or material used in the course of the PCB and Mercury Abatement Project.

.2 Prior to starting work, submit the following information regarding personnel:

.1 WHMIS training certificates for all personnel.

.3 Submit the following upon completion of the work:

.1 Manifests, bills of lading, certificate of destruction/recycling etc. as applicable for each type of waste.

1.7 Regulations

.1 Perform work in accordance with current applicable environmental and occupational health regulations and codes including but not limited to:

.1 PCB Regulations, SOR 2008-273.

.2 Regulation 347 as amended.

.3 Regulation 490/09 Designated Substances.

.4 Transportation of Dangerous Goods Act.

1.8 Supervision

.1 Provide a supervisor, with authority to oversee aspects of the work, including but not limited to, health and safety, methods, scheduling, labour and equipment requirements.

.2 A minimum of one supervisor for every 10 workers is required.

.3 Replace supervisory personnel, with approved replacements, within 3 working days of a written request.

1.9 Quality Assurance

.1 Ensure the removal and handling of PCBs and mercury is performed by persons experienced in the methods, procedures and industry practices.

.2 Complete work so that at no time do PCBs or mercury contaminate the building or environment.

1.10 Insurance

.1 Maintain a Comprehensive General Liability Policy with an insurance company acceptable to NRCC. The intent of this policy is to hold NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Commercial General Liability insurance shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period, even though a claim may not be presented for many years.

.2 Maintain an Automobile or Fleet Policy, and Non-owned Automobile Policy with an insurance company acceptable to NRCC. The intent of these policies is to hold Pinchin Ltd. and the NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract.

.3 Maintain a Pollution Liability Policy with an insurance company acceptable to NRCC. The intent of this policy is to hold NRCC harmless as it relates to claims for Bodily Injury or Property Damage or both, relating to the contract. Pollution Liability shall be provided on an “occurrence” basis to cover injury or damage (whether detected or not during the policy period) which happens during the policy period, even though a claim may not be presented for many years. Without limiting the generality of the foregoing, the policy shall insure the operations of the work and shall not contain any environmental and/or health hazard exclusions relating to remediation operations.

.4 All certificates must be forwarded to NRCC before work is commenced, showing NRCC as additional insured as their interest may appear.

.5 NRCC may request a certified true copy of the policies if he deems it necessary.

.6 The limits will not be less than:

.1	Commercial General Liability	$5,000,000.00
.2	Automobile	$2,000,000.00
.3	Pollution Policy	$5,000,000.00

1.11 Instruction and Training

.1 Instruction and training must be provided to all workers and supervisors. Instruction and training includes the following:

.1 Hazards of PCBs and mercury.

.2 Use, care and disposal of protective equipment (including but not limited to respirators and filters) and clothing that would be used and worn during work, including:

.1 Limitations of equipment.

.2 Inspection and maintenance of equipment.

.3 Proper fitting of equipment.

.4 Disinfecting and cleaning of equipment.

.3 Personal hygiene to be observed when performing the work.

.4 The measures and procedures prescribed by this section.

.5 Instruction and training must be provided by a competent, qualified person.

1.12 Personal Protection

.1 During work involving PCBs, personnel are to wear the following personal protective equipment:

.1 Gloves.

.2 Provide soap, towels and facilities for washing of hands and face, which shall be used by all personnel when leaving the Work Area.

.3 Prohibit smoking, eating, drinking, chewing in the Work Area.

.4 Use hard hats, safety shoes and other personal protective equipment required by applicable construction safety regulations.

.5 PCB's ballasts do not present an inhalation hazard when handled. In the event of a fire or other heating of PCB Equipment, Material, Waste or Liquid, immediately vacate the area. Air purifying filter respirators DO NOT provide protection against PCB vapours.

.6 In the event of PCB ingestion, obtain medical assistance immediately.

.7 Do not break lamps or bulbs.

PART 2 PRODUCTS

2.1 Materials

.1 Apron: Full body neoprene apron.

.2 Containment Drums: new, not used double bung 45 gallon No. 16 gauge cold rolled steel drums with removable steel lid, PCB resistant gasket, and 12 gauge compression type ring closure with 5/8" bolt and forged lug. Drums shall be newly painted inside and out with bright white rust-resistant enamel.

.3 Drum liners: clear polyethylene bag, 36" x 60", 6 mil thick. Open one 36" end.

.4 Gloves: Elbow length, of PCB resistant material (neoprene) and in good condition.

.5 Label: Mercury and PCB warning labels.

.6 Lamp Storage Container: Cardboard box that lamps were originally packaged within, or plastic tote for recycling lamps. Intent is to package lamps so that they are not broken during shipping. Container to be designed for lamps of that size.

.7 Polyethylene Sheeting: 6 mil (0.15 mm) minimum thickness unless otherwise specified, in sheet size to minimize joints. New materials only.

PART 3 EXECUTION

3.1 Packaging

.1 Do not contaminate building surfaces with PCB-containing oil, tar, mercury, etc.

.2 Notify Owner's Representative of any spills immediately:

.1 Any spills of PCBs or mercury are to be cleaned to the satisfaction of the Owner's Representative at the contractors cost.

.3 Prior to removing any fixtures, conduit, bx cable etc., isolate, at panel, and disconnect existing power supply to electrical equipment. Power supply to remaining areas of building must not be disrupted during work of this section.

.1 Lock-out/tag-out power at electrical panels.

.2 Mark/tag any items within or passing through the Work Area that are to remain live including but not limited to cable, conduit, wire, fixtures, equipment panels, etc. as required.

.4 Remove bx cable, conduit and wire from lights back to junction box.

.5 Install polyethylene drop sheets in packaging area to protect surfaces and finishes.

.6 Remove and package mercury containing components for recycling. Do not drain mercury.

.7 Package lamps in lamp storage containers. Do not break lamps.

.1 Affix label.

.8 Place PCB waste including on polyethylene drop sheets immediately after removal.

.9 Avoid rough handling of PCB ballasts. Do not drop or throw into drum.

.10 Place ballasts and capacitors on end in Containment Drum. When full:

.1 Seal liner bag with duct tape.

.2 Seal drum with lid, gasket and compression ring.

.3 Affix specified and completed label.

.4 Do not leave liner bags or drums open overnight.

.11 As filled drums accumulate, transfer to temporary storage area.

.12 Temporary storage facility to be a fully enclosed block wall room within the building complete with appropriate warning signs.

.13 Remove contaminated material, including gloves, aprons, rags, hoses, solvents, protective coveralls, polyethylene, etc. and package as per the above.

3.2 Transportation and Reporting

.1 Transport materials following Transportation of Dangerous Goods Act:

.1 Transport Mercury Materials and Waste to approved site for recycling, including mercury vapour in lamps and thermostats, and ensure materials are recycled.

.2 Transport PCBs to approved incineration site for destruction and ensure materials are destroyed.

.2 The facility used to process and recycle the mercury shall be approved by the Ministry of the Environment, or local jurisdictional authority, and shall have valid Certificates of Approval to carry out the work outlined herein:

.1 The facility must issue a Certificate of Recycling identifying types and quantities of materials generated from the project. The facility must also provide a Certificate of Recycling for the mercury generated from the project.

.1 Any elemental mercury drained from its container is to be identified by a manifest. All remaining mercury-containing materials must be identified on a bill of lading.

.3 The facility used to process the PCBs shall be approved by the Ministry of the Environment, and shall have valid Certificates of Approval to carry out the work outlined herein:

.1 The facility must issue a Certificate of Destruction identifying types and quantities of PCBs generated from the project.

.4 A typed and signed transfer document for each transfer of PCBs or mercury is to be submitted to Owner's representative, giving following:

.1 Number of drums or boxes.

.2 Contents including approximate quantities.

.3 Approximate net weight of contents.

.4 Dates removal begun and completed (for each lot).

.5 Date drums transferred.

.5 Submit certificate(s) of destruction, certificate of recycling (as applicable) and waste manifests or bills of lading from **all** transfer points. Submit the above for waste **regardless** of single transport or as blended waste.

3.3 Fire and Explosion Response

.1 PCB liquids are relatively non-flammable. However, if exposed to flame or hot surfaces, a higher vapour concentration will result. At high temperatures PCBs may decompose and chemically rearrange to produce highly toxic gases, vapours, and soot.

.2 In the event of a fire involving PCBs, immediately stop work and report to the local Fire Marshall and Fire Department. Report specifically the presence of PCBs. The necessity to rapidly report the fire overrides any decontamination procedures.

.3 Cause all workers to evacuate the site. When leaving, shut down all water in use. Only personnel trained in use of, and wearing SCBA apparatus, will be allowed to re-enter site.

.4 Do not return to site until Owner's Representative and Ontario Ministry of the Environment representatives have declared the area for re-entry.

3.4 Broken Lamps

.1 If lamps are broken, clean-up using a HEPA vacuum. If significant quantities are broken, repackage waste in containment drums, and empty HEPA vacuum into drum. Wear NIOSH approved ½ face respirators with appropriate filters if repackaging significant quantities of broken lamps.

3.5 Re-Establishment of Items

.1 Upon completion of work:

.1 Remove tags and locks from electrical panels and re-energize equipment and items.

.2 Clean, mop and vacuum the Work Area.

End of Section 02 84 10

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A 53/A 53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A 307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 CSA International

.1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.3 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.

.3 Green Seal Environmental Standards (GS)

.1 GS-11-2008, 2nd Edition, Paints and Coatings.

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

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, bolts and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS.

.3 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

.2 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.3 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

.3 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.4 Replace defective or damaged materials with new.

1.5 PRODUCTS

1.6 MATERIALS

.1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.

.2 Steel pipe: to ASTM A 53/A 53M standard weight black finish.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A 307.

.6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

1.7 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

1.8 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/mý to CAN/CSA-G164.

.2 Shop coat primer and finish.

1.9 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint:

.2 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.3 Concrete, mortar and masonry.

.4 Wood.

1.10 SHOP PAINTING

.1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

.3 Clean surfaces to be field welded; do not paint.

1.11 ANGLE LINTELS

.1 Steel angles: galvanized, prime painted, sizes indicated for openings. Provide 150 mm minimum bearing at ends.

.2 Weld or bolt back-to-back angles to profiles as indicated.

.3 Finish: shop painted.

.1 Primer: VOC limit 250 g/L maximum to GS-11 when applied onsite.

1.12 CORNER GUARDS

.1 Stainless steel angle: 51 x 51 x 1219 mm high, with 3 anchors each guard.

.2 Acceptable product: Canadian Builder’s Hardware CBH 450.

1.13 EXECUTION

1.14 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.

.2 Visually inspect substrate in presence of Departmental Representative.

.3 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

1.15 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

.7 Primer: maximum VOC limit 250 g/L to GS-11.

1.16 CORNER GUARDS

.1 Install corner guards in locations as indicated.

1.17 CLEANING

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Waste Management: separate waste materials for reuse and recycling.

1.18 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 08 52 00 Aluminum Windows.

1.2 REFERENCES

.1 CSA International

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
.2 CSA O121-08, Douglas Fir Plywood.
.3 CSA O141-05(R2009), Softwood Lumber.
.4 CSA O151-09, Canadian Softwood Plywood.
.5 CAN/CSA-O325.0-07, Construction Sheathing.
.6 CAN/CSA-Z809-08, Sustainable Forest Management.

.2 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.3 Green Seal Environmental Standards (GS)

.1 GS-11-11, Paints and Coatings.

.4 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2010.

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2011, Architectural Coatings.

.6 Sustainable Forestry Initiative (SFI)

.1 SFI-2010-2014 Standard.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for rough carpentry work and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

.3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

.3 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.4 Store and protect wood from nicks, scratches, and blemishes.

.5 Replace defective or damaged materials with new.

1.6 PRODUCTS

1.7 MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

- .1 CAN/CSA-O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 CAN/CSA-Z809 or FSC or SFI certified.

.2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:

- .1 S2S is acceptable for concealed locations.
- .2 Board sizes: "Standard" or better grade.
- .3 Dimension sizes: "Standard" light framing or better grade.
- .4 Post and timbers sizes: "Standard" or better grade.

.3 Panel Materials:

- .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .2 Urea-formaldehyde free.

.4 Wood Preservative:

.1 Surface-applied wood preservative: coloured, copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

1.8 ACCESSORIES

.1 Fasteners: to CAN/CSA-G164, for exterior work, pressure- preservative and treated lumber.

.2 Nails, spikes and staples: to CSA B111.

.3 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs recommended for purpose by manufacturer.

.5 Explosive actuated fastening devices are not allowed.

1.9 EXECUTION

1.10 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

1.11 PREPARATION

.1 Treat surfaces of material with wood preservative, before installation.

.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.

.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

.4 Treat material as follows:

.1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.

.2 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

1.12 INSTALLATION

.1 Comply with requirements of NBC, supplemented by the following paragraphs.

.2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.

.3 Align and plumb faces of furring and blocking to tolerance of 1:600.

.4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.

.6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.

.7 Install sleepers as indicated.

.8 Use caution when working with particle board. Use dust collectors and high quality respirator masks.

.9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.10 Countersink bolts where necessary to provide clearance for other work.

1.13 CLEANING

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI A208.2-09, Medium Density Fibreboard (MDF) for Interior Applications.

.2 ANSI/HPVA HP-1-2004, American National Standard for Hardwood and Decorative Plywood.

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

.1 Architectural Woodwork Quality Standards, 1st edition, 2009.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-11.3-M87, Hardboard.

.4 CSA International

.1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.

.2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA O121-08, Douglas Fir Plywood.

.4 CSA O141-05, Softwood Lumber.

.5 CSA O151-09, Canadian Softwood Plywood.

.6 CSA O153-M1980(R2008), Poplar Plywood.

.5 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1.

.3 FSC Accredited Certified Bodies.

.6 National Lumber Grades Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber 2008.

.7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for plywood, particleboard, OSB, MDF and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS.

.2 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

.2 Indicate details of construction, profiles, jointing, fastening and other related details.

.3 Indicate materials, thicknesses, finishes and hardware.

.3 Samples:

.1 Submit for review and acceptance of each unit.

.2 Samples will be returned for inclusion into work.

.3 Submit duplicate 300 x 300 mm samples of millwork panel materials and finishes.

1.3 QUALITY ASSURANCE

.1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).

.2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wood products from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Softwood lumber: S4S, moisture content 19% or less in accordance with following standards:

.1 CSA O141.

.2 CAN/CSA-Z809 or FSC or SFI certified.

.3 NLGA Standard Grading Rules for Canadian Lumber.

.4 AWMAC premium grade, moisture content as specified.

.5 Machine stress-rated lumber is acceptable.

.6 Hardwood lumber: moisture content 9 % or less in accordance with:

.1 National Hardwood Lumber Association (NHLA).

.2 AWMAC premium grade, moisture content as specified.

.2 Panel Material: urea-formaldehyde free

.1 FSC certified.

.2 Douglas fir plywood (DFP): to CSA O121, standard construction.

.3 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.4 Hardwood plywood: to ANSI/HPVA HP-1.

.5 Poplar plywood (PP): to CSA O153, standard construction.

.6 Particleboard: to ANSI A208.1.

.7 Hardboard: to CAN/CGSB-11.3.

.8 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/ m^3.

2.2 ACCESSORIES

.1 Nails and staples: to CSA B111; galvanized to ASTM A 123/A 123M for exterior work, interior humid areas and for treated lumber; stainless steel finish elsewhere.

.2 Wood screws: type and size to suit application.

.3 Splines: wood.

.4 Adhesive and Sealants: in accordance with Section 07 92 00 - Joint Sealants.

2.3 PLASTIC LAMINATE FINISHING

.1 Comply with NEMA LD3, Annex A.

.2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.3 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.4 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600 mm from sink cutouts.

.5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

.6 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.7 Apply laminated plastic liner sheet to interior of cabinetry.

2.4 WINDOW SILL

.1 Natural Quartz and Resin Composite window sill: Non-porous blend of natural quartz, 93 percent, and polyester resin, 7 percent, formed into flat slabs, self-supporting over structural members. Slab thickness 25mm, edge profile flat.

.1 Acceptable manufacture: Caesarstone Canada, and/or approved equal.

2.5 HARDWARE

.1 Acceptable manufacture: Richelieu Canada, and/or approved equal.

.1 Hinges; 120deg, full overlay, Richelieu #73T559180

.2 Shelf Standards and Shelf Support; Standard-16mm wide x 1.65mm thick, painted metal, slot adjustment. 11kg capacity shelf support.

.3 Door Pulls; Richelieu #54000140, chrome finish. 90mm center to center

.4 Drawer Slides: 3/4 extension, slide, 34kg capacity.

.5 Miscellaneous: door bumpers/pads, self-adhering, clear colour.

.6 Grab Bars: 1.2mm thick, 32mm stainless steel, peened grip.

.7 Hooks (1 in each accessible washroom stall): Richelieu #51128170AB, stainless steel

Part 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood products installation in accordance with manufacturer's written instructions.

.2 Visually inspect substrate in presence of Departmental Representative.

.3 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Do finish carpentry to Quality Standards of (AWMAC), premium grade.

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

.3 Form joints to conceal shrinkage.

3.3 CONSTRUCTION

.1 Fastening:

.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.

.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.

.3 Shelving to cabinetwork to be adjustable unless otherwise noted.

.4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

.5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

.6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.7 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.8 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.

.9 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

.10 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

.11 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.12 Apply laminated plastic liner sheet to interior of cabinetry.

3.4 FINISHING

.1 Do finishing to wood veneer casework doors, drawer fronts, base cabinets to MPI interior painting systems. Shop finished spray applied.

.1 INT 6.4E Polyurethane finish, semi-gloss finish.

.2 Acceptable product; Minwax, or approved equal.

3.5 CLEANING

.1 Leave Work area clean at end of each day.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by finish carpentry installation.

.3

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 06 20 00 Finish Carpentry.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI 208.1-09, Particleboard.

.2 ASTM International

.1 ASTM D 2369-10e1, Standard Test Method for Volatile Content of Coatings.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.4 CSA International

.1 CSA O112.10-08, Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure).

.2 CSA O121-08, Douglas Fir Plywood.

.3 CSA O151-09, Canadian Softwood Plywood.

.4 CSA O153-M1980(R2008), Poplar Plywood.

.5 CAN/CSA-Z809-08, Sustainable Forest Management.

.5 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.6 Green Seal Environmental Standards (GS)

.1 GS-36-11, Commercial Adhesives.

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

.1 Material Safety Data Sheets (MSDS).

.8 National Electrical Manufacturers Association (NEMA)

.1 ANSI/NEMA LD-3-05, High Pressure Decorative Laminates (HPDL).

.9 Scientific Equipment and Furniture Association (SEFA)

.1 SEFA 8-99, Laboratory Furniture.

.10 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2011, Architectural Coatings.

.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.11 Sustainable Forestry Initiative (SFI)

.1 SFI-2010-2014 Standard.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for laminate, adhesive, and core material and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS. Indicate VOC's for adhesives in g/L.

.2 Samples:

.1 Submit for review and acceptance of each unit.

.2 Samples will be returned for inclusion into work.

.3 Submit duplicate samples, 300 mm x 300 mm of joints, edging, cutouts and postformed profiles in accordance with Section 010000.

.3 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

.1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect laminate, adhesive, and core materials from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Do not store or install materials in areas where relative humidity is less than 25% or greater than 60% at 22°C (72°F).

Part 2 PRODUCTS

2.1 MATERIALS

.1 Laminated plastic for flatwork: to CAN3-A172-M79.

.1 Type: S

.2 Grade: GP.

.3 Size: 1.25 mm thick.

.4 Colour: integral colour throughout.

.5 Pattern: solid.

.6 Finish: as indicated.

.2 Laminated plastic for postforming work: to CAN3-A172-M79.

.1 Type: S.

.2 Grade: PF.

.3 Size: 1.25 mm thick.

.4 Colour: integral colour throughout.

.5 Pattern: solid.

.6 Finish: as indicated.

.3 Laminated plastic backing sheet: supplied by same manufacturer as facing sheet; not less than 0.5 mm thick and same thickness and colour as face laminate. Sanded one side.

.4 Plywood core: for surfaces with cutouts, to CSA O153-M1980 solid two sides, 19 mm thick.

.5 Particleboard core: to CAN3-O188.1-M78, sanded faces, of thickness indicated.

.6 Laminated plastic adhesive: as recommended by plastic laminate manufacturer.

.7 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.

.8 Sealant: one component silicone in accordance with Section 07900, colour selected by Engineer.

.9 Draw bolts and splines: as recommended by fabricator.

2.2 FABRICATION

.1 Comply with CAN3-A172-M79, Appendix "A".

.2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.3 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.4 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.

.5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

.6 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

.7 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.8 Apply laminated plastic liner sheet where indicated.

2.3 EXECUTION

2.4 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for laminate, adhesive, and core materials installation in accordance with manufacturer's written instructions.

.2 Visually inspect substrate in presence of Departmental Representative.

.3 Inform Departmental Representativeof unacceptable conditions immediately upon discovery.

.4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

2.5 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

2.6 INSTALLATION

.1 Install work plumb, true and square, neatly scribed to adjoining surfaces.

.2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.

.3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm on centre, 75 mm from edge. Make flush hairline joints.

.4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.

.5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.

2.7 CLEANING

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Remove traces of primer, caulking, epoxy and filler materials and clean doors and frames.

.4 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

2.8 PROTECTION

.1 Cover finished laminated plastic veneered surfaces with heavy kraft paper or put in cartons during shipment.

.2 Protect installed laminated surfaces in accordance with manufacturer's written recommendations.

.3 Remove protection only immediately before final inspection.

.4 Protect installed products and components from damage during construction.

.5 Repair damage to adjacent materials caused by laminate, adhesive, and core materials installation.

END OF SECTION

Part 1 GENERAL

NOT USED.

Part 2 PRODUCTS

2.1 INSULATION

.1 Sound batt insulation: fabricated from friction fit batts, mineral fibre, 89 mm and 140 mm thickness, as indicated and thickness to fill stud cavity.

.2 Safe'n'Sound Fire & Soundproofing Insulation by Roxul Inc. (or approved equal).

2.2 ACCESSORIES

.1 Sealant: to CAN/CGSB-19.21-M87.

.2 Tape for sealing as recommended by manufacturer.

Part 3 EXECUTION

3.1 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Fit insulation closely around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.5 Offset both vertical and horizontal joints in multiple layer applications.

.6 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 84 00 Firestopping

.2 Section 09 11 10 Metal Stud System

1.2 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 CAN-ULC-S101-04, Standard Methods of fire Endurance Tests of Building Construction and Materials.

.2 CAN-ULC-S102-03, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.

.2 Test Reports:

.1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.

.2 Submit test results in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

.3 For assemblies not tested and rated, submit proposals based on related designs using accepted fireproofing design criteria.

.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company specializing in sprayed-on fireproofing with 5 years documented experience, approved by manufacturer.

.2 Mock-ups:

.1 Apply fireproofing to approximately 10 m^2 area of surfaces of mock-up-matching surface to be treated.

.2 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.2 For testing to determine compliance with performance requirements.

.3 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with fireproofing work.

.4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

.3 Site Meetings:

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations, with contractor's representative and Departmental Representative to:

.1 Verify Project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.5 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.

.6 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

.2 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Deliver packaged materials in original unopened containers, marked to indicate brand name, manufacturer, and ULC markings.

.4 Storage and Protection:

.1 Store materials indoors in dry location.

.2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

.3 Damaged or opened containers will be rejected.

.4 Packaging to indicate shelf-life and materials to be applied prior to expiration of shelf-life.

.5 Provide temporary enclosures to prevent spray from contaminating air beyond application area.

.6 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fireproofing materials.

.5 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 AMBIENT CONDITIONS

.1 At temperatures less than 5 degrees C, ensure that 5 degrees C air and substrate temperature is maintained during and for 24 hours after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.

.2 Maintain relative humidity within limits recommended fireproofing manufacturer.

.3 Ensure that natural ventilation to properly dry fireproofing during and subsequent to its application is provided.

.4 In enclosed areas lacking openings for natural ventilation, provide minimum of 4 air exchanges per hour by forced air circulation.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Sprayed fireproofing: ULC certified cementitious fireproofing qualified for use in ULC Designs specified. Acceptable product: AD Fire Protection Systems-Type 5GP.

.2 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.

.3 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified. Acceptable product: AD Fire Protection Systems Type-TC-55 Sealer.

.1 Colour: white.

Part 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 datasheets.

3.2 PREPARATION

.1 Substrate: free of material, which would impair bond.

.2 Verify that painted substrates are compatible and have suitable bonding characteristics to receive fireproofing.

.3 Remove incompatible materials.

.4 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.

.5 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

3.3 APPLICATION

.1 Apply bonding adhesive or primer to substrate.

.2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings;

.1 Steel Columns; 2 hrs fire rating – ULC Design No. X813

.2 Steel floor decks and beams: 2 hrs fire rating – ULC Design No. 810

.3 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density and texture.

.4 Apply curing compound to surface of cementitious fireproofing as required by manufacturer.

.5 Apply sealer to surface of fireproofing as required by manufacturer where fireproofing is to be painted and as indicated.

3.4 SCHEDULE

.1 Apply new fireproofing to existing columns, beams and underside of steel deck at ground floor of building (M-58) in all areas shown on the drawings within the scope of contract under this project.

3.5 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 Inspection and Site Tests:

.1 Inspection and testing of fireproofing will be carried out by Testing Laboratory designated by Departmental Representative.

.2 Departmental Representative will pay costs for testing.

3.6 PATCHING

.1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before final inspection.

3.7 CLEANING

.1 Clean surfaces not indicated to receive fireproofing of sprayed material within 24 hours period after application.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Division 22 – Plumbing.

.2 Division 23 – Heating, Ventilating and Air Conditioning.

.3 Division 26 – Electrical.

1.2 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.3 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.

.5 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets.

.2 Shop Drawings:

.1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.

.2 Construction details should accurately reflect actual job conditions.

.3 Samples:

.1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.

.4 Quality assurance submittals:

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

.7 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company specializing in fire stopping installations, with 5 years experience, approved by manufacturer.

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Departmental Representative.

.3 Verify project requirements.

.4 Review installation and substrate conditions.

.5 Co-ordination with other building subtrades.

.6 Review manufacturer's installation instructions and warranty requirements.

.7 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of Work, after cleaning is carried out.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, and ULC markings.

.2 Storage and Protection:

.1 Store materials indoors, in dry location, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.

.2 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended.

.3 Fire stop system rating: 2 hours..

.4 Service penetration assemblies: systems tested to CAN-ULC-S115.

.5 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.6 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.7 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.8 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.9 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.10 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.11 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.12 Sealants for vertical joints: non-sagging.

Part 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 datasheets.

3.2 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.

.2 Ensure that substrates and surfaces are clean, dry and frost free.

.3 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.4 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.4 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Departmental Representative.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: certified fire stop system component.

.1 Ensure pipe insulation installation precedes fire stopping.

3.5 FIELD QUALITY CONTROL

.1 Inspections: notify Departmental Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.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.

3.6 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.7 SCHEDULE

Fire stop and smoke seal at:

.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Edge of floor slabs at curtain wall and precast concrete panels.

.3 Top of fire-resistance rated masonry and gypsum board partitions.

.4 Intersection of fire-resistance rated masonry and gypsum board partitions.

.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

.7 Openings and sleeves installed for future use through fire separations.

.8 Around mechanical and electrical assemblies penetrating fire separations.

.9 Rigid ducts: greater than 129 cm^2: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

Part 1 GENERAL

.1 One manufacturer's product only to be used throughout.

.2 Sealant must be approved by Departmental Representative as acceptable product.

.3 Colours of all sealants to be selected by the Departmental Representative prior to proceeding.

Part 2 PRODUCTS

2.1 Materials

.1 Type 1-Multi-purpose sealant (interior): Acrylic latex one part: to CAN/CGSB-19.17., approved by Departmental Representative.

.2 Type 2-Acoustic sealant: Synthetic Rubber Sealant, "Tremco Acoustical Sealant" or equivalent approved by Departmental Representative.

.3 Type 3-Single Component Silicone, high performance medium modulus, one part, neutral cure 100% silicone sealant: "Tremco Spectrum 1" or equivalent approved by Departmental Representative.

.4 Preformed compressible and non-compressible back-up materials:

- .1 Polyethylene, urethane, neoprene or vinyl foam:
  - .1 Extruded: closed cell foam backer rod.
  - .2 Size: oversize to 30%.
- .2 Bond breaker tape:
  - .1 Polyethylene bond breaker tape that does not bond to sealant.

.5 Primers: sealant manufacturer's type.

.6 Cleaners: as recommended by sealant manufacturers.

.7 Sealant Colour: to Departmental Representatives selection from standard colour range.

2.2 Sealant Selection

.1 Type-1; Perimeters of interior door frames.

.2 Type-2; At base along bottom track of partitions.

.3 Type-3; Perimeter of windows on exterior and interior side

Part 3 EXECUTION

3.1 Preparation

.1 Ensure all materials which will bear sealant on their surfaces are clean and free from foreign material which would affect bonding.

.2 Permit concrete and mortar to cure fully before sealing.

.3 Prime joint sides in accordance with manufacturer's directions.

.4 Mask adjacent surfaces to prevent contamination by sealant. Remove mask immediately after joints completed.

.5 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.6 Ensure joint surfaces are dry and frost free.

3.2 Backup Material

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30%

3.3 Application

.1 Sealant:

.1 Apply sealant in accordance with manufacturer's written instructions.
.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
.3 Apply sealant in continuous beads.
.4 Apply sealant using gun with proper size nozzle.
.5 Use sufficient pressure to fill voids and joints solid.
.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
.7 Tool exposed surfaces before skinning begins to give slightly concave shape.
.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing:

.1 Cure sealants in accordance with sealant manufacturer's instructions.
.2 Do not cover up sealants until proper curing has taken place.

3.4 Cleaning

.1 Leave Work area clean at end of each day.

.1 Clean adjacent surfaces immediately.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION

Part 1 GENERAL

1.1 Related Requirements

.1 Section 08 71 00 – Finish Hardware

.2 Section 08 80 00 - Glazing

1.2 Requirements of Regulatory Agencies

.1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4 S104M-80 revised 1985 and CAN4 S105M-1985 for ratings specified or indicated, for example ULC or Warnock-Hersey.

.2 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.

1.3 Shop Drawings

.1 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners openings, glazed.

Part 2 PRODUCTS

2.1 Hollow Metal Doors

.1 Steel: zinc coated .25 oz zinc per square foot content to ASTM A527.

.2 Flat sheet: face and back skins to be 18 (1.0mm) gauge thickness.

.3 Door Core:

.1 Honeycomb: structural core consisting of kraft paper having [20mm] cell size to thickness indicated.

.4 Hardware reinforcement: hinges 7 (3.7mm) gauge, lock box, closer mounting, 14 (1.6mm) gauge.

.5 Top and bottom channels closures: 14 (1.6mm) gauge.

.6 Primer: for touch-up zinc chromate CAN/CGSB-1.132-M90.

2.2 Materials Pressed Steel Frames

.1 Steel; zinc coated .25 oz zinc per square foot content to ASTM A527.

.2 All components; headers, jambs, screen stiles to be 16 (1.3mm) gauge thickness.

.3 Hardware reinforcement; minimum 7 (3.7mm) gauge for hinge plates min. 16 (1.3mm) gauge for closer mounting, panic sets, cylindrical and mortised locksets.

.4 Glazing stops: min. 20 (0.8mm) gauge.

.5 Temporary channel spreaders; min. 1.6mm (1/16").

.6 Guard and dust boxes; 0.8mm (0.031") thick.

.7 All anchors; drywall and masonry 18 (1.0mm) gauge, tube and screw 3/16" (5mm) dia. screws and 3/8" (10mm) dia. for labelled frames.

.8 Door bumpers; pressure fit black neoprene.

.9 Angle clips; min. 20 (0.8mm) gauge.

.10 Primer: for touch-up zinc chromate CAN/CGSB-1.132-M90.

Part 3 EXECUTION

3.1 Fabrication

.1 Prior to fabrication take critical measurements at site to facilitate installation and fitting of doors.

.2 Blank, drill, reinforce and tap frames to receive templated strikes, door closers and hinges.

.3 Cut frames, mitre accurately and form continuous invisible welds inside profile.

.4 Grind welded corners, fill exposed surface depressions and butted joints with metallic paste filler and sand to a smooth uniform finish.

.5 Protect strikes and hinges by guard boxes welded in place.

.6 Reinforce door transoms and heads for openings larger than 5'-0" (1500mm) with light structural section or as indicated.

.7 Fabricate doors as integral units, free from sag, distortion, wave or core ghosting, with slide interlocking edge seams.

.8 Bond steel sheets to approved core material. Fill voids in stiles with polyurethane.

.9 Exterior doors to have inverted top channel welded in place and filled with a metallic paste filler and sand to a smooth uniform finish.

.10 Glazing stops, zinc coat steel cut to suit glass opening sizes with butted corners for doors and frame screens. Secured in place with oval headed cadmium plated machine screws 8" o.c.

.11 Welding of door and frame components in accordance with CSA W59-M1989.

.12 Fabricate thermally broken frames for exterior doors using steel core, separating exterior portion of frame from interior portion with polyvinyl chloride thermal breaks.

3.2 Installation

.1 Provide each door frame with two rubber door silencers at head of each door, and three at the strike side.

.2 Provide two channel or angle spreaders per frame to ensure proper alignment. Where frames terminate at finished floor, provide angle clips for anchorage to slab.

.3 Provide six adjustable anchors for seven feet height of frames.

.4 Obtain hardware templates. Cut, blank-out, reinforce and drill all members accurately to receive hardware. Provide locating clips for mortise locks.

.5 Secure physical metal fire label, by means of pop rivets on labelled fire doors and frames. Label to carry qualifications of rating in accordance to Underwriters or Warnock-Hersey standards. Locate labels on hinge rebate of frames and hinge end of doors.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 Door material and construction in accordance with CAN/CSA-0132.2.

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC).

.1 Quality Standards for Architectural Woodwork 1998.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-71.19-[M88], Adhesive, Contact, Sprayable.

.2 CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.

.4 Canadian Standards Association (CSA International).

.1 CAN/CSA O132.2 Series-90(R1998), Wood Flush Doors.

.2 CAN/CSA-O132.5-M1992 (R1998), Stile and Rail Wood Doors.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's:

.1 For caulking materials during application and curing.

.2 For door materials and adhesives.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 001000.

.2 Indicate door types and cutouts for lights and louvres, sizes, core construction, transom panel construction and cutouts.

1.3 SAMPLES

.1 Submit one 300 x 300 mm corner sample of each type wood door.

.2 Show door construction, core, glazing detail and faces.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 PROTECTION & STORAGE

.1 Store doors in a dry temperature controlled room, laid face down on wood sleepers spaced not less than 12" (300mm) apart. Do not stack higher than eight doors per area.

.2 Provide scab wood corner strip protectors on all four corners of stack doors.

.3 Loose lay cardboard on face of top door in each stack.

1.6 GUARANTEE

.1 Written guarantee to be supplied against all defects for a period of not less than three (3) years.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Core; solid particle in mat formed.

.2 Stiles; soft wood.

.3 Rails; softwood.

.4 Crossband 1/16" (1.5mm) fir veneer overlay.

.5 Faces; rotary cut birch, stain grade.

.6 Adhesive; water resistant.

.7 Edges; birch hardwood.

2.2 FABRICATION

.1 All door components to be of first class composition with exposed components being of select grading of wood as per industry standards. Reinforced for openings and hardware.

.2 All doors to have finished dimensional thickness of 1 3/4" (45mm).

.3 Stiles and rails to be glued to particle core center.

.4 Hardwood edge strips to be glued to end stiles.

.5 Bond crossband sheets on faces of doors with grain running horizontal.

.6 Bond rotary cut face veneer to crossband with grain running vertically.

.7 Stiles to be not less than 4 1/2" (112mm).

.8 Top and bottom rails to be 2 3/4" (70mm).

.9 Crossband not less than 1/16" (1.5mm) thick veneered, sanded or bonding of face veneer.

.10 Edge strips not less than 5/8" (16mm) thick.

Part 3 EXECUTION

3.1 INSTALLATION

.1 Install plumb, level, straight, rigid and in accordance with manufacturer's instruction.

.2 Install no damaged material.

.3 Install all hardware supplied by hardware contractor.

3.2 ADJUSTMENT

.1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

3.3 CLEANING

.1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of primer, caulking; clean doors and frames.

.3 Clean glass and glazing materials with approved non-abrasive cleaner.

.4 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 GENERAL

1.1 RELATED WORK

.1 Caulking of joints between frames and other building components: Section 07 90 00 - Sealants.

.2 Glass units: Section 08 80 00 - Glazing.

.3 Window Sills: Section 06 20 00 Finish Carpentry.

1.2 REFERENCES

.1 Aluminum Association (AA)

.1 Designation System for Aluminum Finishes (2003).

.2 CSA International

.1 CSA-A440-00/A440.1-00(R2005), A440-00, Windows / Special Publication A440.1-00, User Selection Guide to CSA Standard A440-00, Windows. CAN/CSA-A440.2-09, Fenestration Energy Performance.

.2 CAN/CSA-Z91-02(R2008), Health and Safety Code for Suspended Equipment Operations.

1.3 SCOPE OF WORK

.1 Provide glazed fixed window units into the curtain wall framing system and flashing specified in this section.

1.4 SAMPLES

.1 Submit one representative model of each type aluminum window in accordance with Section 01000.

.2 Show frame, glazing and weatherproofing method, and surface finish. Include 150 mm (6") long samples of head, jamb, meeting rail, mullions and flashings to indicate profile.

1.5 QUALITY ASSURANCE

.1 Mock-ups:

.1 Construct one mock-up of entire window assembly including; glass units, head, jambs, intermediate mullions, flashing, caulking and spandrel assembly.

.1 Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, flashing, and perimeter sealant.

.2 Locate mock-up where indicated Departmental Representative.

.3 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with work.

.4 When accepted, mock-up will demonstrate minimum standard of quality and materials for work of this Section.

.5 Mock-up may remain as part of finished work.

1.6 SHOP DRAWINGS

.1 Submit drawings stamped and signed by professional Departmental Representative registered or licensed in the Province of Ontario, Canada

.2 Clearly indicate materials and large scale details for head, jamb, profiles of components, elevations of unit, anchorage details, junction between combination units (i.e. curtain wall), location of isolation coating, description of related components and exposed finishes, fasteners and caulking.

1.7 TEST REPORTS

.1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, in accordance with CAN/CSA-A440-00, for:

.1 Window type and classification specified.

.2 Anodized aluminum finish.

.3 Air tightness: A3.

.4 Water tightness: B7.

.5 Wind load resistance: C5.

.6 Condensation resistance: I = 55.

1.8 MAINTENANCE DATA

.1 Provide maintenance data for cleaning and maintenance of aluminum windows for incorporation into maintenance manual.

1.9 PROTECTION

.1 After erection, protect finished work from damage of other trades with 6 mil polyethylene and cardboard, and as directed by Departmental Representative.

.2 Leave protective covering in place until final cleaning of building.

1.10 Warranty

.1 For work of this section, the 12 months warranty period prescribed in subsection GC 32.2 of General Conditions "C" is extended to 60 months.

.2 For insulated glass units, refer to Section 08 80 00 - Glazing.

Part 2 PRODUCTS

2.1 SYSTEMS

.1 Description:

.1 Fixed window units includes thermally broken tubular aluminum sections with self supporting framing, shop fabricated, factory prefinished, vision glass, insulated metal panel infill with covers; related flashings, anchorage and attachment devices.

.2 Assembled system to permit re-glazing of individual glass units from exterior without requiring removal of structural mullion sections.

.2 Performance Requirements:

.1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with NBC.

.2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with applicable codes.

.3 Limit mullion deflection to flexure limit of glass.

.4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

.5 Ensure system is designed to accommodate the following without damage to components or deterioration of seals:

.1 Movement within system.

.2 Movement between system and perimeter framing components.

.3 Dynamic loading and release of loads.

.4 Deflection of structural support framing.

.5 Shortening of building concrete structural columns.

.6 Creep of concrete structural members.

.7 Mid-span slab edge deflection.

.6 Limit air infiltration through assembly to 0.0003 m3/s/m2 of wall area, measured at a reference differential pressure across assembly of 75Pa as measured in accordance with AAMA 501and ASTM E283.

.7 Vapour seal with interior atmospheric pressure of 25 mm sp, 22 degrees C, 40% RH: no failure.

.8 Water leakage: none.

.9 Ensure system allows for expansion and contraction within system components when temperature range is 95 degrees C over 12 hour period without causing detrimental affect to system components.

.10 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network. Windows to be designed as rainscreen windows.

.11 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

.1 Position thermal insulation on exterior surface of air barrier and vapour retarder.

.12 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

.3 Acceptable products from following manufacturers:

.1 Kawneer Company Canada Ltd – 1600 Curtain Wall System

.2 Alumicor Ltd – 2500 Curtain Wall System

.3 Or equivalent approved by the Departmental Representative.

.4 Aluminum extrusions: Aluminum Association alloy AA6063-T5.

.5 Materials: to CAN/CSA-A440-00 supplemented as follows:

.6 Glass and glazing materials: in accordance with Section 08 80 00.

.7 Sealant within window member assembly: in accordance with window manufacturer, colour to match aluminum profiles.

.8 Isolation coating: alkali resistant bituminous paint.

.9 Bedding compound: to 19-GP-14M.

2.2 ALUMINUM WINDOW FRAME COMPONENTS

.1 Mullion profile:

.1 Vertical members: 2-1/2” (63.5mm) x (6 1/2” – 8” (164 -200mm)) nominal overall dimension.

.2 Horizontal members: 2-1/2”(63.5mm) x (6 1/2” – 8” (164 -200mm)) nominal overall dimension.

.3 Snap cap cover: 1-1/4” (32mm) deep x 2-1/2”(63.5mm)

.4 Thermally broken with interior tubular section insulated from exterior pressure plate.

.5 Matching stops and pressure plate of sufficient size and strength to ensure adequate bite on glass and infill panels.

.6 Drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system.

.7 Internal mullion baffles to eliminate "stack effect" air movement within internal spaces.

.2 Infill panel: internally reinforced, glazing edge sealed.

.1 Outer face: 1.8mm thick aluminum.

.2 Inner face: 1.8mm anodized aluminum.

.3 Core: semi-rigid insulation core with RSI of 2.96, Roxul CurtainRock or equal.

.3 Backpan: 1.5mm galvanized sheet material.

.4 Sill Flashings: 1.8mm thick anodized aluminum finish to match window mullion sections, profile as detailed.

.5 Sill Flashing Upturn Termination: 50mm x 50mm x 1.8mm thick anodized aluminum finish to match window mullion sections.

.6 Flashing Securement Clips: 1.8mm thick anodized aluminum finish to match window mullions.

.7 Classification rating (on site): to CAN/CSA-A440:

.1 Air tightness: A3.

.2 Water tightness: B3.

.3 Wind load resistance: C3.

.4 Condensation resistance: Temperature Index, I = 55.

.8 The Departmental Representative may conduct tests "in situ".

.1 The Departmental Representative will pay for associated testing costs.

.2 If testing indicates unsatisfactory performance, revise the design as required and re-test.

.3 All associated costs for re-testing to be borne by manufacturer.

2.3 FABRICATION

.1 Fabricate in accordance with CAN/CSA-A440-00 supplemented as follows:

.2 Fabricate window units square and true with maximum tolerance of plus or minus 1.5 mm (1/16") for units with diagonal measurement of 1800 mm (6'-0") or less, and plus or minus 3 mm (1/8") for units with diagonal measurement over 1800 mm (6'-0").

.3 Brace sash frames to maintain squareness and rigidity during shipment and installation.

.4 Finish steel clips and reinforcement with shop coat primer to CAN/CGSB-1.40-97 380 g/m² zinc coating to CAN/CSA-G164-M92 (R1998).

.5 Manufacturer's nameplates on windows are not acceptable.

2.4 FINISHES

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes-1980.

.1 Electrolytically deposited colour anodic finish: Clear anodic finish: designation AA-A31, with a minimum coating thickness of 10 microns (0.4 mil).

.2 Appearance and properties of anodized finishes as designated by the Aluminum Association as Architectural Class 2.

2.5 ISOLATION COATING

.1 Isolate aluminum from following components, by means of isolating coating:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

2.6 GLAZING

.1 Glaze windows with insulating glass units in accordance with CAN/CSA-440-00 and Section 08 80 00.

.2 Prepare frames to accommodate glass and glazing method specified in Section 08 80 00.

Part 3 EXECUTION

3.1 WINDOW INSTALLATION

.1 Install in accordance with CAN/CSA-A440-00.

.2 Arrange components to prevent abrupt variation in colour.

.3 Make allowance for deflection of structure. Ensure that structural loads are not transmitted to windows.

.4 Install sill flashing full width of window and extend over exterior finish as detailed. Provide clips to secure sill flashing and secure clips in place.

.5 At both ends of sill flashing provide a separate piece of upturned flashing and seal against adjacent material. Vertical leg of upturn to be 38mm above horizontal line of sill flashing and have a horizontal leg of 38mm. Secure the upturned flashing in place.

3.2 CAULKING

.1 Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside and air vapour seal at inside.

.2 Apply sealant in accordance with manufacturer's recommendations. Conceal sealant within aluminum work except where exposed use is permitted by Departmental Representative. Provide foam backer rod in joint prior to caulking.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCE STANDARDS

.1 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame manufacturer's Association.

1.2 HARDWARE LIST

.1 Submit hardware schedule for Departmental Representative's approval.

.2 Indicate hardware proposed, including make, model, material, function, finish and other pertinent information.

1.3 MAINTENANCE

.1 Provide maintenance data, parts lists, and manufacturer's instruction for each type door closers, locksets, door holders and fire exit hardware for incorporation into maintenance manual.

1.4 MAINTENANCE MATERIALS

.1 Supply two sets of wrenches for door passage and privacy sets.

1.5 HARDWARE REQUIREMENTS

.1 Hardware standards listed in Paragraph 2.2 can be obtained through NRC standing offer program.

.2 NRC has a bonded locksmith for our keying system on standing contract. See NRC Departmental Representative for information.

.3 Contractor will be responsible to have all cylinders keyed by NRC bonded locksmith on standing offer contract.

.4 Contractor will be responsible to carry all associated costs for cylinders and keying of same with N.R.C. bonded standing offer locksmith.

Part 2 PRODUCTS

2.1 HARDWARE ITEMS

.1 Only door latch sets listed below.

.2 Use one manufacturer's products only for all similar items.

2.2 DOOR HARDWARE STANDARDS

.1 Hinges: Apply to all new doors.

.1 Interior doors: Dorex 114.3mm x 101.6mm x 179 454 NRP X C15.

.2 Latching devices: ANSI/BHMA Commercial Grade 1 hardware. Apply to all new doors

.1 Passage Set, "Yale" 4701(LN) F75, ‘Augusta AU’ lever, 626 finish

.2 Lockset “Yale”AU-5407-L ‘Augusta AU’ lever, 626 finish.

.3 Privacy Set "Yale" 4702(LN) F76A, ‘Augusta AU’ lever, 626 finish.

.3 Door-Weatherstrip and Door Bottom:

.1 Door bottom: K.N. Crowder CT-50, 626 finish, or approved equal.

.2 Weatherstrip: K.N. Crowder W-20N, 626 finish, or approved equal.

.3 Acoustic Door Astragal (on inactive leaf): Ambico Acoustic Door Astragal From STC 33 to STC52, surface mounted.

.4 Door Stops: Apply to all new doors.

.1 Half dome floor or wall mount door stop, solid brass dome, rubber bumper x 626.

.5 Door Threshold: Apply at ED012 and ED013

1. Threshold: K.N. Crowder CT-65, aluminium.

.6 Door Closer: "Norton” 1600BC-Reg x AL. Parallel arm with hold open function, maximum force applied to operate door 22N for barrier free compliance.

.7 Electric Strike: Von Duprin, VD 6223.DS FSE 24VDC 630

2.3 FASTENINGS

.1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.2 Exposed fastening devices to match finish of hardware.

.3 Use fasteners compatible with material through which they pass.

Part 3 EXECUTION

3.1 INSTALLATION

.1 Furnish door and frame manufacturer with complete instructions and templates for preparation of their work to receive hardware.

.2 Furnish manufacturer's instructions for proper installation of each hardware component.

.3 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.4 Weather-stripping shall not be installed until final coat of paint has been applied to door and frame and is completely dry.

.5 Only tradesmen competent in the installation of Finish Hardware shall be used for this purpose. The installer shall adjust, clean, and make good all installations of Finish Hardware to the satisfaction of the Departmental Representative.

3.2 SCHEDULE

.1 Hardware Package #01 (Exterior Exit Door)

.1 (3) Hinge

.2 (1) Automatic door closer

.3 (1) Panic Bar/Exit Device

.4 (1) Latch set

.5 (1) Floor stop

.6 (1) Aluminum Threshold

.7 Weather stripping seal around door

.2 Hardware Package #02 (Quiet Rooms)

.1 (3) Hinge

.2 (1) Latch set

.3 (1) Floor stop

.4 (1) Door bottom seal and perimeter acoustical gasket

.5 (1) Kick down hold open device

.3 Hardware Package #03 (Directors' Offices & Photo Studio)

.1 (3) Hinge

.2 (1) Lock set

.3 (1) Floor stop

.4 (1) Door bottom seal and perimeter acoustical gasket

.5 (1) Kick down hold open device

.4 Hardware Package #04 (Corridor Double Doors)

.1 (6) Hinge

.2 (1) Locket set

.3 (2) Automatic Door Closer

.3 (2) Floor stop

.4 (2) Door bottom seal and perimeter acoustical gasket

.5 (2) Panic Bar/Exit Device

.6 (2) Kick down hold open device

.7 (4) Kick plate, J102 250 mm x 876 mm, self-adhesive, 630

.8 (1) Acoustic door astragal

.5 Hardware Package #05 (IT Rooms & Storage Rooms)

.1 (3) Hinge

.2 (1) Lock set

.3 (1) Floor stop

.4 (1) Kick down hold open device

.5 (1) Kick plate, J102 250 mm x 876 mm, self-adhesive, 630

.6 Hardware Package #06 (Washrooms and Locker Rooms)

.1 (3) Hinge

.2 (1) Latch set

.3 (1) Floor stop

.4 (2) Power door operator/push button

.5 (1) Kick plate, J102 250 mm x 876 mm, self-adhesive, 630

.6 (1) Automatic door closer

.7 Hardware Package #07 (Shared Equipment Room)

.1 (3) Hinge

.2 (1) Latch set

.3 (1) Floor stop

.4 (1) Kick down hold open device

.5 (1) Kick plate, J102 250 mm x 876 mm, self-adhesive, 630

.6 (1) Door bottom seal and perimeter acoustical gasket

.8 Hardware Package #08 (Utility Storages)

.1 (6) Hinge

.2 (1) Lock set

.3 (2) Kick down hold open device

.5 (2) Kick plate, J102 250 mm x 876 mm, self-adhesive, 630

.9 Hardware Package #09 (Janitor's Room)

.1 (3) Hinge

.2 (1) Lock set

.3 (1) Floor stop

.4 (1) Kick plate, J102 250 mm x 876 mm, self-adhesive, 630

.5 (1) Automatic Door closer

.10 Hardware Package #10 (Meeting Rooms)

.1 (3) Hinge

.2 (1) Lock set

.3 (1) Floor stop

.4 (1) Door bottom seal and perimeter acoustical gasket

.5 (1) Kick down hold open device

END OF SECTION

Part 1 GENERAL

1.1 SAMPLES

.1 Submit two 300 x 300 mm (1'-0" X 1'-0") samples of glass for approval by Departmental Representative in accordance with Section 00 10 00.

Part 2 PRODUCTS

2.1 GLASS MATERIALS

.1 Tempered Glass: to CAN/CGSB-12.1, 6mm overall thickness unless indicated otherwise.

.2 Silvered mirror glass: 6mm thick tempered. Dimensions as per the drawings, SS frame perimeter.

.3 Fire Rated Glass: glass ceramic, 5mm thick. Acceptable product “FireLite” or approved equal.

.4 Insulating Glass Units:

.1 Insulating glass units: to CAN/CGSB-12.8, double unit, 25 mm overall thickness.

.1 Glass thickness: 6 mm each light.

.2 Inter-cavity space thickness: low conductivity spacers 12mm between inner and outer lights.

.3 Glass coating: reflective low "E".

.4 Inert gas fill: argon.

.5 Glass privacy film: translucent, pressure sensitive adhesion, 3M or approved equal.

.6 Label: each light to be labelled, indicate name of manufacturer, thickness and quality of glass. Do not remove labels until final cleanup of project.

2.2 GLAZING & SEALING COMPOUND MATERIALS

.1 Only compounds listed on the CGSB Qualified Products List are acceptable for use on this project.

.2 Sealing compound: two-component, polysulphide, CANCGSB-19.24-M90, type 2, Class A, colour to be selected by Departmental Representative.

.3 Glazing type: self shimming, preformed butyl tape, 10-15 durometer hardness, paper release.

.4 Setting blocks: neoprene, Shore "A" durometer hardness 75-85, 100 mm (4") long, of thickness suitable to glazing condition to provide adequate glazing bite.

.5 Glazing splines: manufacturer's standard dry glazing splines to suit aluminum extrusions.

.6 Primer-sealers and cleaners: to glass manufacturer's standard.

Part 3 EXECUTION

3.1 WORKMANSHIP

.1 Remove protective coatings and clean contact surfaces with solvent and wipe dry.

.2 Apply primer-sealer to contact surfaces.

.3 Place setting blocks in accordance with manufacturer's instructions.

.4 Install glass, rest on setting blocks, ensure full contact and adhesion at perimeter.

.5 Install removable stops, without displacing tape or sealant.

.6 Provide edge clearance of 3 mm (1/8") minimum.

.7 Apply cap bead of sealant at exterior void.

.8 Apply sealant to uniform and level line, flush with sightline and tooled or wiped with solvent to smooth appearance.

.9 Do not cut or abrade tempered, heat treated, or coated glass.

.10 Use manufacturer's standard glazing system in accordance with the following.

3.2 INTERIOR GLAZING

.1 Dry method - tape/tape:

.1 Cut glazing tape to length and install against permanent stop, project 1.5 mm (1/16") above sightline.

.2 Place glazing tape on free perimeter of glass in same manner described above.

.2 Combination method - tape/sealant:

.1 Cut glazing tape to proper length and install against permanent stop, projecting 1.5 mm (1/16") above sightline.

.2 Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass to uniform and level line.

.3 Trim off excess tape to sightline.

3.3 FINISHING

.1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed and reviewed.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 08 80 50 Glazing: Glass surface to receive film application.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM E84-15a Standard Test Method for Surface Burning Characteristics of Building Materials

.2 International Window Film Association (IWFA)

.1 IWFA Visual Quality Standard for Applied Window Film 1999.

.3 National Fire Protection Association

.1 NFPA 101-2015 Life Safety Code

1.3 SUBMITTALS

.1 Submittals in accordance with submittal procedures of Div. 01.

.2 Product Data: submit WHMIS MSDS - Material Data Sheets in accordance with submittal procedures of Div. 01.

.3 Submit shop drawings and product data in accordance with submittal procedures of Div. 01.

.4 Submit samples in accordance with submittal procedures of Div. 01.

.1 Submit one 500 x 500 x mm sample of film installed on 6 mm thick clear plate glass.

.5 Submit test reports in accordance with submittal procedures of Div. 01.

.1 Submit test reports from approved independent testing laboratory, certifying film's compliance with specified requirements.

.6 Submit closeout submittals in accordance with closeout procedures of Div. 01.

.1 Provide operation and maintenance data for window film.

.2 Follow manufacturers written instructions for care and maintenance of decorative film.

.3 Use only cleaning solution recommended by manufacturer for regularly scheduled cleaning of decorative film.

1.4 MOCK-UP

.1 Construct mock-up in accordance with submittal procedures of Section 00 10 00.

.2 Construct mock-up of one of each typical installation. Mock-up may be part of finished work.

.3 Allow 24 h for inspection of mock-up by Consultant before proceeding with waterproofing work.

1.5 QUALITY ASSURANCE

.1 Film applicator: applied by applicator trained and approved by manufacturer for application of its products.

.2 Applicators: minimum 5 years proven experience.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original sealed packaging with manufacturer’s labels legible and seals intact.

.2 Store materials elevated from contact with the ground, and protected from moisture and direct sunlight. Store materials in accordance with manufacturers written instructions.

.3 Provide and maintain dry, off-ground weatherproof storage.

.4 Store rolls of film flat on cross supports. Do not stand rolls of film on end.

.5 Remove from storage, in quantities required for same day use.

1.7 ENVIRONMENTAL AND SAFETY REQUIREMENTS

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

.2 Conform to manufacturer’s recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Do not apply film until all dust generating operations are completed and the area has been cleaned.

1.8 WARRANTY

.1 For Work of this Section, the 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to 10 years.

.2 Ensure warranty includes items as follows:

.1 Maintaining adhesion properties without blistering, bubbling or delaminating from glass surface.

.2 Maintaining appearance without discolouration.

.3 Removing, replace and reapply defective materials.

.4 In event of product failure under warranty terms, remove and re-apply film without glass replacement at no cost to NRC.

Part 2 Products

2.1 PRODUCTS

.1 Decorative Graphic Window Film: Polyester film, pressure sensitive with visible light transmittance and reflectance of 50% and 20% respectively when measured on 6 mm thick clear glass. Pattern: horizontal bars 60 mm long by 3 mm wide, spaced 1.5 mm vertically and 3 mm horizontally. Fire performance Type A as defined in NFPA 101 when tested to ASTM E84.

.1 Acceptable product and manufacturer: Fasara Paracell as manufactured by the 3M Company.

2.2 SHOP FABRICATION

.1 Apply and attach film to glass in accordance with manufacturer's written instructions.

.2 Use only water and film slip solution on glass to facilitate positioning of film.

.3 Clean glass before beginning installation using neutral cleaning solution.

.4 Ensure no deleterious material adheres to glass by scraping surface of glass using industrial razors.

.5 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.

.6 Lay out film on glass to ensure film edges will captured behind window stops.

.7 Cut film edges straight and square to within 3 mm of edge of panel..

.8 Splicing:

.1 Splice film only when glass is greater in width than film.

.2 Splice film only after receipt of written approval from Consultant.

.3 Use butt factory edges only.

.9 Install decorative film to glass panels ensuring no blisters, bubbles, scratches, edge defects or distortions.

.10 Ensure removal of excess water from between film and glass.

.11 Examine film applied to glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems.

.12 Deliver glass panels complete with decorative film installed and labels intact and legible to site in accordance with manufacturer's recommendations for handling, transportation and storage.

Part 3 Execution

3.1 INSTALLATION

.1 Install glass panels with applied film in glazing frames as indicated and in accordance with manufacturer's instructions and requirements of Section 08 80 50.

.2 Installed glass and film shall have orientation of film level and properly aligned with surrounding frame.

3.2 INSTALLER'S INSPECTION

.1 Perform visual Inspection at time of installation in accordance with IWFA - Visual Quality Standard for Applied Window Film.

.2 Return to work place after 30 days but no longer than 40 days for final cleaning and inspection of installed film.

.3 Remove and replace glass panel or film that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 2.0 m after 30 day period.

.1 Replace film that exhibits defects with newly installed film

.2 Re-inspect as specified.

3.3 FINAL CLEANING

.1 Wash both sides of each glass panel and film using cleaning solution recommended by film manufacturer.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 ASTM International

.1 ASTM C 645-14, Standard Specification for Nonstructural Steel Framing Members.

.2 ASTM C 754-15, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

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

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Samples:

.1 Submit duplicate 300 mm long samples of non-structural metal framing.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Non-loadbearing channel stud framing: to ASTM C645-83; 38mm (1-5/8"), 64mm (2-1/2"), 92mm (3-5/8"), 152mm (6") stud sizes as indicated on drawings; roll formed from 0.53 mm (26 gauge) and 1.0mm (20 gauge) electrogalvanized steel sheet; for screw attachment of gypsum board. Knock-out service holes at 460 mm (1'-6") centres.

.2 Floor and ceiling tracks: to ASTM C645-92b; in widths to suit stud sizes, 32 mm (1-1/4") flange height.

.3 Ceiling brackets for attachment of partitions to underside of existing deck/beams above: Custom fabrication, ‘L’ shaped, 90mm vertical flange height with 6mm wide vertical slots, horizontal flange width 90mm x 200mm wide, roll formed from 0.478 mm thick electro-galvanized steel sheet. Use heavier gauge metal at partitions with impact resistant gypsum board.

.4 Metal channel stiffener: 38 x 20mm (1-1/2" x 3/4") size, 1.52 mm (16 gauge) thick cold rolled steel, coated with rust inhibitive coating.

.5 Acoustical sealant: to CAN/CGSB-19.21-M87.

.6 Insulating strip: rubberized, moisture resistant 3 mm (1/8") thick cork strip, 12 mm (1/2") wide, with self sticking adhesive on one face, lengths as required.

.7 Deflection Track: in widths to suit stud top track, 64mm flange height with 6mm wide vertical slots, roll formed from 0.478 mm thick electro-galvanized steel sheet. Use heavier gauge track at partitions with impact resistant gypsum board. Acceptable Product: Bailey Multi-Slot Track – MST 250 or approved equal.

Part 3 EXECUTION

3.1 ERECTION

.1 Align partition tracks at floor and ceiling and secure at 600 mm (2'-0") oc maximum.

.2 Install ceiling brackets at 600mm spacing and secure to underside of deck/beams prior to installation of sprayed on fire proofing. Protect vertical legs of bracket from fire proofing overspray.

.3 Place studs vertically at 600mm (24") o.c. and not more than 50 mm (2") from abutting walls and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Erect metal studding to tolerance of 1:1000.

.5 Attach studs to bottom tracks using screws.

.6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.7 Co-ordinate erection of studs with installation of door frames and special supports or anchorage for work specified in other Sections.

.8 Provide wood blocking secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, and base and upper cabinets, attached to steel stud partitions.

.9 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, using column clips or other approved means of fastening placed alongside frame anchor clips.

.10 Erect track at head of door openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.11 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.12 Extend partitions to ceiling height except where noted otherwise on drawings.

.13 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use slotted deflection track.

.14 Install continuous insulating strips to isolate studs from uninsulated surfaces.

.15 Install two continuous beads of acoustical sealant behind studs and tracks around perimeter of sound control partitions.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCE STANDARDS

.1 Installation: to ASTM C636-92 except where specified otherwise.

1.2 DESIGN CRITERIA

.1 Maximum deflection: 1/360th of span to ASTM C635-83 deflection test.

.2 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.3 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide acoustic tile ceiling systems including:

- .1 Acoustic ceiling tiles
- .2 Suspension grid systems
- .3 Hangers and inserts
- .4 Accessories for system

1.4 SAMPLES

.1 Submit one representative sample of ceiling tile in accordance with Section 00 10 00.

1.5 CLOSEOUT SUBMITTALS

.1 Provide ten (20) ceiling tiles for each pattern and type on project. Extra materials shall be from same production run as installed materials, in unopened packages.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Intermediate duty suspension system to ASTM C635-91.

.2 Basic materials for suspension system: commercial quality cold rolled steel, conforming to ASTM A525-91b and ASTM A526/A526M-90, zinc coated to Z275.

.3 Suspension system: non fire rated, made up as follows:

.1 Two directional exposed tee-bar grid.

.4 Exposed tee-bar grid components: shop painted satin sheen white. Components die cut. Main tee with double web, rectangular bulb and 25 mm (1") rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs: lower flange extended and offset to provide flush intersection.

.5 Hanger wire: galvanized soft annealed steel 3.0 mm (1/8") dia. (12 gauge).

.6 Hangers: self-drilling type anchors similar to Phillips "Red Head" T-32.

.7 Carrying channels: 38 x 25 mm (1-1/2" x 1") channel, of 1.2 mm thick galvanized steel.

.8 Ceiling tiles: to CAN/CGSB-92.1; 16mm (5/8”) thick non-combustible mineral fibre lay-in panels, square edge, colour white, Armstrong Cortega 769a White;

.1 ACT -1, 610mm x 1220mm (2’-0” x 4’-0”)

.2 ACT-2, 610mm x 610mm (2’-0” x 2’-0”)

.9 Accessories: splices, clips, wire ties, retainers and wall moulding, flush, to complement suspension system components, as recommended by system manufacturer.

Part 3 EXECUTION

3.1 INSTALLATION

.1 Install suspension system to manufacturer's instruction.

.2 Secure hangers to overhead structure using attachment methods acceptable to engineer. Install hangers spaced at maximum 1200 mm (4'-0") centres and within 150 mm (6") from ends of main tees.

.3 Do not erect ceiling suspension system until work above ceiling has been inspected by Departmental Representative.

.4 Lay out system according to reflected ceiling plan.

.5 Suspension system and ceiling components to be installed continuous over walls of demountable office partitions. Coordinate installation to allow for installation of acoustic insulation over demountable wall locations.

.6 Ensure suspension system is co-ordinated with location of related components.

.7 Install wall mould to provide correct ceiling height. Finished ceiling system to be level within 1:1000.

.8 Completed suspension system to support superimposed loads, such as lighting fixtures, diffusers and grilles, etc.

.9 Support light fixtures, diffusers, with additional ceiling suspension hangers within 150 mm (6") of each corner and at 600 mm (2'-0") around perimeter of fixture, also install at splices.

.10 Interlock cross member to main runner to provide rigid assembly.

.11 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

.12 Install ceiling tiles in correct seated position within suspended grid system.

3.2 COORDINATION

.1 Coordinate ceiling work to accommodate components of other sections, including light fixtures, diffusers, speakers, sprinkler heads, exposed mechanical and electrical installations, to be built into or above acoustical ceiling components.

3.3 CLEANING

.1 Touch up scratches, abrasions, voids and other defects in painted surfaces to the satisfaction of the Departmental Representative.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCE STANDARDS

.1 Do work in accordance with CAN/CSA-A82.31-M91 except where specified otherwise.

Part 2 PRODUCTS

2.1 GYPSUM BOARD

.1 Regular board: to CAN/CSA A82.27-M91 12.5mm (1/2") x 1200 mm (4'-0") wide x maximum practical length, edges tapered with round edge.

.2 Fire Rated board: Type X, 16mm (5/8") x 1200 mm (4'-0") wide x maximum practical length, edges tapered with round edge.

.3 Impact-Resistant Gypsum Board: 16mm (5/8”) x 1200 mm (4'-0") wide x maximum practical length, edges tapered with round edge. Acceptable product: “Dens Armor Plus” by Georgia-Pacific or equal.

.4 Moisture-Resistant Gypsum Board: 12.5mm (1/2”) x 1200 mm (4'-0") wide x maximum practical length, edges tapered with round edge. Acceptable product: “M2Tech” by Certainteed or equal.

2.2 METAL FURRING

.1 Metal furring, runners, hangers, tie wires & suspension to CSA A82.30-M1980, galvanized systems.

.2 Hangers: self-drilling type anchors similar to Phillips "Red Head" T-32.

.3 Drywall furring channels: 0.5 mm (0.02") core thickness galvanized steel channels for screw attachment of gypsum board.

2.3 FASTENINGS AND ADHESIVES

.1 Nails, screws and staples: CAN/CSA- A82.31-M91.

.2 Laminating compound: to CAN/CSA-A82.31-M91, asbestos-free.

.3 Stud adhesive: to CAN/CGSB-71.25.

2.4 ACCESSORIES

.1 Casing beads, corner beads: 0.5 mm (0.02") base thickness commercial grade sheet steel with Z275 zinc finish to ASTM A525-91b, perforated flanges; one piece length per location.

.2 Acoustic sealant: to CAN/CGSB-19.21-M87.

.3 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Panel for joint sealants.

.4 Insulating strip: rubberized, moisture resistant, 3 mm (1/8") thick closed cell neoprene strip, 12 mm (1/2") wide, with self sticking permanent adhesive on one face; lengths as required.

.5 Joint compound: to CAN/CSA-A82.31-M91, asbestos-free.

Part 3 EXECUTION

3.1 WALL FURRING

.1 Install wall furring for gypsum board wall finishes in accordance with CAN/CSA-A82.31-M91, except where specified otherwise.

.2 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.2 GYPSUM BOARD APPLICATION

.1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

.2 Apply single layer gypsum board as indicated to metal furring or framing using screw fasteners. Maximum spacing of screws 300 mm (1'-0") oc.

3.3 SOUND ATTENUATION BLANKET

.1 Refer to Section 07 20 00.

3.4 CONTROL JOINTS

.1 N/a.

3.5 ACCESS DOORS

.1 Install access doors to electrical and mechanical fixtures specified in respective Sections.

.2 Rigidly secure frames to furring or framing systems.

3.6 TAPING AND FILLING

.1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.2 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

END OF SECTION

Part 1 GENERAL

1.1 Reference Standards

.1 Do tile work in accordance with Installation Manual 200-1979, "Ceramic Tile", produced by Terrazzo Tile and Marble Association of Canada (TTMAC), except where specified otherwise.

1.2 Samples

.1 Submit duplicate 300 x 300 mm (1'-0" x 1'-0") sample panels of each colour, texture, size, and pattern of tile, in accordance with Section 01000.

1.3 Maintenance Materials

.1 Provide minimum 5m² of each type and colour of tile required for project for maintenance use.

1.4 Environmental Conditions

.1 Maintain air temperature and structural base temperature at ceramic tile installation area above 10°C (50°F) for 24h before, during and 24h after installation.

Part 2 PRODUCTS

2.1 Floor Tile

.1 Porcelain tile: CAN/CGSB-75.1-M88, cushion edges, unglazed surface.

.2 **CT-1:** 300mm x 600mm porcelain tile, Creation series, colour: black, finish: matte, from Olymia Tile & Stone, or approved equivalent.

.3 **CT-2 (shower floor):** 50mm x 50mm mosaic tile, Quebec series, colour: black fleck, finish: matte, from Olympia Tile & Stone, or approved equivalent.

2.2 Wall Tile

.1 Ceramic Tile: CAN/CGSB-75.1-M88, satin unglazed surface.

.2 **CT-1:** 100mm x 400mm porcelain tile, Colour & Dimension series, colour: bone, finish: bright, from Olymia Tile & Stone, or approved equivalent.

.3 **CT-2 (accent wall tile & full shower tile):** 16mm x 16mm mounted on 300mm x 300mm backing sheet, Murano series, colour: red pepper, finish: gloss, from Olympia Tile & Stone, or approved equivalent.

2.3 Mortar and Adhesive

.1 Portland Cement: to CAN3-A5-M1983, Type Materials 10, colour to match tile, to be selected by Departmental Representative from manufacturer's full range of colours.

.2 Sand: to CSA A82.56-M1976.

.3 Water: potable and free of minerals which may discolour mortar.

.4 Mortar additive: liquid polymer.

.5 Thin-set adhesive: latex modified high bond strength.

2.4 Grout

.1 Sand and cement grout additive: liquid latex.

2.5 Accessories

.1 Thresholds: 45 mm (1-3/4") wide marble selected by Departmental Representative, 16 mm (5/8") thick, rounded edges, honed finish to exposed surfaces, size to suit door opening and frame width.

.2 Sealant: in accordance to manufacturer's specifications. Colour selected by Departmental Representative.

2.6 Mortar and Adhesive Mixes

.1 Mortar bed for floors: 1 part cement, 2 parts sharp sand, liquid polymer mortar additive mixed in accordance with manufacturer's instructions.

.2 Floor tile joint: 1 part grey cement, 1 part fine sharp sand, latex polymer additive.

.3 Mortar bed for walls: latex modified high strength mortar/adhesive, two components mixed in accordance with manufacturer's instructions.

.4 Wall tile joint: 1 part white cement, 1 part fine sharp sand, latex polymer additive.

Part 3 EXECUTION

3.1 Workmanship

.1 Apply tile to clean and sound surfaces.

.2 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even.

.3 Maximum surface tolerance 1:800 for walls and floors.

.4 Make joints between tile uniform and approximately 1.5 mm (1/16") wide, plumb, straight, true, even and flush with adjacent tile.

.5 Lay out tiles so perimeter tiles are minimum ½ size.

.6 Sound tiles after setting and replace hollow-sounding units to obtain full bond.

.7 Make internal angles square, external angles rounded.

.8 Use round edged tiles at termination of wall tile panels, except where panel butts projecting surface of differing plane.

.9 Allow minimum 24h after installation of tiles, before grouting.

.10 Clean installed tile surfaces after installation and grouting cured.

3.2 Wall Tile

.1 Install tiles on walls in accordance with TTMAC detail 11.

3.3 Floor Tile

.1 Install tiles on floor substrate in accordance with TTMAC detail 15.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 07 95 13 Expansion Joint Assemblies: Coordination with wall expansion joints.

.2 Section 09 29 00 Gypsum Board: Wall repairs at surfaces to receive resilient base.

.3 Section 09 65 19 Resilient Tile Flooring: Floor finish.

.4 Section 09 68 13 Tile Carpeting: Floor finish.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM International)

.1 ASTM F1861-08 Specification for Resilient Wall Base.

1.3 PRODUCT DATA

.1 Submit manufacturer's product literature describing specified products, including their technical and physical properties.

.1 Include manufacturer's certificate of mix formulation compliance, including certification that products contain no more than 0.5% asbestos.

.2 Include WHMIS and Material Safety Data Sheets.

1.4 SAMPLES

.1 Submit samples in accordance with submittal procedures of Section 01 00 10.

.2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base.

1.5 QUALITY ASSURANCE

.1 Installer shall have five (5) years of documented experience installing resilient base products.

.2 Provide proof of experience at request of Departmental Representative.

1.6 MOCKUP

.1 Include resilient base and accessories in mockups specified for each floor covering product specified, in accordance with requirements of Division 01.

.2 Accepted mockup may form part of finished Work.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store packaged materials in original containers with manufacturer's seals and labels intact.

.2 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness. Store rolled goods on end.

.3 Store materials on site for site conditioning at temperatures between 18oC and 24oC for at least 48 hours immediately before installation.

.4 Protect from intense or direct sunlight until installation is complete and adhesives are fully cured.

1.8 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for resilient base for incorporation into manual specified in Section 01 00 10.

1.9 EXTRA MATERIALS

.1 Provide extra materials of each type of resilient base materials and adhesives in accordance with closeout procedures of Section 01 00 10.

.2 Provide 5% of each colour, pattern and type of resilient base material required for project for maintenance use.

.3 Extra materials to be in one piece and from same production run as installed materials.

.4 Clearly identify each resilient base product and each container of adhesive.

.5 Deliver to Departmental Representative, upon completion of the work of this section.

.6 Store where directed by Departmental Representative.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Maintain air temperature and structural base temperature at resilient base installation area above 20oC for 48 hours before, during and 48 hours after installation.

.2 Protect materials from intense or direct sunlight during storage and until installation is complete and adhesives are fully cured.

Part 2 Products

2.1 RESILIENT WALL BASE

.1 Resilient base: to ASTM F1861, Type TS or TP, rubber, Style B-cove minimum for resilient floor, Style A-straight toeless for carpeted areas, in maximum practical length, 3 mm thick, 150 mm high, of colour selected by Departmental Representative from manufacturer's standard range.

.1 Acceptable products and manufacturers:

.1 Pinnacle Rubber Base by Roppe,

.2 Traditional Wall Base by Johnsonite.

.3 Equivalent products from Amtico, Armstrong.

.2 Allow for one colour to be selected by Departmental Representative from manufacturer's full range.

2.2 RESILIENT BASE COLOUR SCHEDULE

.1 Allow for one colour per functional area for each type of resilient base specified, selected from manufacturer's full range.

2.3 RESILIENT BASE INSTALLATION ACCESSORIES

.1 Primers and adhesives: of types recommended by resilient products manufacturer for specific material on applicable substrate, above, on or below grade.

.2 Adhesives for contoured resilient wall base: as recommended by manufacturer.

.1 Porous substrate: Johnsonite #960 Acrylic Cove Base Adhesive.

.2 Non-porous substrate: Johnsonite #945 Contact Bond Adhesive.

.3 Double sided tape adhesive for all substrates: Johnsonite Power Tape.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

.1 Inspect areas and surfaces to receive new resilient base and report conditions detrimental to performance of the Work and satisfactory installation in writing to the Departmental Representative.

.2 Ensure that surfaces to receive base have been repaired under Section 09 29 00 and are sound, dry, clean and smooth.

.3 Do not proceed with the work until detrimental conditions have been corrected.

3.2 RESILIENT BASE APPLICATION

.1 Lay out base to keep number of joints at minimum.

.2 Clean substrate and prime with one coat of adhesive.

.3 Apply adhesive to back of base.

.4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.

.5 Install straight and level to variation of 1:1000.

.6 Scribe and fit to door frames and other obstructions.

.7 Cope internal corners.

.8 Form external corners from resilient base as follows:

.1 Bend the base and flip the toe to stretch it.

.2 Reverse the bend and shave a strip 6 mm wide to a depth ¼ the thickness of the base from the back of the base at corner location.

.3 Apply hot melt or solvent-based adhesive to outside corners, minimum 100 mm back from corner.

.4 Install base.

.9 Use toeless type base where floor finish will be carpet, coved type elsewhere.

.10 Install toeless type base before installation of carpet on floors.

.11 Heat weld base joints in accordance with manufacturer's printed instructions.

3.3 APPLICATION – CONTOURED RESILIENT TRIM

.1 Lay out base to keep number of joints at minimum.

.1 Space joints in resilient base at maximum length available.

.2 Set base in adhesive tightly by using 3 kg hand roller, against wall and floor surfaces.

Apply adhesive uniformly at both top and bottom of base.

.3 Install straight and level to variation of 1:1000.

.4 Scribe and fit to door frames and other obstructions.

.5 Running joints to be diagonal or scarf joints.

.6 Miter inside and outside corners using compound miter saw.

.7 Jointing tolerances:

.1 AWI Premium grade:

.1 Maximum gap width: 0.65 mm.

.2 Maximum gap length: 30% of joint length.

3.4 CLEANING

.1 Remove excess adhesive from floor, base and wall surfaces without damage.

.2 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

3.5 PROTECTION

.1 Prohibit traffic on stairs for 24 hours after installation.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 ASTM International

.1 ASTM F 1066-04(2010) e1, Standard Specification for Vinyl Composition Floor Tile.

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

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for resilient tile flooring and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Samples:

.1 Submit duplicate 305mm X 305mm for each specified flooring type.

1.3 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials:

.1 Provide extra materials of resilient tile flooring, base and adhesive.

.2 Provide $2m^2$ of each colour, pattern and type flooring material required for this project for maintenance use.

.3 Extra materials from same production run as installed materials.

.4 Identify each container of floor tile and each container of adhesive.

.5 Deliver to Departmental Representative, upon completion of the work of this section.

.6 Store where directed by Departmental Representative.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect specified materials from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

.1 Ambient Conditions:

.1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for 48 hours before, during and for 48 hours after installation.

Part 2 PRODUCTS

2.1 RESILIENT TILE PRODUCTS (VCT-1)

.1 All resilient tile flooring materials shall be the products of the same single manufacturer.

.2 Vinyl Composition Tile: 305 mm square x 3.2 mm thick tile to ASTM F1066, class 2 through patterrn.

.1 Acceptable Product: Excelon, Colour' 55800 Snowdrift' as manufactured by Armstrong.

2.2 INSTALLATION ACCESSORIES

.1 Adhesive: Type as tile recommended by tile manufacturer for substrate condition.

.2 Primers: waterproof, type recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.

.3 Sub-floor filler and leveller to ASTM F710, moisture-, mildew-, and alkali-resistant material, with 3000 psi compressive strength when cured:

.1 2 part latex-type filler requiring no water and packaged separately in correctly proportioned units as recommended by flooring manufacturer for use with their product.

.4 Reducer and transition strips: resilient wedge profile transition of thermoplastic rubber compound, 457 mm wide from 0 to thickness to suit transition.

.1 Acceptable product: Subfloor Leveller as manufactured by Roppe.

.5 Transition and edge strips: purpose made solid vinyl strip, tapered profile, dimensions to provide flush meeting with adjacent surfaces, color to be selected by Departmental Representative from manufacturer's standard range.

.1 Provide "J" or "T" profiles as necessary to protect edges at transitions.

.2 Tapered vinyl or rubber edging, profile and thickness to suit flooring condition, with lip to extend under floor finishes, shoulder flush with top of adjacent floor

finish. Colour selected by Departmental Representative from manufacturer's full range.

.6 Sealer: type recommended by flooring manufacturer.

.7 Wax: type recommended by flooring manufacturer.

Part 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for resilient tile flooring installation in accordance with manufacturer's written instructions.

.2 Visually inspect substrate in presence of Departmental Representative.

.3 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSPECTION

.1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.

3.3 SUB-FLOOR TREATMENT

.1 Remove existing resilient flooring.

.2 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.

.3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.5 Prime concrete to flooring manufacturer's printed instructions.

3.4 TILE APPLICATION

.1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.

.2 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.

.4 Install flooring direction and joints, as indicated on the drawings.

.5 As installation progresses, and after installation, roll flooring in 2 directions with 45 kg minimum roller to ensure full adhesion.

.6 Cut tile and fit neatly around fixed objects.

.7 Install feature strips and floor markings where indicated. Fit joints tightly.

.8 Install flooring in pan type floor access covers. Maintain floor pattern.

.9 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.10 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.

.11 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 BASE APPLICATION

.1 Lay out base to keep number of joints at minimum. Base joints at maximum length available or at internal or premoulded corners.

.2 Clean substrate and prime with one coat of adhesive.

.3 Apply adhesive to back of base.

.4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.

.5 Install straight and level to variation of 1:1000.

.6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.

.7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles, minimum 300 mm each leg. Wrap around toeless base at external corners.

.8 Install toeless type base before installation of carpet on floors.

3.6 CLEANING

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

.3 Clean flooring and base surfaces to flooring manufacturer's printed instructions.

.4 Remove excess adhesive from floor, base and wall surfaces without damage.

.5 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.

3.7 PROTECTION

.1 Protect new floors from time of final set of adhesive until final inspection.

.2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 09 65 13 Resilient Base and Accessories: Resilient base for carpeted areas.

.2 Section 09 65 19 Resilient Tile Flooring: Floor reducer and transition strips.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-4.2 No.27.6-M91(R2013), Textile Test Methods - Flame Resistance - Methemine Tablet Test for Textile Floor Coverings.

.2 CAN/CGSB-4.129-93, Carpet for Commercial Use.

.2 Carpet and Rug Institute (CRI)

.1 CRI-104-96, Standard Installation of Commercial Carpet.

.2 IAQ Carpet Testing Program.

.3 National Floor Covering Association (NFCA)

.1 Floor Covering Specification Manual.

.4 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102.2-10, Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

1.3 SUBMITTALS

.1 Submit the following in accordance with submittal procedures of Div. 01.

.2 Submit verification to demonstrate compliance with CAN/ULCS102.2 for floor covering.

.3 Submit proof that carpet has been tested and passed the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute (CRI) and the Canadian Carpet Institute (CCI).

.4 Submit carpet schedule using same room designations indicated on drawings.

.5 Submit carpet manufacturer's installation instructions: Indicate special procedures and perimeter conditions requiring special attention.

.6 Submit certification and description of carpet reclamation and/or recycling process.

1.4 PRODUCT DATA

.1 Submit product data in accordance with submittal procedures of Div. 01.

.2 Submit product data sheet for each carpet, undercushion, adhesive, carpet protection and subfloor patching compound.

.3 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam adhesive. Indicate VOC content.

.4 Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colours, and methods of installation.

1.5 SAMPLES

.1 Submit samples in accordance with submittal procedures of Div. 01.

.2 Submit duplicate pieces of each type, size and colour of carpet tile specified.

1.6 CLOSEOUT SUBMITTALS

.1 Submit operation and maintenance data for incorporation into manual specified in Div. 01.

.2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

1.7 QUALIFICATIONS

.1 Installer Qualifications:

.1 Flooring contractor requirements.

.1 Specialty contractor normally engaged in this type of work, with prior experience in installation of these types of materials.

.2 Certified by carpet manufacturer prior to bid submission.

.3 Must not sub-contract labour without written approval of Departmental Representative.

.2 Be responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturers written instructions.

1.8 REGULATORY REQUIREMENTS

.1 Carpet tile shall be tested to CAN/ULC-S102.2 and have a maximum flame spread rating of 300 and maximum smoke developed rating of 450 in accordance with NBC requirements

.2 Indoor Air Quality: compliance with CRI/CCI Green Label Indoor Air Quality Program, CRI/CCI-IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI/CCI-IAQ label.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Label packaged materials.

.2 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.

.3 Store carpeting and accessories in location as directed by Departmental Representative. Store carpet and adhesive at minimum temperature of 18°C and relative humidity of maximum 65% for minimum of 48 hours before installation.

.4 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.

.5 Store materials in area of installation for minimum period of 48 hours prior to installation.

.6 Modular carpet: store on pallet form as supplied by Manufacturer. Do not stack pallets.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Moisture: Ensure substrate is within moisture limits and alkalinity limits prescribed by manufacturer. Prepare moisture testing and provide report to Departmental Representative.

.2 Temperature: Maintain ambient temperature of not less than 18^{o}C from 48 hours before installation to at least 48 hours after completion of work.

.3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.

.4 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.5 Ventilation:

.1 Arrange with Departmental Representative to operate existing building ventilation system to provide continuous ventilation during and after carpet application. 24 hours per day during installation and for 7 days after completion of carpet installation.

1.11 EXTRA MATERIALS

.1 Provide extra materials of carpet, carpet base, and adhesives in accordance with Section 00 10 00.

.2 Provide modular tile maintenance material in quantity equivalent to minimum 5% of each colour, pattern and type of carpeting installed. Minimum one full box of each.

.3 Extra materials to be from same production run as installed materials.

.4 Identify each package of carpet and each container of adhesive.

.5 Deliver to site and store where directed by Departmental Representative.

Part 2 Products

2.1 MANUFACTURERS

.1 Specification is based on products of Shaw Contract Group. Products of other modular carpet manufacturers may be acceptable subject to review and acceptance by the Departmental Representative for conformance to design concept and specifications.

.2 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute IAQ requirements.

2.2 MODULAR CARPET (CPT)

.1 Provide carpet tile in dimensions, patterns and colours as specified.

.2 Construction: tufted.

.3 Pile Surface Appearance:

.1 Multi-level pattern loop.

.4 Pile fibre: to CAN/CGSB-4.129.

.1 Nylon.

.5 Gauge: 1/12.

.6 Stitch Rate: 10 per inch.

.7 Tuft Density: 6,511 ounces per square yard.

.8 Finished Pile Thickness: 0.094 inch.

.9 Yarn Dye Method: 100% solution dyed.

.10 Colourization: multiple colour tones.

.11 Colourfastness to light: to CAN/CGSB-4.2No.18.3.

.12 Primary Backing: woven.

.13 Secondary Backing: synthetic.

.14 Soil protection: manufacturer’s protective treatment.

2.3 INSTALLATION ACCESSORIES

.1 Adhesive:

.1 Pressure sensitive type: recommended by carpet manufacturer for direct glue down installation of modular carpet or speciality backed carpets.

.2 Primers: waterproof, type recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.

.3 Sub-floor filler and leveller to ASTM F710, moisture-, mildew-, and alkali-resistant material, with 3000 psi compressive strength when cured:

.1 2 part latex-type filler requiring no water and packaged separately in correctly proportioned units as recommended by flooring manufacturer for use with their product.

.4 Reducer and transition strips: resilient wedge profile transition of thermoplastic rubber compound, 457 mm wide from 0 to thickness to suit transition.

.1 Acceptable product: Subfloor Leveller as manufactured by Roppe.

.5 Transition and edge strips: purpose made solid vinyl strip, tapered profile, dimensions to provide flush meeting with adjacent surfaces, color to be selected by Departmental Representative from manufacturer's standard range.

.1 Provide "J" or "T" profiles as necessary to protect edges at transitions.

.2 Tapered vinyl or rubber edging, profile and thickness to suit flooring condition, with lip to extend under floor finishes, shoulder flush with top of adjacent floor finish. Colour selected by Departmental Representative from manufacturer's full range.

.6 Carpet protection: non-staining heavy duty kraft paper.

.7 Subfloor patching compound: Portland cement base filler, mix with latex and water to form a cementitious paste.

2.4 CARPET TILE SCHEDULE

.1 **CPT-1:** Ignite Tile, Colour: Oxidize 48531, Size: 460mm x 915mm, as manufactured by Shaw Contract Group.

.2 **CPT-2:** Colour: glowing 81211 (yellow), Size: as per the drawings, as manufactured by Shaw Contract Group.

.3 **CPT-3:** Colour: purple 81991 (purple), Size: as per the drawings, as manufactured by Shaw Contract Group.

.4 **CPT-4:** Colour: hyper green 81326 (green), Size: as per the drawings, as manufactured by Shaw Contract Group.

.5 **CPT-5:** Colour: hyper blue 81436 (blue), Size: as per the drawings, as manufactured by Shaw Contract Group.

Part 3 Execution

3.1 SUB-FLOOR TREATMENT

.1 Concrete shall be inspected to determine special care required to make it a suitable foundation for carpet. Fill cracks 3 mm wide and level protrusions over 0.8 mm with appropriate and compatible latex or polymer fortified patching compound.

.2 Do not exceed manufacturer's recommendations for patch thickness.

.3 Large patch areas are to primed with a compatible primer.

.4 Concrete substrates shall be cured, clean and dry.

.5 Concrete substrates shall be free of paint, dirt, grease, oil, curing or parting agents, and other contaminates, including sealers, that may interfere with the bonding of the adhesive.

.6 Wherever a powdery or porous concrete surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for glue-down installation.

3.2 PREPARATION

.1 Prepare floor surfaces in accordance with CRI 104 Standard for Installation of Commercial Carpet.

.2 Pre-condition carpeting following manufacturer's printed instructions.

3.3 SUB-FLOOR TRANSITION LEVELLER

.1 Provide pre-fabricated resilient subfloor leveller at all transitions between resilient tile flooring and adjacent flooring types where elevation difference is 12.7 mm or less.

.2 Trim width of leveller to suit difference in elevation.

3.4 INSTALLATION OF ADHESIVE

.1 Review substrate and environmental conditions to ensure they are in accordance with adhesive manufacturer's written requirements.

.2 Mix and apply adhesives in strict accordance with manufacturer's written instructions, observing recommended application techniques and spread rates, open times and safety precautions.

.3 Apply adhesive to fully cover substrate using appropriate notched trowel. Use new trowels when existing trowels become worn. Self-adhesive carpet tile installation shall be in accordance with manufacturer's recommendations.

3.5 INSTALLATION OF CARPET TILE

.1 Install modular carpet in accordance with manufacturer's printed instructions and in accordance with NFCA guidelines using tools, materials, methods and sequence of work as recommended

.2 Install carpet tile as indicated in areas and patterns detailed on drawings and/or indicated on the project Finish Schedule.

.3 Install carpet tile adhered to substrate in accordance with NFCA requirements and carpet tile manufacturer's recommendations.

.4 Install carpet tile starting in the centre of the room and working outwards towards perimeter walls. Other acceptable commercial practices can be substituted as the starting point to provide a border width equal to at least half a tile.

.5 Install carpet tile with butted joints straight, in true plane with carpet nap in pattern indicated. Ensure dye lot, pattern, and texture match within any one area. All patterns shall be pre-approved by Departmental Representative.

.6 Border tiles shall be scribed to vertical surfaces and around architectural, mechanical, electrical and furniture fixtures, fitments and floor projections, and cut and fitted into place after the field tile has been laid and before wall base has been installed.

.7 Install carpet tile into recesses and closets adjacent to carpeted areas and continuous through doorways and other openings for a uniform appearance.

.8 Do not bridge building expansion joints with carpet tile; provide for movement.

.9 Tiles should be carefully rolled in each direction with a roller of size and weight as recommended by carpet tile manufacturer to ensure full adhesion of tile to the substrate and again when entire room is complete to ensure uniform adhesion.

.10 Clean excess adhesive off of tiles after installation using methods and materials recommended by flooring and adhesive manufacturer.

3.6 COMPLETION

.1 On completion of work, trim all loose pieces of face yarn with scissors, remove all carpet tile scraps and other refuse from areas and rooms worked in and from job site, and inspect and correct other apparent defects.

.2 Vacuum carpet tile with a beater type vacuum to remove dirt. Remove any soiled spots with proper cleaner recommended by carpet tile manufacturer for each type of carpet tile installed.

3.7 PROTECTION OF FINISHED WORK

.1 Prohibit traffic on carpet for a period of 24 hours until adhesive is cured.

.2 Install carpet protection to satisfaction of Departmental Representative.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

.2 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual, 2004.

.2 MPI - Maintenance Repainting Manual, 1998.

.3 Do painting and finishing to CGSB 85-GP series standards and to material manufacturer's instructions, except where specified otherwise.

.4 Stucco and Brick: Comply with CGSB 85-GP-31M.

.5 Concrete Floors: Comply with CGSB 85-GP-32M.

.6 Ferrous Metal: Comply with CGSB 81-GP-10M, 11a, 12, 13 or 15 as applicable.

.7 Galvanized Steel: 85-GP-16M.

.8 Copper & Copper Alloys: 85-GP-20M.

.9 Interior Plaster and Wallboard: 85-GP-33M.

1.2 SUBMITTALS

.1 Submittals in accordance with Section 00 10 00 General Instructions.

.2 Deliver on the Departmental Representative's request for approval, samples of materials proposed for use in the work. Make up samples 100mm wide by 300mm long (4" x 1'-0"). Finished work shall be equal to approved samples.

.3 Product Data:

.1 Submit product data and instructions for each paint and coating product to be used.

.2 Submit product data for the use and application of paint thinner.

.3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 00 10 - General Instructions. Indicate VOCs during application and curing.

.4 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Submit manufacturer's installation and application instructions.

1.3 QUALIFICATIONS

.1 Work shall be carried out by skilled labour under the supervision of a responsible and experienced foreman.

.2 Equipment shall be clean and in optimum working condition.

1.4 Protection

.1 Provide protective barriers and signs to protect the work and the public from contact with paint not yet dry.

.2 Protect surfaces likely to attract dust and insects thus liable to mar the finished surface.

.3 Have hardware, electrical and mechanical fittings removed and replaced by appropriate trades, else protect the above and other adjacent work.

1.5 STORAGE AND HANDLING

.1 Storage and Protection:

.1 Provide and maintain dry, temperature controlled, secure storage.

.2 Store materials and supplies away from heat generating devices.

.3 Store materials and equipment in well ventilated area within temperature as recommended by manufacturer.

.2 Fire Safety Requirements:

.1 Provide one, 9 kg, Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

.4 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

1.7 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces in accordance with Section 00 10 00 General Instructions..

.2 Co-ordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.

.3 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.

.2 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.

.3 Additional application requirements:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative, such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.8 WARNING

.1 DO NOT USE SPRAY EQUIPMENT: Only paint brush and roller will be accepted on this project.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Provide paint materials for paint systems from single manufacturer.

.3 Acceptable Paint: Sherwin Williams or approved equal.

2.2 COLOURS

.1 Submit proposed Colour Schedule to Departmental Representative for review.

.2 Colour schedule:

.1 P1: Sherwin Williams, Elder White, SW 7014.

.2 P2: Sherwin Williams, Dynamic Blue, SW 6958.

.3 P3: Sherwin Williams, Gauntlet Grey, SW 7019.

.4 P4: Sherwin Williams, Overt Green, SW 6718.

.5 P1: Sherwin Williams, Bee, SW 6683.

.6 P1: Sherwin Williams, Verve Violet, SW 6975.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site, in accordance with manufacturer's written instructions. Obtain written approval from Departmental Representative for tinting of painting materials.

.2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's instructions.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

2.5 INTERIOR PAINTING

.1 Gypsum board walls & existing perimeter metal heater covers, apply:

.1 One coat primer-sealer CAN/CGSB-1.119-M89.

.2 Two finish coats latex, Gloss Level 3, Sherwin Williams Paints:

.2 Doors and Frames surfaces apply:

.1 One coat primer-sealer.

.2 Two finish coats latex, Gloss Level 5, Sherwin Williams Paints (Door Frames are dissimilar in colour to Door).

.3 Concrete Floors:

.1 One coat primer-sealer.

.2 Two finish coats latex floor enamel Gloss Level 5, Sherwin Williams Paints.

.4 Exposed Mechanical and Electrical Equipment (except electrical conduit, refer to electrical spec):

.1 One coat primer-sealer.

.2 Two finish coats latex Gloss Level 2, Sherwin Williams Paints:

.5 Exposed Cementitious Fireproofing:

.1 One coat primer-sealer.

.2 Two finish coats latex Gloss Level 2, Sherwin Williams Paints:

Part 3 EXECUTION

3.1 GENERAL

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

.2 Perform preparation and operations for interior painting in accordance with MPI - Architectural Painting Specifications Manual and MPI - Maintenance Repainting Manual except where specified otherwise.

3.2 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.3 PREPARATION

.1 Protection:

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.2 Surface Preparation:

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

.2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.

.3 Clean and prepare surfaces in accordance with specific requirements and coating manufacturer's recommendations.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.

.2 Apply wood filler to nail holes and cracks.

.3 Tint filler to match stains for stained woodwork.

.6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

.7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.

.8 Touch up of shop primers with primer as specified.

.9 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

3.4 APPLICATION

.1 Method of application to be as approved by Departmental Representative. Conform to manufacturer's application instructions unless specified otherwise.

.2 Apply two finish coats to all previously finished or primed work.

.3 Give the Departmental Representative due notice and ample opportunity to inspect each coat and do not proceed with any coat until the last preceding coat is approved. Each coat shall be a different tint, under white a light blue.

.4 Apply no finish nor paint to wet, frozen or rusty surfaces.

.5 Clean castings with wire brushes.

.6 Do not paint at temperatures under 10°C (50°F) or over 35°C (95°F) (lacquer not lower than 15°C (59°F)) nor on surfaces where condensation is likely to form.

.7 Give additional coats to work which is unsatisfactory to the Departmental Representative after the application of the specified number of coats without extra compensation. Touch up dead or dull spots.

.8 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.9 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.10 Sand and dust between coats to remove visible defects.

.11 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

.12 Finish inside of cupboards and cabinets as specified for outside surfaces.

.13 Finish closets and alcoves as specified for adjoining rooms.

.14 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

.15 Doors, windows: and other shop made items, shop prime. Seal and paint the bottoms and edges of all doors before hanging.

.16 Allow a minimum of 24 hours between coats for oil based paints and 8 hours between coats of water based paints

3.5 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.

.2 Do not paint over nameplates.

.3 Keep sprinkler heads free of paint.

.4 Paint fire protection piping to match colour on existing piping.

.5 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.6 Paint natural gas piping to match colour on existing piping.

.7 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

END OF SECTION

Part 1 GENERAL

1.1 Shop Drawings

.1 Submit shop drawings in accordance with Section 01000.

.2 Clearly indicate fabrication details, plans, elevations, hardware, and installation details.

Part 2 PRODUCTS

2.1 Materials

.1 Sheet steel: commercial grade, stretcher levelled sheet steel to ASTM A526/A526M-90 with Z275 zinc coating to ASTM A525M-91b.

.2 Minimum base steel thickness:

.1 Panels and doors: 0.8 mm (20 gau.).

.2 Pilasters: 1.0 mm (18 gau.).

.3 Reinforcement: 3.0 mm (1/8").

.3 Stainless steel sheet: to ASTM A666-92 type 304 with No. 4 finish.

.4 Pilaster shoe: 0.8 mm (20 gau.) stainless steel, 75mm (3") high.

.5 Attachment: stainless steel tamperproof type screws and bolts.

.6 Hardware:

.1 Hinges: concealed heavy duty chrome plated non-ferrous casting, adjustable door-open angle.

.2 Latch set: built-in, combination latch, door stop, keeper and bumper chrome plated non-ferrous casting or extrusion.

.3 Wall and connecting brackets: anodized aluminum extrusion or casting.

.4 Coat hook: combination hook and door bumper, chrome plated non-ferrous casting. Vinyl reinforced tarps.

2.2 Fabrication

.1 Doors and panels: 25 mm (1") thick, two sheet steel faces pressure bonded to honeycomb core, 600 mm wide x 1473 mm (2'-0" x 4'-10") high.

.2 Pilasters: 32 mm (1-1/4") thick, constructed same as door, to sizes indicated.

.3 Headrails: 25 x 40 mm (1" x 1-1/2").

.4 Pilaster shoes: 75 mm (3") high, die formed stainless steel.

.5 Provide formed and closed edges for doors, panels and pilasters. Mitre and weld corners and grind smooth.

.6 Provide internal reinforcement at areas of attached hardware and fittings. Temporarily mark location of reinforcement for tissue holders.

.7 Provide 0.8 mm (20 gau.) thick type 316 stainless steel protective shields on urinal side of toilet partition panels next to urinals. Make protective shields 600 mm wide x 800 mm high (2'-0" x 2'-8") with top of shield 1200 mm (4'-0") above finished floor. Fasten with stainless steel screws.

2.3 Shop Finishing

.1 Clean, degrease and neutralize steel components with phosphate or chromate treatment.

.2 Spray apply primer to CAN/CGSB-1.81-M90, 1 coat.

.3 Spray apply finish enamel to CAN/CGSB-1.88-92, type 2 gloss, 1 coat and bake to smooth, hard finish.

.4 Finish: doors and pilaster/panels same colour as selected from manufacturer's custom colour by the Departmental Representative.

Part 3 EXECUTION

3.1 Partition Erection

.1 Install partitions secure, plumb and square.

.2 Leave 12 mm (1/2") space between wall and panel or end pilaster.

.3 Attach fixing brackets securely to masonry/ concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors.

.4 Attach panel and pilaster to brackets with through type sleeve bolt and nut.

.5 Provide for adjustment of floor variations with screw jack through steel saddles made integral with pilaster. Conceal floor fixings with stainless steel shoes.

.6 Equip each door with hinges, latch set, and coat hook. Adjust and align hardware for easy, proper function. Set door open position at 30° to front, opening inward.

.7 Make good baked enamel surfaces damaged during shipment or installation.

END OF SECTION

Part 1 GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit submittals in accordance with Division 01.

.2 Product Data:

1. Provide manufacturer's printed product literature and data sheets for metal lockers and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

1. Submit drawings stamped and signed by professional engineer registered or licensed in Ontario of Canada.

2. Indicate on drawings: type and class of locker, thicknesses of metal, fabricating and assembly methods, assembled banks of lockers, tops, rods, hooks, shelves, bases, trims, numbering, filler panels, end/back panels, doors, handles, locking method, ventilation method, and finishes.

.4 Samples:

1. Submit duplicate 50 x 50 mm samples of colour and finish on actual base metal.
2. Samples will be returned for inclusion into work.

1.2 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section Div. 01 and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

1. Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect metal lockers from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

Part 2 PRODUCTS

2.1 MANUFACTURED UNITS

.1 Lockers: to CAN/CGSB-44.40, Type 2 - Double tier locker, and freestanding.

.2 Acceptable Product: Emperor Corridor Lockers, from Hadrian Inc. Colour: to be selected by Departmental Representative from manufacturer's full range of available colours, or approved equivalent.

2.2 ACCESSORIES

.1 Locking system: padlocks, supplied by locker manufacturer.

Part 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates and surfaces to receive metal lockers previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to metal locker installation.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Assemble and install lockers in accordance with manufacturer's written instructions.

.2 Securely fasten lockers to grounds and nailing strips.

.3 Install wall trim around recessed locker banks.

.4 Install filler panels (false fronts) where indicated and where obstructions occur.

.5 Install finished end/back panels to exposed ends/backs of locker banks.

.6 Install locker numbers and locks.

3.3 ADJUSTING

.1 Adjust metal lockers for correct function and operation in accordance with manufacturer's written instructions.

.2 Lubricate moving parts to operate smoothly and fit accurately.

3.4 CLEANING

.3 Progress Cleaning: clean in accordance with Div. 01.

.4 Leave Work area clean at end of each day.

.5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.5 PROTECTION

.6 Protect installed products and components from damage during construction.

.7 Repair damage to adjacent materials caused by metal locker installation.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 08 52 00 – Aluminum Windows.

1.2 REFERENCES

.1 ASTM International

.1 ASTM D1784-11, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature and data sheets for horizontal louver blinds and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Shop Drawings:

.1 Indicate on drawings dimensions in relation to window jambs, operator details, head and sill anchorage details, hardware and accessories details.

.3 Samples:

.1 Submit duplicate samples of manufacturer's standard colours for selection by Departmental Representative.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

Part 2 PRODUCTS

2.1 DESIGN CRITERIA

.1 Design roller blinds to the following requirements:

.1 Allow wear susceptible parts to be replaceable by either user or manufacturer.

.2 Guarantee of at least five-years of available replacement parts following discontinue of products manufacture.

.3 Include instructions for replacing or repairing worn parts, including inventory numbers for parts and procedures for ordering replacement parts.

.4 Include stamps on major plastic components indicating composition code to facilitate recycling efforts.

2.2 MATERIALS AND FABRICATION

.1 Manual operated roller shades: Acceptable manufacture, Hunter Douglas “RB 500 Manual Roller Shades”, 10% open and 0% open (blackout) or approved equal.

.2 Fabrics: Inherently anti-static, flame retardant, fade and stain resistant, light filtering & blackout fabrics.

.1 Fabric Composition: 100% Polyester, PVC Free, 72% recycled content.

.2 Acceptable roller shade material: Hunter Douglas "Apollo – 0% Openness factor and GreenScreen Evolve – 10% Openness factor.

.3 Colour selections by Departmental Representative.

.3 Control Systems: Clutch Operated, engineered heavy duty chain drive pulley operating system consisting of metal clutch housing and locking plug containing minimum 6 ribs and inserted at minimum of 2-1/4" into roller tube. Lift torque enhancement provided by Counter Balance System with integrated spring support module.

.4 Dual Roller Shades: Universal mount steel brackets with 2 separate solar and room darkening blackout roller shades operating independently of each other.

.5 Bottom Bar: Extruded aluminum weight in a Sealed Pocket Hem Bar, or RB Bottom Bar for fabrics that are not seamable. Bottom bar is for tracking adjustments and provides uniform look

.6 Mounting Hardware: Manufacturer's standard heavy duty bracket constructed of hardened 3mm thick steel to support full weight of shade with bracket & screw hole covers to provide uniform look. Integrated leveling device for enhanced level adjustment of overall shade. Locking mechanism on bracket adapter provides for a secure installation and removal of the shade.

.7 Fascia: L shape removable aluminum extrusion valance that attaches to brackets and conceals roller shade.

.8 Roller Shade Pocket: Extruded aluminum alloy U shape housing for recessed mounting in acoustical tile or drywall ceilings. 5.25" (or 9") in diameter with aluminum closure mount.

.9 Blockout System: Extruded aluminum side channel with concealed mounting brackets. Bottom bar with nylon wool pile to prevent light leakage.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates and surfaces to receive horizontal louvre blinds previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to horizontal louvre blinds installation.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative.

3.2 INSTALLATION

.1 Install blinds at new exterior windows, as indicated on plans and details.

.2 Include centre brackets where necessary to prevent deflection of headrail.

.3 Adjust to provide for operation without binding.

.4 Use non corrosive metal fasteners for installation, concealed in final assembly.

3.3 ADJUSTING

.1 Adjust roller shade components for correct function and operation in accordance with manufacturer's written instructions.

.2 Lubricate moving parts to operate smoothly and fit accurately.

3.4 CLEANING

.1 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by roller shade installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI A208.1-2009, Standard for Particleboard.

.2 American National Standards Institute / Business & Institutional Furniture Manufacturers Association

.1 ANSI/BIFMA X5.5-2014 Desk Products

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-44.227-2008 Free-Standing Office Desks and Components

.2 CAN/CGSB-44.232-2002, Task Chairs for Office Work with Visual Display Terminals.

.4 Underwriters' Laboratories Canada (ULC).

.1 CAN/ULC-S102-10, Standard Method of Test for Surfaces Burning Characteristics of Building Materials and Assemblies.

.5 Underwriters' Laboratories (UL).

.1 UL 1286 2008, Standard for Office Furnishings.

1.2 SUBMITTALS

.1 Submit product data in accordance with submittal procedures of Section 00 10 00. Indicate conformance to specified reference standards and specifications.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with submittal procedures of Section 00 10 00. WHMIS MSDS acceptable to Health Canada.

.3 Supply part numbers of furniture to allow for replacement of worn or damaged furniture parts.

.4 Supply instructions detailing procedures for repairing or replacing worn furniture parts.

.5 Submit samples in accordance with submittal procedures of Section 00 10 00.

1.3 DELIVERY, HANDLING AND STORAGE

.1 Deliver, store and handle furniture in accordance with manufacturer’s recommendations, using means and methods as necessary to prevent all damage, deterioration and loss.

.2 Schedule delivery to minimize time of storage at site and to prevent overcrowding of construction areas. Do not deliver furniture until all painting, flooring and overhead work is complete and products are required for installation.

.3 Deliver products in manufacturer’s original sealed containers or wrappings, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

.4 Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are free from damage and deterioration and are properly protected.

1.4 WARRANTY

.1 Provide written assurance that replacement parts will be available for minimum of 5years following discontinuation of product manufacture.

.2 Ensure warranties provide for repair rather than replacement.

Part 2 Products

2.1 FURNITURE PRODUCTS

.1 Specification is based on products as listed by a stated manufacture. Equivalent products with similar design and function must be submitted to the Departmental Representative for review, conformance to design concept and accommodation requirements.

.2 Provide all finished products specified in this section as the products of a single manufacturer with a minimum of ten (10) years experience in the manufacturing of office furniture.

.3 Products shall conform to applicable requirements of CAN/CGSB-44.227, CAN/CGSB-44.232, and UL 1286.

.4 Surface burning characteristics shall conform to requirements of National Building Code of Canada when tested in accordance with CAN/ULC-S102.

2.2 MEETING CHAIR (C3)

.1 Dimensions:

.1 Seat height: 419 - 527 mm.
.2 Overall height: 953 - 1060 mm.
.3 Overall depth: 711 mm.
.4 Overall width: 711 mm.
.5 Seat width: 470 mm.
.6 Seat depth: 457 mm.
.7 Back height: 533 mm.
.8 Back width: 482 mm.

.2 Features

.1 Frame: 22 mm solid steel frame, constructed for strength and durability.
.2 Seat: Upholstered with foam pad.
.1 Color selected by Departmental Representative from manufacturer’s full range.
.2 Upholstery: Grade 2
.3 Back: Midback, mesh.

.1 Color selected by Departmental Representative from manufacturer's full range.

.4 Control Mechanism: Synchro tilt.

.5 Casters: 65mm carpet Casters Standard.

.6 Frame finish: Polished Aluminum

.7 Chair Style:

.1 Arms: Conference Arm.

.2 Base: 5 prong base with casters, chrome finish.

.3 Arms: Fixed conference arms..

.3 Similar product to:

.1 Inertia Mesh Conference Midback Chair as manufactured by Allseating, or approved equal.

2.3 TASK CHAIR – Typical Hoteling Stations (C5)

.1 Dimensions:

.1 Seat height: 419 - 527 mm.

.2 Overall height: 1016 - 1124 mm.

.3 Overall depth: 711 mm.

.4 Overall width: 711 mm.

.5 Seat width: 470 mm.

.6 Seat depth: 470 mm.

.7 Back height: 597 mm.

.8 Back width: 482 mm.

.2 Features

.1 Frame: 22 mm solid steel frame, constructed for strength and durability.

.2 Seat: Upholstered with foam pad.

.1 Color selected by Departmental Representative from manufacturer's full range.

.2 Upholstery: Grade 2

.3 Back: Highback, mesh.

.1 Color selected by Departmental Representative from manufacturer's full range.

.4 Control Mechanism: Synchro tilt.

.5 Casters: 65mm carpet Casters Standard.

.6 Frame finish: Polished Aluminum

.7 Chair Style:

.1 Arms: Conference Arm.

.2 Base: 5 prong base with casters, chrome finish.

.3 Arms: Fixed conference arms.

.3 Similar product to:

.1 Inertia Conference Highback Chair as manufactured by Allseating, or approved equal.

2.4 GUEST CHAIR – Managers' and Directors' Offices (C1)

.1 Dimensions:

.1 Seat height: 445 mm.
.2 Overall height: 812 mm.
.3 Overall depth: 610 mm.
.4 Overall width: 457 mm.

.2 Features:

.1 Upholstered Seat GR 2.
.1 Seat foam, cut foam standard.
.2 Woven+ mesh back.
.3 Color selected by Departmental Representative from manufacturer's full range.
.4 Ganging brackets with arms.
.5 Carpet casters
.6 Tubular steel frame, silver finish.

.3 Similar product to:

.1 Inertia Mesh Side Chair as manufactured by Allseating, or approved equal.

2.5 STATIONARY LOUNGE CHAIR – Collaboration Areas (C6)

.1 Dimensions

.1 Seat height: 432 mm.
.2 Overall height: 864 mm.
.3 Overall depth: 813 mm.
.4 Overall width: 813 mm.
.5 Seat width: 610 mm.
.6 Seat depth: 483 mm.
.7 Back height: 432 mm
.8 Bach width: 610 mm

.2 Features

.1 Available as single cushion lounge chair
.2 Upholstered back/seat.
.3 Passive lumbar back support.
.4 Grommets to accommodate cup holder and tablet arm non- handed (reversible)
.5 Tablet and cup holder: Standard Laminate finish
.6 Interior frame has glued and doweled joints, reinforced with screws and cleats.
.7 Exposed metal legs.

.8 Fabric: Different fabrics for each of seat and back as selected by Departmental Representative from manufacturer's full range.

.9 Legs, back support uprights and optional grommets metal construction in metallic silver finish.

.3 Similar product to:

.1 Taylor Lounge Arm Chair, GR 3 as manufactured by Logiflex Office Furniture, or approved equal.

2.6 TABLET CHAIR – Quiet Rooms Tablet Chair (C2)

.1 Dimensions:

.1 Seat height: 440 – 550 mm.

.2 Overall height: 765 – 870 mm.

.3 Overall depth: 795 mm.

.4 Overall width: 630 mm.

.2 Features:

.1 Base and yolk, polished aluminum

.2 Five star base, polished aluminum.

.3 Fully upholstered, GR 2.

.1 Color selected by Departmental Representative from manufacturer's full range.

.4 Moulded foam construction.

.5 Tablet arm.

.6 Cup holder.

.3 Similar product to:

.1 Sholes Lounge Arm Chair (SHLED03) as manufactured by Allermuir Sholes, or approved equal.

2.7 STACKING CHAIR – Kitchen Chair (C4)

.1 Dimensions

.1 Seat height: 457 mm.

.2 Overall height: 862 mm.

.3 Overall depth: 584 mm.

.4 Overall width: 546 mm.

.5 Seat width: 438 mm.

.6 Seat depth: 457 mm.

.7 Back height: 362 mm

.8 Bach width: 470 mm

.2 Features:

.1 Stacking chair, stacks 12 high.

.2 Sled base,

.3 Polypropylene seat and back.

.1 Color selected by Departmental Representative from manufacturer's full range.

.4 Frames finish chrome.

.3 Similar product to:

.1 Tuck Stacking Chair as manufactured by Allseating Seating, or approved equal.

2.8 STACKING STOOL – Kitchen Stool (S1)

.1 Dimensions

.1 Seat height: 787 mm.
.2 Overall height: 1162 mm.
.3 Overall depth: 699 mm.
.4 Overall width: 622 mm.
.5 Seat width: 438 mm.
.6 Seat depth: 483 mm.
.7 Back height: 362 mm
.8 Bach width: 470 mm

.2 Features:

.1 Stacking barstool, stacks 5 high.
.2 Sled base,
.3 Polypropylene seat and back.

.1 Color selected by Departmental Representative from manufacturer's full range.

.4 Frames finish chrome.

.3 Similar product to:

.1 Tuck Bar Stool as manufactured by Allseating Seating, or approved equal.

2.9 SIT TABLE - Quiet Rooms, Managers' and Directors' Offices (T1)

.1 Table Top Finish: Laminate.

.2 Tables tops

.1 Thickness: 30 mm thick.
.2 Table edge: PVC edgeband
.3 Table Shape: Round
.4 Table size: Size: 915 mm diameter by 724 mm high.

.3 Table Base: Single Column X-Base with glides.

.4 Similar product to:

.1 Everywhere Table 915mm as manufactured by Herman Miller, or approved equal.

2.10 MEETING ROOM, Furniture supplied by one manufacture

.1 MEETING TABLE – All Meeting Rooms

.1 Dimensions:

.2 Overall Table Top:

.1 **T2** (1450 mm x 2700 mm), **T6** (1067 mm x 2100 mm), **T7** (2500 mm x 3400 mm), **T8** (1600 mm x 3800 mm).

.2 Thickness: 26.5 mm.

.3 Table top construction: manufacturer's standard core with high-pressure wood grain laminate finish, rectangular shape.

.1 Color selected by Departmental Representative from manufacturer's full range.

.2 Table Connectors:

.1 Zinc finish,

.2 One package of two per table.

.3 Edge:

.1 3 mm thermoplastic polymer edge banding.

.2 Silver edge.

.4 Base:

.1 Metal L Base.

.2 Flip-Top Mechanism.

.3 75 mm diameter casters with brake.

.1 Capacity 45kg per caster.

.5 Power and data module: UL listed, clear anodized aluminum bezel, with sliding module with four power and one HDMI and one data/communications outlet each. All table sections to have power and data modules.

.6 Similar product to:

.1 Training Tables as manufactured by Lacasse Office Furniture Solutions, or approved equal.

2.11 COFFEE TABLE – Collaboration Areas (T9)

.1 Dimensions:

.1 Overall Height: 508 mm.

.2 Diameter: 915 mm.

.2 Table Top:

.1 Finish: Laminate.

.1 Color selected by Departmental Representative from manufacturer's full range.

.2 Table Thickness: 41 mm.

.3 Edge: Knife Edge.

.4 Table Shape: Round

.3 Table Base: Disc.

.4 Similar product to:

.1 Magog Coffee Table 915mm Round as manufactured by Logiflex Office Furniture, or approved equal.

2.12 KITCHEN TABLEs – Kitchen (T3), (T4) & (T5)

.1 Dimensions:

.1 **T3:** (3) 760 mm x 1525 mm. Height: 760 mm.

.2 **T4:** (2) 400 mm x 1830 mm. Height: 1067 mm.

.3 **T5:** (3) 400 mm x 1830 mm. Height: 1067 mm.

.2 Tables top:

.1 Table Top Finish: Laminate.

.1 Color selected by Departmental Representative from manufacturer's full range.

.2 Thickness: 30 mm thick.

.3 Table edge: 2mm.

.4 Table Shape: Rectangular,

.3 Gable Ends: 50 mm End Panels.

.1 Gable Finish: Laminate.

.1 Color selected by Departmental Representative from manufacturer's full range.

.4 Similar product to:

.1 Endzone 50 mm End Panel as manufactured by Spec Furniture Inc, or approved equal.

2.13 DUAL MONITOR ARM – All Workstations and Offices

.1 Features:

.1 600 mm maximum monitor size.

.2 546 mm arm reach.

.3 240 mm arm height adjustment range. (450 mm maximum height)

.4 145° monitor tilt.

.5 360° monitor rotation with 180° limiter.

.6 Grommet bolt through mount.

.7 Silver with black accents.

.2 Similar product to:

.1 ISE MA4000 Lite Dual Monitor Arm as manufactured by ISE, or approved equal.

Part 3

3.1 FABRICATION

.1 Manufacture furniture to allow for dismantling and replacing of worn or defective components and recycling options following first use.

.1 Fabricate furniture to allow for remanufacturing or refurbishing of furniture following first use.

.2 Seal exposed surfaces of particleboard constructed with urea formaldehyde adhesives to contain formaldehyde emissions.

.2 Chair Marking and labelling: to CAN/CGSB-44.232.

Part 4 Execution

4.1 EXAMINATION

.1 Examine Project site 24 hours before first delivery, including loading dock area, elevators and staging areas to ensure conditions are satisfactory for proper performance of the Work.

.2 Note existing damage to building or debris that hinders performance and report to Departmental Representative.

.3 Examine products immediately upon delivery and again prior to installation. Reject damaged or defective items and remove from site.

.4 Do not proceed until unsatisfactory conditions have been corrected.

4.2 INSTALLATION OF FURNITURE

.1 Comply with manufacturer’s installation instructions and recommendations.

.2 Provide connection devices, hardware, and accessories required for complete installation.

4.3 CLEANING AND ADJUSTMENT

.1 Remove and replace products that are chipped, scratched, delaminated, or otherwise defective and do not match adjoining Work or do not operate properly. Provide new matching units, installed as specified and without evidence of replacement.

.2 Adjust to provide smooth operation of moving parts without binding or racking, levelled to prevent rocking.

.3 Clean furniture of all soil marks, dust, fingerprints and loose threads.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Division 26 Electrical: Electrical services for work stations.

.2 Division 27 Communications: Communications cabling and connections for work stations.

1.2 REFERENCES

.1 American National Standards Institute / Business & Institutional Furniture Manufacturers Association

- .1 ANSI/BIFMA X5.5-2014 Desk Products
- .2 ANSI/BIFMA X5.6-2010 Panel Systems
- .3 ANSI/BIFMA X5.9-2012 Storage Units
- .4 ANSI/BIFMA X7.1-2011 Standard for Formaldehyde & TVOC Emissions.

.2 Canadian General Standards Board

- .1 CAN/CGSB-44.227-2008 Free-Standing Office Desks and Components
- .2 CAN/CGSB-44.229-2008 Inter-connecting Panel Systems and Supported Components.

.3 Underwriters Laboratories

- .1 UL 1286 Standard for Office Furnishings

1.3 SCOPE OF WORK

.1 Include all panels and furniture components as indicated on the drawings.

.2 Panel systems to include base and/or stackable units, separate and/or in combination to provide an architectural look and function as specified and as indicated.

.3 Panels to be wired by installers for hook-up by others. Panels are to have desk height or base accessible data, telephone and power, as outlined on drawings. The raceway to be accessible from one or both sides.

1.4 MANUFACTURERS & PRODUCTS

.1 The standard of performance for manufacturer's products and panels are as specified herein and as generally described by the latest edition of CAN/CGSB-44.229 for Inter-connecting Panel Systems and Supported Components. Free-Standing Components to meet CAN/CGSB-44.227.

.2 Local representation with a local sales office and locally available factory trained and certified installers is a requirement.

.3 Submit all design and associated design material including shop drawings for review in accordance with submittal requirements of Section 01 00 10.

.4 Manufacturers are to demonstrate by mock-ups the ability to meet the technical specifications, stability without the support of furniture components and load bearing ability with stacking components without changing base units. Mock-up should also show a typical side by side workstation with and without work surfaces and accessories.

.5 Demonstrations and mock-ups of product shall be carried out locally at supplier showroom, on site or other local installation.

1.5 SUBMITTALS

.1 Submit all necessary test reports, samples and other information required to demonstrate that the products to be installed meet all performance criteria specified herein. Systems certification to CAN/CGSB-44.229 Standard. Assembled panels to meet Flame Spread and Smoked Developed Index of the National Building Code of Canada.

.2 Provide test reports from a recognized testing laboratory or agency.

.3 Show complete plans of the work at 1:100 or a scale sufficient to indicate:

- .1 Widths and heights of all panels.
- .2 Locations of panel joins, vertical and horizontal.
- .3 Finish of each side of each panel,
- .4 Locations of all components,
- .5 Heights of work surfaces and accessories indicated.
- .6 Points of connection of powered panels to hard-wired circuits,
- .7 Locations of all electrical and telephone and data outlets

.4 Update shop drawings upon completion of installation to show completed (as-built) layout in AutoCAD format, as requested by Departmental Representative and in accordance with Department CAD Standards.

1.6 WARRANTY

.1 Provide a written warranty, signed and issued in the name of National Research Council of Canada by the manufacturer stating that the post and panel demountable partitions system is guaranteed against defects in materials and workmanship of the systems as a whole or of any component for a period of five (5) years and against obsolescence for a period of ten (10) years from the date of Substantial Completion.

.2 Replacement of defective material to be provided at no cost for parts, labourer, and transportation for first five (5) years.

.3 Provide replacement parts, including transportation, for five (5) years after initial five (5) years from date of Substantial Completion at no cost to the National Research Council of Canada.

1.7 TRAINING

.1 Provide training in accordance with closeout procedures of Section 01 00 10.

.2 Provide a training program for designated maintenance staff in methods of disassembly and reassembly, reupholstering, replacement and ordering of panels and components, furniture etc.

1.8 TOOLS

.1 Supply two (2) sets of tools required for disassembly, reassembly, and reupholstery for use by maintenance personnel, in accordance with closeout procedures of Section 01 00 10.

1.9 MAINTENANCE DATA

.1 Provide two (2) sets of Maintenance and Operations Manuals in accordance with closeout procedures of Section 01 00 10, including assembly, disassembly, refinishing and reupholstering and maintenance data.

1.10 DIMENSIONS

.1 Provide panels as dimensioned on drawings.

.2 Panel heights shall consist of a base panel with or without added stacking panels to achieve panel division heights as indicated on drawings.

.3 Dimensions noted on the drawings are critical minimums required to accommodate specific furniture and provide adequate corridor and exit widths that meet NBCC, latest edition, Exit Requirements.

.4 Dimensions of workstations shall not be scaled from the drawings. Workstations are to be constructed using the minimum number of standard panels yielding the total length of the dimension provided such that specified and future components or furniture can be installed in the indicated location. Layouts to accommodate future or specified furniture layouts as shown by combination panel hung and floor supports without having to be reconfigured.

.5 Panels and workstation components to the manufacturer's nearest standard size to the metric dimensions indicated.

.6 Panels and panel ends delineating corridors to fall on straight lines.

1.11 SCHEDULING

.1 Departmental Representative to approve installation schedule. Schedule time for inspections and training.

1.12 MAINTENANCE MATERIALS

.1 Provide maintenance material listed and in accordance with closeout procedures of Section 01 00 10.

.2 Provide 15 m2 of each type and colour of upholstery fabric used as surface covering for partition panels.

.3 Provide 150 ml quantity of touch-up fluid for the repair of paint-type surfaces. Supply touch-up fluid in small containers.

.4 Maintenance materials to be of the same production run, and dye lot as the installed materials.

PART 2 PRODUCTS

2.1 ACCEPTABLE PRODUCTS AND MANUFACTURERS

.1 Specification is based on Canvas as manufactured by Herman Miller. Equivalent products with similar design and function must be submitted to the Departmental Representative for review, conformance to design concept and accommodation requirements.

.2 The following products and manufacturers are acceptable, subject to conformance with the specification and drawings:

.1 Canvas as manufactured by Herman Miller.
.2 Compose as manufactured by Haworth.
.3 Answer as manufactured by Steelcase.
.4 Leverage as manufactured by Teknion
.5 Cosmopolitan as manufactured by Tayco.

.3 Provide all primary products specified in this section as the products of a single manufacturer with a minimum of ten (10) years experience.

2.2 PANELS

.1 Panel Types:

.1 Panel thickness: 75 mm +/- 5 mm.
.2 Standard panel width +/- 25mm:
.1 915 mm
.2 610 mm
.3 1219 mm
.4 1524 mm
.5 Other panel sizes for closure panels may be required.
.3 Standard panel heights:
.1 1270 or 1447 mm

.2 1676 or 1727 mm

.4 Use combinations of panel widths and heights listed above to achieve workstation layouts indicated on drawings. Max panel and glass topper height 1727mm,

.1 Panel height of 1447 mm plus glass topper height 280 mm = 1727 mm,

.2 Panel height of 1270 mm plus glass topper height 406mm = 1676 mm.

.2 Architectural glazed elements: single pane 6.0 mm clear tempered glass, frameless, for panels as indicated.

.1 Glass panel-topper height:

.1 280 mm or 406 mm.

.3 Panel construction: Panels to be capable of providing telephone, data and power as indicated. Manufacturer to provide power from building connection to receptacle locations. Cover panels with the specified fabric, attached to allow field re-upholstery without removing the panel. Trim panels with durable top and side rail. If caps are required by manufacturer to provide trim look, caps are to be metal or PVC unless noted otherwise. Trim to be finished with the manufacturer's standard powder coated finish, colour to be selected by Departmental Representative. Panels to be load bearing up to 1700 mm.

.4 Panel frames:

.1 Frames shall consist of four roll-formed cold rolled steel tubes welded together at the corners into a rectangular frame and finished using an e-coating process. Frames shall be load bearing.

.2 Panels shall be reinforced to accommodate cantilevered work surfaces, shelves and storage units.

.5 Panel core: no-added formaldehyde molded fiber-pad insert.

.6 Panel joints: Panels shall be jointed with manufacturer’s standard closure providing a sight and sound seal as tight as possible (maximum allowable gap of 3 mm). Provide equal sight and sound, seal at existing construction, where wall mounts are used.

.1 Panels shall have the capability to stack up to 90" and be connect to one another via a bolted connection.

.2 Panel connectors must be universal for use in all 90 degree conditions (2-,3- and 4-way conditions shall be orderable as a single line item).

.7 Support: Manufacturer's standard, to permit up to 38 mm +/- 5 mm adjustment. Provide two (2) corrosion resistant supports per panel and provide grippers for each support leg for the finished floor. Provide extended leg support to meet site conditions at no extra cost. Provide support for panels independent of work surfaces. Provide stabilizing panels as required, where wall attachment is not possible.

.8 Fabric: Fabric pattern/style as selected by Departmental Representative from manufacturers full range, meeting this specification. Several colors or patterns may be used throughout, limited to three (3) different colors or patterns. Fabric to meet the following minimum requirements;

.1 Content: 100% polyester (may contain recycled material)

.2 Weight: Between 275 and 400 g per linear m

.3 Width: min 1675 mm

.4 Directional: Non-directional

.5 Fabric to meet the Association of Contract Textiles (ACT), Fabric Performance Guidelines.

.9 Adjustment: Panels to allow for work surface components and accessories to be adjusted in height in 25 mm increments.

2.3 FURNITURE COMPONENTS

.1 Manufacturer's standard systems furniture as shown on the drawings.

.2 Provide standard supports and accessories required for proper installation and functioning of the furniture components. Provide accessories for optimum rigidity of work surfaces and other items without attaching panel bottoms or legs to building structure. Where support legs are necessary provide corrosion resistant supports and two (2) per panel.

.3 Colours as selected by the Departmental Representative from the manufacturer's full range.

.4 Provide numbers and types of units indicated:

.5 Work Surfaces:

.1 Straight and corner styles, depths and lengths as shown.

.1 Fixed height work surface with panel mounted bracket supports.

.2 Freestanding electric height adjustable (simple up down) work table with 686 mm to 1173 mm range on L-shaped legs.

.1 Typical Workstation – Surface Size:

.1 610 mm X 1220 mm.

.2 Private Offices – 333, 334, 335, and 336 – Surface Size.

.1 762 mm X 1524 mm with modesty panel.

.3 Similar product to:

.1 Renew Sit-To-Stand Tables as manufactured by Herman Miller.

.2 Manufacturers standard, constructed of high pressure plastic laminate bonded to high pressure particle board, with a high pressure laminate backer sheet on the underside work surfaces and pre-drilled for support devices.

.1 Thickness: 25 mm to 30 mm.

.3 Edges to be rounded and trimmed with a PVC T-moulding in a colour to be selected by Departmental Representative.

.4 Support brackets to be self-locking where mounted to panels. Colour and finish to match the panel trim.

.5 Each work surface may be supported using pedestals, panels, brackets or cantilever brackets or a combination thereof.

.6 Work surfaces may be hung from panels in an off modular manner.

.7 Design work surfaces to support up to 200 kg as per ANSI-BIFMA 5.5, 1998, Functional Load Test, tested for 60 minutes fully loaded with less than 1/180 of span deflection.

.8 Extra support to be provided for work surfaces 1500 mm and over in length.

.9 Provide a clearance envelope under work surfaces 610 mm in depth or greater, to meets CSA Z412 Guidelines for Office Ergominics.

.10 Colour to be selected by the Departmental Representative from manufacturer's full range.

.11 Floor supports to have adjustable capability for levelling with a vertical adjustment of 25 mm.

.6 Open Shelves:

.1 Construction and finish: to match work surfaces.

.2 Shelf depth: 337 mm.

.3 Shelf end height: 204 mm.

.4 Shelf length 1220mm

.5 With 1220 mm LED light below.

.7 Storage tower:

.1 Typical Workstation:

.1 Dimensions:

.1 Width: 610 mm.

.2 Depth: 610 mm.

.3 Height: 1727 mm.

.2 Drawer configuration: Drawers in box/box/file.

.3 Closed bookcase with hinged door and one adjustable shelf.

.4 Colours as selected by Departmental Representative from manufacturer's full range.

.2 Private Offices – 333, 334, 335, and 336

.1 Dimensions:

.1 Width: 914 mm

.2 Depth: 610 mm

.3 Height: 1650 mm

.2 Full Coat storage with bar.

.3 Drawer configuration: Drawers in box/box/file.

.4 Closed bookcase with hinged door and one adjustable shelf.

.5 Colours as selected by Departmental Representative from manufacturer's full range

.8 User Adjustable Tool Bar: Provide one option per workstation,

.1 Option#1 Panel Integrated User Adjustable Tool Bar

.1 Manufacturer's standard sizes to match panel width.

.2 Qty two X 610 mm user adjustable tool bar.

.3 Constructed from heavy duty extruded aluminium, Colour finish to match panel trim.

.4 Provide all necessary accessories for proper attachment to building components to provide support for panel.

.2 Option #2 Panel integrated slat tile:

.1 Manufacturer's standard sizes to match panel height and width.

.2 Constructed from heavy duty extruded aluminum, Colour finish to match panel trim.

.3 Tracks to be 12 mm slotted on 25 mm centers to match panel side rails.

.4 Provide all necessary accessories for proper attachment to building components to provide support for panel.

.9 Electrical Feed modules:

.1 Provide for routing of communications and data cables, and access to power receptacles.

.2 Manufacturers standard sizes as indicated. Modules to provide power to the panel's raceway from wall or ceiling connections.

.1 Panel base raceway covers shall have factory installed knockouts (4 per panel, 2 each side).

.2 External base in feed modules shall be capable of mounting into every base receptacle outlet location.

.3 Provide leads length as required for connection to the building electrical system.

.4 Leads to be in CSA protective covering, as per the Canadian Electrical Code.

.10 Ceiling Feeds:

.1 Provide ceiling poles when required and where indicated. Finish to match metal finish on exposed panel trim.

.1 Five station or less clusters require one ceiling pole, with power and a minimum data capacity of 24 CAT6.

.1 With metal separation between power and data.

.2 Five to eight station clusters require two ceiling poles. One power ceiling feed pole and one data pole with minimum of 24 CAT6 capacity.

.2 Power pole widths shall be equal to the thickness of the panels.

.3 Power pole shall be capable of being opened along the length of the vertical of the pole to permit lay-in of wiring.

.11 Wiring:

.1 Wiring for panel systems shall have preconnectorized cable assemblies for connection of duplex receptacles and meet the following requirements:

.1 Voltage: 120/208 VAC

.2 Circuit capacity: three circuits with not less than six wires providing one circuit having the common ground and having its own neutral.

.3 One circuit for dedicated/isolated use of the computer

.4 Tamper proof connectors.

.5 Flexible cable to the Canadian Electrical Code, approved for use in systems furniture. The complete electrical system in the panels and the components to meet CSA-C22.2, No. 23.

.12 Receptacles:

.1 Manufacturer's standard single sided duplex style, 15 Amp CSA configuration 5-15R configuration.

.2 Coordinate actual locations in the panels on site by the Departmental Representative's Representative.

.3 Provide two duplex receptacles for general use and one isolated/dedicated duplex per workstation, receptacles may be a combination of duplex or simplex providing six (6) plug-in locations.

.1 One general use duplex outlet along spine.

.2 One general use duplex outlet and one isolated/dedicated duplex outlet under the electric height adjustable table.

.13 Raceway systems:

.1 Manufacturer's standard raceway to accommodate both electrical, telephone/data distribution, be an integral part of the base panel and ULC approved.

.2 Panels without power shall be capable of field installation without changing or removing panel raceways and carry up to three separate 120 volt A.C. 15 amp circuits.

.3 Location of duplexes as shown on drawings. Wiring shall move easily through raceways and around corners in both vertical and horizontal directions.

.4 Raceways to be accessible from at least one side, located at desk or base height.

.14 Cutouts:

.1 Provide factory cut-outs as required for all outlets and replacement cover plates.

.15 Miscellaneous: In addition to the products specified and listed herein, provide all additional products, hardware, trims and accessories needed for a proper, operable and complete installation.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install panels, componentry, accessories and systems furniture in accordance with the manufacturers' instructions and reviewed shop drawings and adjust for proper performance.

.2 Install panels over finished floor.

.3 Adjust panel heights as necessary to suit unevenness of floors and ensure horizontal lines of panels are level and continuous.

.4 Install and adjust seals between panels and existing construction for proper performance.

.5 Supply maintenance inventory parts list.

.6 Replace all damaged panels, componentry, accessories and systems furniture or repair to the approval of the Departmental Representative. Obtain approval to repair in each instance before beginning repair work, and at completion of repair work.

.7 Provide Departmental Representative with maintenance material at the time of Certificate of Final Completion.

3.2 ELECTRICAL

.1 Install all panel electrical work to meet the requirements of the Canadian Electrical Code Latest Edition and to the approval of authorities having jurisdiction.

.2 Co-ordinate connection of panel electrical system with the building electrical system installers.

.3 Co-ordinate with the work of the data cable installers and telephone installers.

3.3 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Clean surfaces after installation using manufacturer’s recommended cleaning procedures.

.3 Upon completion of installation remove surplus materials, rubbish, tools and equipment.

END OF SECTION

NATIONAL RESEARCH COUCIL

M-58 Ground Floor East and West Wings Renovation

NRC File: 5189
SNC-Lavalin File: 607079

Not to be used for Construction

MECHANICAL & ELECTRICAL SPECIFICATIONS ISSUED FOR TENDER

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Part 1 GENERAL

1.1 GENERAL

.1 This section covers topics common to all sections of Divisions 21, 22, 23 and 25 and serves to complement the general conditions of the specifications. The general conditions and complementary general conditions apply to work described in this section.

.2 These specifications do not necessarily specify in detail the design, construction, or all various parts and equipment components and their installation. If applicable, observe generally accepted techniques and recommendations of suppliers.

.3 The specifications and drawings for the Electricity (Division 26) and Architecture are integral to the mechanical specifications as if they were reproduced in full.

.4 The Main Contractor and Specialized Contractors should become familiar with the type of construction proposed by carefully examining the drawings and specifications for architecture, structure and electrical works.

.5 The Main Contractor and Specialized Contractors must also become familiar with existing site and perform required surveys for coordination.

.6 The Contractor shall, before submitting his tender, review the general conditions and visit the project site on the required date to gain thorough knowledge of the conditions under which he will work. After visiting the site and examining the conditions affecting his work, the Contractor shall ensure that the work can be done within limits set out in the work execution schedule. The Contractor shall report in writing to the NRC Representative any discrepancy, omission from drawings, and any other element that prevents execution of the work at least five (5) working days before submitting his tender. It is assumed that all tenderers will have visited the site and no claim may be made due to a lack of knowledge of existing conditions of premises and existing facilities.

.7 During the tender period, the Contractor shall verify the feasibility of work, become familiar with existing site, review existing building construction drawings and take into consideration all existing elements that may conflict with this work. The Contractor shall include in his tender the cost of dismantling, relocating or bypassing such elements.

.8 Any discrepancy between the general drawings and specifications or other specialty trades and the mechanical drawings and specifications must be brought to the attention of the NRC Representative. The NRC Representative must provide additional information necessary to eliminate any ambiguity that may result.

.9 Drawings and specifications:

.1 Only drawings and specifications marked "for tender" or "addendum", as appropriate, may be used for the calculation of tenders.

.2 Ensure that the copy of documents is complete: number of pages of drawings and specifications.

.3 The NRC Representative's mechanical drawings and specifications are complementary to the architectural and structural drawings and specifications. Check all dimensions on site and consult general drawings to ensure exact location of equipment before installation. No supplement will be allocated for discrepancies between mechanical drawings and documents from other disciplines.

.4 In preparing his tender and during the work, the Contractor shall become familiar with the NRC Representative's drawings, as well as those of other specialty trades to know of any problems in spacing and interference before starting work. The drawings provide a general layout of the work and the Contractor shall make adjustments according to site conditions, if any, after consultation with the NRC Representative, at no extra cost.

.5 No architectural or structural data will be taken from mechanical drawings.

.6 No additional compensation will be granted for the removal of ducts and equipment deemed necessary due to the structure or any other normal consideration, whether they have been installed or not.

.7 The NRC Representative reserves the right to move Division 23 equipment without cost or credit on the condition that the displacement does not exceed 3 m and that notice is given prior to installation.

.8 Plans and specifications are complementary. All that appears on drawings or in specifications is considered to be included on drawings and in specifications.

.9 The NRC Representative reserves the right to interpret mechanical drawings and specifications. If there is a discrepancy between the mechanical plans and specifications with respect to the quantity, quality, nature or price of certain work or materials, the Contractor will use the most expensive solution to prepare his tender and will submit a tender accordingly. Credit shall be given to the NRC Representative if another solution is adopted during construction.

.10 Detail drawings that may be provided to the Contractor during work will also become part of mechanical drawings and specifications. If the Contractor requires detail drawings, he will request such from NRC Representative in writing at least fifteen (15) days in advance.

.11 In general, large scale details take precedence over floor plans, but all accessories required on floor plans are part of the contract, even if they are not repeated on detail drawings.

.12 Where site conditions require NRC Representative to prepare drawings for additional details, such documents become part of the contract and cannot be used by the Contractor to warrant an additional charge, unless the detail indicates additional work required on drawings and in specifications other than those used to prepare tenders.

.13 If the Contractor, at the time of execution of the work, discovers an omission or discrepancy between the drawings and specifications, he must immediately notify

the NRC Representative in writing, who in turn will issue a directive for clarification or a change, if necessary.

.14 All work must be executed perfectly, and the installation of any item must be done taking into account ease of reading, calibrating, access, inspection and repair. The NRC Representative will require the removal of any item installed without regard to this clause and at the exclusive expense of the Contractor.

.15 In committing to perform the work described on drawings and in specifications, the Contractor acknowledges and agrees that the drawings and specifications may not contain a description of or even mention all accessories, details, minor works, etc., which are required for the full completion of the work and agrees to accept the decision of the NRC Representative regarding what should be provided and how to the work should be performed to meet the requirements of the drawings and specifications.

.16 The Contractor shall provide, install and connect all materials or accessories required for a complete installation even if they are not specifically included on drawings or in specifications.

.17 The names of specialties included in drawing identification or under drawing title are only used to facilitate work of each section and should not be considered as restrictive.

.1 No additional compensation will be paid for work not provided but required by the type of construction.

.18 The contractor shall coordinate its work with the responsible of section 07 84 00 – Fire Stopping.

1.2 RELATED SECTIONS

.1 Section 00 10 00 – General Instructions

.2 Section 07 84 00 – Fire Stopping

.3 Section 09 91 23 – Interior Painting

.4 Section 21 05 05 – Common Work Results for Fire Suppression

.5 Section 22 05 00 – Common works Results for Piping.

.6 Section 23 05 00 – Common works Results for HVAC

.7 Section 23 05 01 – Mechanical – Use of HVAC Systems During Construction.

1.3 LAWS, CODES, REGULATIONS AND PERMITS

.1 Perform work included on drawings and in specifications in accordance with codes and regulations governing the work within this project. Codes and regulations are issued by federal, provincial, municipal and other authorities.

.2 Perform work in accordance with specific requirements of utility companies and authorized electricity, gas and telephone suppliers.

.3 Comply with codes, regulations and requirements without additional compensation and pay all associated costs for obtaining required permits.

.4 The NRC Representative reserves the right to interpret mechanical drawings and specifications. If there is a discrepancy between mechanical drawings and specifications with respect to quantity, quality, nature or price of certain works or materials, the Contractor will use the most expensive solution in preparing his tender and submit a tender accordingly. The NRC Representative will be given credit if another solution is adopted during the construction.

1.4 COST BREAKDOWN

.1 Upon notice of contract award, provide a breakdown of the tender price as required by the general requirements. This price breakdown may be the same as the one used in tender.

.2 Submit the amount tendered as described in the NRC Representative's general and complementary requirements.

1.5 EQUIVALENTS AND SUBSTITUTIONS

.1 The term "Standard of Acceptance" means that the manufacturer's name is mentioned only in order to establish quality standards for equipment, hardware and service.

.2 When equipment or material is specified and identified by catalog number (acceptable product), this means that the system was designed with that equipment or material in mind and the Contractor shall submit his tender with the equipment or material specified as an acceptable product.

.3 However, the Contractor may submit a tender on equipment or material specified as an acceptable equivalent, and when presenting his shop drawings, the Contractor shall include the drawings of the acceptable product and the acceptable equivalent in design to allow the NRC Representative to compare the two. The product that the Contractor wishes to use must be clearly identified.

.4 When the Contractor wishes to propose equipment or material from a manufacturer whose name is not mentioned in the specifications (SUBSTITUTE), he must submit a written request for substitution in three (3) copies in PDF format within five (5) working days, and include with the request three (3) copies in PFD format of a comparative table describing the main features of the specified and proposed equipment or material and a copy of datasheets on specified and proposed material.

.1 This table should include information on the following:

.1 Overall dimensions.

.2 Maintenance procedures.

.3 Spare parts.

.4 Guarantees.

.5 Characteristics of device or material.

.5 In addition to the comparative table, the Contractor must include in his request the following information:

.1 Copy of the tender for the specified devices, equipment or materials specified.

.2 Copy of the tender for the proposed devices or equipment; if there are any savings, the difference in price will be credited to NRC Representative.

.3 The reasons for the substitution request.

.1 References of where equipment is in service and its proven use.

.6 The proposed equipment or materials will be examined taking into account ease of maintenance, spare parts availability and delivery times. The NRC Representative may reject the proposed equipment based on performance criteria or energy demand or consumption. This applies particularly to any mechanical equipment.

.7 Note that the NRC Representative's decision will be final. It is the Contractor's responsibility to demonstrate proof of equivalence, which will be entirely at his expense.

.1 If characteristics of the proposed device or equipment require any change to the drawings and work to be performed, the Contractor must cover the cost for such changes, including any adjustments required to meet the work acceptance performance and the cost of additional verifications by the NRC Representative, for all disciplines involved.

.2 If the device or equipment proposed by the Contractor is rejected, he must provide and install the equipment or materials specified by number, without additional compensation.

.3 Requests for substitution will be rejected if they hinder or delay the execution of work.

1.6 SUBMITTALS

.1 Submittals: in accordance with Section 00 10 00 – General Instructions.

.1 Submit one electronic copy (PDF format).

.2 Do not start work until submittals have been verified by the NRC Representative. These requirements are in addition to the NRC Representative's requirements for shop drawings.

.3 At the time of submission, notify the NRC Representative in writing of any deviations from the requirements of drawings and specifications, specifying the reasons for these deviations.

.4 The Contractor's or Supplier's responsibility for deviations from the requirements of drawings and specifications is not relieved by the NRC Representative's review of the submitted documents, unless the NRC Representative gives written acceptance of specific deviations.

.5 Notify the NRC Representative in writing of any changes other than those required by the NRC Representative for submissions of new documents and/or samples.

.6 Shop drawings: shop drawings submitted must bear the seal and signature of the NRC Representative, authorized to practice in Canada, in the province of Ontario.

.7 Keep one revised copy of each submission on site by the Sub-contractor and verified by the NRC Representative.

.2 The present specifies the scope of document verification by the NRC Representative:

.1 Introduce an intermediate quality control step in the workflow, without constituting a change order to the drawings and specifications.

.2 Check general provision of equipment and materials only.

.3 Ensure, with annotations that are not restrictive, that the minimum requirements used in developing the project have been met.

.3 The present specifies the responsibilities of the Subcontractor or Supplier prior to submitting documents for verification.

.1 Verify that shop drawings and specifications are in accordance with drawings and specifications in terms of quality, characteristics and overall dimensions.

.2 Correct shop drawings and specifications as necessary.

.3 Approve shop drawings and specifications.

.4 Coordinate each submittal of required documents in compliance with the requirements of work, drawings and specifications. Note that documents submitted individually will not be checked until related information is available.

.5 Submit shop drawings, data sheets and all required samples in a reasonable amount of time and in the proper order so as not to delay the execution of work. Such delays do not constitute a valid reason to request an extension of the work schedule or contract period and no request for this purpose will be accepted.

.6 Include with the packing slip, shop drawing identification sheets with the following information:

.1 Date.

.2 Project title and number.

.3 Name and address of Subcontractor or supplier.

.4 Identification of shop drawings, datasheets and/or submittals.

.5 Identification of specification section number.

.6 Signature of the sender responsible for the document in question, stating that the document complies with drawings and specifications.

.7 The identification sheet for shop drawings is included at the end of this section. This sheet must be completed; failure to do so will result in the return of the drawings without them being verified.

.7 Ensure that documents submitted, with regard to drawings, also contain the following information:

.1 Dates of preparation and revision.

.2 Project name and number.

.3 Name and address:

.1 Contractor and/or;

.2 Subcontractor and/or;

.3 Manufacturer and/or;

.4 Supplier.

.4 Identification of specifications section number.

.8 Ensure that documents to be submitted meet the specified criteria below:

.1 Shop drawings:

.1 Original drawings or standard modified drawings prepared by the supplier and illustrating parts thereof that apply to this work.

.2 Technical data:

.1 Manufacturer's catalog sheets, graphics and performance diagrams to illustrate standard products manufactured.

.2 Sheet dimensions: 8½ x 11 inches or 11 x 17 inches.

.3 Cross-outs of information that does not apply to this work.

.4 Add, to standard information, additional information applicable to this work.

"For the shop drawing identification sheet (Section 00 10 00 – General Instructions), which must be submitted in one (1) copy, in electronic PDF format, in colour, high quality. The form must be duly completed (specify section number and paragraph in question), attached to the shop drawing indicating the project

number in the subject line, and if known, the name of project director".

.3 Shop drawings and specifications submitted by fax are unacceptable and will be refused.

.4 Any shop drawing submitted without a duly completed identification sheet will be returned.

.4 The present specifies the responsibilities of the Contractor or Supplier after receiving documents verified by the NRC Representative. According to annotations given in the documents, choose only one (1) of three actions:

.1 Correct documents rejected by the NRC Representative or re-submit new documents respecting the annotations provided; do not order equipment and/or material and do not start work involving equipment and/or material.

.2 Order equipment and/or material and carry out the work taking into account the NRC Representative's minor annotations, but resubmit corrected documents for final verification by the NRC Representative.

.3 Distribute documents that do not contain the NRC Representative's annotations, order equipment and/or material and perform the installation work.

.5 Shop drawings to indicate:

.1 Mounting arrangements.

.2 Clearances necessary for operating and maintaining equipment.

.6 Submit the following documents with shop drawings and datasheets:

.1 Detailed drawings of bases, supports, and anchor bolts.

.2 Acoustic data, where applicable.

.3 Points of operation on performance curves.

.4 Compliance certification with applicable codes.

.7 Closeout Submittals:

.1 Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

.2 The operation and maintenance manual must be approved by the NRC Representative before the final inspection. The NRC Representative will keep final copies.

.3 Operating sheets must include:

.1 Each system's control circuit schematics, including ambient condition controls.

.2 Description of each system and its controls.

.3 Description of operation of each system at various loads, together with set point change schedules and seasonal variances.

.4 Operating instructions for each system and component.

.5 Description of actions to be taken in event of equipment failure.

.6 Schedule of valves and fittings and flow diagram.

.7 Colour coding chart.

.4 Maintenance data must include:

.1 Servicing, maintenance, operation and troubleshooting instructions for each piece of equipment.

.2 Data must include schedules of tasks, frequency, tools required and task time.

.5 Performance data must include:

.1 The equipment manufacturer's performance datasheets with the point of operation, once commissioning is complete.

.2 Equipment performance verification test results.

.3 Special performance data as specified in contract documents.

.4 TAB reports (Testing, Adjusting and Balancing) reports as specified in Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.

.6 Approvals:

.1 Submit two (2) copies of the draft of the Operation and Maintenance Manual to the NRC Representative for approval. Submission of individual data will not be accepted unless directed by NRC Representative.

.2 Make changes as required and re-submit as directed by the NRC Representative.

.7 Additional data:

.1 Prepare and insert additional data into the Operation and Maintenance Manual if need becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 The NRC Representative must provide a set of reproducible mechanical drawings. Provide the number of sets of prints required for each work phase and indicate changes as they are made during execution of work.

Changes to control systems and their wiring must follow the same procedure.

.2 Every week record the information from reproducible drawings on the drawings; retain the services of a qualified draftsperson for this purpose.

.3 Use waterproof ink colors for each different service.

.4 Keep these drawings on site and make them available to those concerned for reference and verification.

.9 As-built drawings:

.1 Prior to starting Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right-hand corner using at least 12 mm high letters as follows: "AS-BUILT DRAWING: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED." (Signature of Contractor) (Date).

.3 In general, as-built drawings must be 1:50 scale and done using AutoCAD. All drawings must be clearly identified and numbered. Numbering should refer to the NRC Representative's drawings.

.4 Submit to NRC Representative for approval in two (2) copies, blueprint format and make corrections as directed.

.5 Perform testing, adjusting and balancing for HVAC systems using as-built drawings.

.6 Submit completed reproducible as-built drawings and an electronic copy in CD format (CD-ROM) with Operating and Maintenance Manual.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.7 HVAC FOREMAN

.1 Each Specialist Contractor must hire and pay for the services of a foreman able to represent Contractor in his absence.

.2 Foremen should have experience and adequate knowledge of their profession and this type of project to ensure cooperation with other Specialist Contractors and proper execution of orders from persons having jurisdiction over them.

.3 Foremen should be the same persons from beginning to completion of work, unless authorized by the NRC Representative.

.4 The NRC Representative reserves the right to demand the dismissal of the coordinator and/or foreman, who, in their opinion, is incompetent in the task assigned to him.

1.8 NRC REPRESENTATIVE'S PRIVILEGE

.1 The NRC Representative reserves the right, at their own expense, to have others perform certain work on the project that is not included on drawings or in specifications. The Contractor will not thereby be relieved of his responsibility for the work as part of his contract.

1.9 SCHEMATICS, DIAGRAMS AND PLAN VIEWS

.1 All schematics, diagrams, typical details, piping and duct runs, plan views and cut-always shown on mechanical drawings, as well as in specifications, are complementary. The Contractor shall provide and install all materials, systems and accessories shown on schematics, diagrams, typical details, plan views, sections and/or in specifications.

1.10 PIPING AND DUCT RUNS

.1 Piping runs for steam, condensate, hot water heating, and chilled water piping, in addition to air duct networks are not precisely located on drawings. These are represented in schematic form and indicated as piping and duct runs. The Contractor must anticipate as close as possible their runs in mechanical room ceilings and their runs in ceiling spaces in other rooms and/or corridors. The Contractor must evaluate conflict with existing elements and modify the runs as required.

.2 In his tender, the Contractor shall include the design of the exact run for these systems, the necessary openings, elbows, and piping length deemed necessary, media and accessories, as well as coordination with all new elements and existing architectural, structural, mechanical and electrical construction. The Contractor will not be compensated for runs modifications due to existing elements.

1.11 EQUIPMENT: INSTALLATION REQUIREMENTS

.1 Ensure, through the use of unions and flanges that equipment servicing and disassembly can be done by moving connected pipes and ducts as little as possible. Also ensure that building elements/structure or other facilities do not constitute an obstacle to execution of this work.

.2 All required unions and/or flanges are not necessarily shown on drawings. The Contractor shall provide and install all unions and/or flanges required for servicing and material and equipment disassembly.

.3 Provide means to access all materials and equipment for servicing.

.4 Connect equipment run-offs to a floor drain.

.5 Where possible, align equipment frames with the walls of the building.

.6 Manufacturer nameplates and seals/labels of standard bodies for equipment approval must be visible and legible once equipment is installed.

.7 Verify factory-assembled fittings and tighten them as necessary to ensure their integrity for installation.

1.12 MOTOR AND CONTROLLER

.1 Motors:

.1 Squirrel cage, induction type, and designed, manufactured and tested to requirements of EEMAC and CSA. All motors must be suitable for installation in accordance with the latest edition of the Ontario Construction Code – Chapter V, Electricity. All engines must be 1,800 rpm, unless otherwise indicated.

.2 Electrical characteristics:

.1 1/3 hp and below: 120 V, single phase, 60 Hz.

.2 1/2 hp and larger: 575 V, 3 phase, 60 Hz.

.3 Torque and starting current: EEMAC design B with 1.15 service factor.

.4 Enclosures: all motors to be totally enclosed fan cooled (TEFC) unless otherwise specified.

.5 Frame size: all single speed integral motors, from 1/2 hp (900 rpm) and up, to be "T" frame size conforming to the latest EEMAC standards.

.6 Insulation: Class F minimum. Class H insulation for motors located in rooms where the ambient temperature is above 65°C. Motors selected for variable frequency drive applications and motors 50 hp and larger shall comply with NEMA MG1, Part 30.

.7 Bearing: all motors in EEMAC frame sizes to be ball bearing with provisions for adding and draining lubricant, and ample grease reservoir, fitted readily accessible facilities for lubrication while engine is running or not. Grease lubricated bearings shall be fitted with heavy-duty push type grease fitting.

.8 Efficiency: NEMA Premium (also faithful to CAN/CSA-C390 art 4.10).

.9 Mounting, shaft extension, pulley or coupling to the requirements driven machinery.

.10 Factory-installed thermostat, one for each phase, wired to identified terminals in motor terminal box for 30 hp motors and larger.

.11 Data: provide manufacturer’s certified dimensional outline drawings. In addition, provide the following information:

.1 *Manufacturer, type and model.*

.2 *Horsepower.*

.3 *Service factors.*

.4 *rpm.*

.5 *Voltage / phase / frequency.*

.6 *UL label (where applicable).*

.7 *Enclosure type.*

.8 *Frame size.*

.9 *Full and no load current, and locked rotor current.*

.10 *Bearing identification.*

.11 *Guaranteed efficiency, and EEMAC spread of efficiency.*

.12 *Power factor.*

.12 All motor driving equipment specified in the mechanical sections of these specifications shall be supplied by the appropriate manufacturer of the mechanical equipment.

.13 Standard of acceptance:

.1 Baldor, GE, Marathon, US Motors, Toshiba Westinghouse or approved equal.

.2 With three (3) year guarantee.

.2 Remote control devices:

.1 *All control devices controlling operating sequ*ences such as thermostats, aquastat, humidistats, pressure or flow switches, push buttons, switches, etc.

.2 These devices must be supplied, installed, wired and connected by Division 26, provided they are included with the starter. Otherwise, they must be supplied, installed, wired and connected by the Sub-contractor responsible for the work specified in Division 25.

.3 Control devices:

.1 All control devices activated by a signal from remote control device such as vent motors, connections, relays, contacts and automatic starters, etc.

.2 Except for starters, these devices must be supplied, installed, wired and connected by the Subcontractor responsible for the work specified in Division 25. The type and number of devices must match the operating sequence.

.4 Starters:

.1 Unless otherwise indicated, all starters must be supplied, installed, wired and connected (primary source only) by Division 26.

.5 Electrical installation:

.1 Required from supply point up to motor terminal.

.2 Electrical installation by Division 26.

.3 For packaged units such as air conditioning units, etc., Division 16 shall provide, install and connect a disconnect switch near the equipment serviced. The connection between the disconnect switch and the packaged unit must be performed by Division 16 according to the manufacturer's instructions.

.6 Power wiring:

.1 Power wiring starts at the starters' power supply and electrical connections for all control devices and remote control devices.

.2 Wiring must be supplied and installed by the Automation Sub-contractor.

.3 Types of conduits and wiring described in Division 26.

.7 Overload relay:

.1 Selection of overload relays to be responsibility of Division 26. Provide a list of motor characteristics to Division 26, including the following: power intensity in ampere under no load or under a normal load, capacity of thermal element in the starter, and value of maximum power written in ampere on the motor nameplate.

1.13 ELECTRICITY

.1 The electrical work must be carried out in accordance with the requirements of Division 26 and the requirements of the following paragraphs:

.1 The responsibility of the supplier and installer of electrical equipment and systems is described in the motor, equipment and controls table appearing in electrical drawings/specifications. The responsibility of the mechanical systems supplier and installer is described in the mechanical equipment and systems table appearing in building or mechanical drawings/specifications.

.2 Refer to Division 26 for requirements relating to power wiring and conduits, except in regard to conduits, wires, cables and connections associated with a network/circuit operating at a voltage below 50 V, for elements belonging to the control circuits specified in Division 23 and illustrated in the mechanical drawings. Refer to Division 26 for quality of materials and work execution.

1.14 BELT DRIVES

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

.2 Unless otherwise stated, use cast iron or steel sheaves secured to shafts with removable keys.

.3 For motors to 10 hp: standard adjustable pitch drive sheaves, having plus or minus 10% range. Use mid-position of range for specified rpm.

.4 For motors over 10 hp: sheave with split tapered bushing and keyway having fixed pitch unless specifically required for the item in question. Provide sheave of correct size to suit balancing.

.5 Maximum drive rating: 2.0 times nameplate rating on motor. Keep overhung loads within manufacturer's design requirements on prime mover shafts.

.6 Motor slide rail adjustment plates to allow for centre line adjustment.

.7 Tension belts to the manufacturer's recommendations before start-up and after the first 100 hours of operation, using a calibrated belt tensioning gauge.

.8 Supply and change all belts and sheaves during system balancing.

1.15 SLEEVES AND COMPARTMENTATION

.1 Locate, supply and install sleeves for pipe crossings at the following locations:

.1 Foundation walls and slabs on ground: leak-proof sleeves, including steel sleeves equipped with waterproof welded flanges and rubber rings. Sleeve dimensions depend on the diameter of pipe.

.2 Floors (other than slabs on ground): galvanized steel sleeves (at least 10 gauge), cast in concrete. Install the sleeves so they extend beyond the finished level by 50 mm (2 in.). Leave an annular space as prescribed so an approved fire resistance system can be used for fire separations.

.3 In mechanical rooms and shafts, the Contractor must pour a 150 mm (6 in.) thick concrete base. The concrete work is specified in Division 03.

.4 Masonry and concrete walls: Galvanized steel sleeves (at least 10 gauge). Leave an adequate annular space for the application of compartmentation materials. The Subcontractor must supply and install lintels and/or opening reinforcements (if necessary due to their size) and fill the space between the sleeve and the opening with material compatible with that of the wall in question.

.5 Drywall: Install galvanized steel sleeves (at least 10 gauge) at locations where pipes pass through fire retardant partitions. Leave an adequate annular space for the application of compartmentation materials.

.2 Locate, supply and install sleeves for ventilation ducts at the following locations:

.1 Ducts passing through firewalls and fitted with fire dampers: the damper sleeves should be at least 26 gauge (0.6 mm). The gauge of the sleeves must comply with the requirements of SMACNA and the National Fire Protection Association (90A). Leave between 6 mm (¼ inch) and 50 mm (2 in.) of free space between the sleeve and the opening in the wall or the floor to allow for expansion. The Contractor shall provide and install the lintels and/or opening reinforcements (if required by their size). The Subcontractor must supply and install a fireproof

sealant on the perimeter of the sleeve's retaining angles and on all joints between the frame of the fire damper and the sleeve. Do not apply a sealant in the space between the fire damper and the wall or the fire-proof flooring reserved for expansion. In the mechanical room and shaft, the Contractor must pour a concrete base with a thickness of 150 mm (6 in.). The concrete work is specified in Division 03.

.2 Ducts without fire dampers passing through drywall: The Contractor must provide and install the lintels and/or the steel reinforcement and/or the metal cover strip around the openings. Leave a space of 12 mm (½ in) between the ventilation duct (or its insulation) and the opening. The Contractor must seal the space by applying a modified, fireproof, rubber latex acrylic sealer on exposed surfaces. On the surfaces of drywall that are not apparent, use an acoustic-based synthetic rubber sealer such as Tremco's Acoustical Sealant.

.3 Ducts without fire dampers passing through masonry walls: The Contractor must provide and install lintels and/or a steel reinforcement around the openings. Leave a space of 12 mm (½ in.) between the ventilation duct (or its insulation) and the opening. The Subcontractor must seal the space by applying a modified, fireproof, rubber latex acrylic sealer.

.4 Refer to architectural drawings for the location of walls, acoustic walls or airtight masonry walls.

.1 Locate, supply and install materials or combinations of materials to maintain the integrity of a building element by providing an effective barrier against the spread of fire, smoke, water and hot gases through the openings.

.2 The Subcontractors are responsible for performing all air sealing work to ensure laboratory pressurization.

1.16 CUTTING AND PATCHING

.1 Provide all openings required for the work. Supply and install required reinforcements.

.2 Provide all sleeves and compartmentation materials in accordance with paragraph 1.17.

.3 Make openings in walls and concrete slabs using a diamond-tip drill or another tool required to achieve penetration providing acceptable finish and precision results.

.4 The Subcontractor will coordinate all required cutting and opening sealing with the Contractor.

.5 The Contractor shall patch and seal all openings in walls, ceilings and concrete slabs after the removal of pipes, ducts or equipment with materials and finishes identical to those of walls or slabs adjacent to patching area.

.6 The Contractor shall patch and seal all openings in walls, ceilings and concrete slabs to ensure pressurization of laboratories and data rooms, in addition to partitions, walls, floors and other openings

.7 All penetrations in roofs, walls, floors, or other elements required by mechanical and electrical works for openings larger than 150 mm dia., or a duct larger than 150 mm x 150 mm (225 cm^2), will be performed by the Contractor. The location of these openings must be approved in advance by the Structural NRC Representative. All others will be performed by the related subcontractor and the location of these openings must be approved in advance by the NRC Representative.

.8 All piercing and cutting works to be performed using tools equipped with integral vacuum unit.

1.17 CAULKING

.1 The Contractor shall caulk the edge of all of the following, as per good trade practices.

.1 Piping, Fire Protection and Ventilation.

.2 Unless otherwise stated, only one (1) type of mildew resistant caulking should be used.

.1 Acceptable Products: Hilti FS ONE or approved equivalent.

.3 The VOC (volatile organic compounds) adhesives, sealants and primers for sealants used must be less than the current VOC limits of Regulation No 1168 "South Coast Air Quality Management District Rule".

1.18 PAINTING

.1 Apply at least one coat of corrosion resistant primer to ferrous supports and hangers and site fabricated equipment.

.2 Prime and touch up marred finished paintwork to match the original.

.3 At the discretion of the NRC Representative, re-finish severely damaged surfaces.

1.19 ENCLOSURE BELT GUARDS

.1 Provide guards for unprotected drives.

.2 Guards for belt drives must have following characteristics:

.1 Expanded metal screen welded to steel frame.

.2 Minimum 3/64 in. thick galvanized sheet metal tops, bottoms and inside faces.

.3 1.5-inch diameter holes on both shaft centers for the insertion of a tachometer.

.4 Removable for servicing.

.3 Provide the means to permit lubrication and use test instruments with guards in place.

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

.5 Supply and install flexible couplings, removable, U-shaped, minimum 1.16 in. thick galvanized mild steel.

.6 Where necessary, provide on unprotected fan inlet or outlet: minimum ¾-in. galvanized wire or expanded metal screen. The guard's net free area is to be not less than 80% of the fan openings.

1.20 EQUIPMENT SUPPORTS

.1 Equipment supports provided by equipment suppliers: specified in Division 23.

.2 Supports not provided by equipment suppliers: supports must be supplied and installed by the Contractor. They must be made of structural steel. Develop and submit structural calculations with shop drawings for review by the NRC Representative.

.3 Levelling base and housekeeping pad beneath equipment: at least 100 mm (4 inches) thick and 50 mm (2 inches) larger all around than the supported devices. Curve perimeter shall be provided with chamfer edge 12 mm at 45°. Work is specified in structural specifications.

.4 The Subcontractor shall provide and install all additional support elements required to connect pipe supports, ducts, or other equipment to the building structure.

.5 Elements part of steel supports for equipment parts, piping and ducts exposed to weather shall be hot dip galvanized after fabrication.

1.21 ESCUTCHEONS

.1 The specialized contractor must install escutcheons where piping penetrates walls, partitions, floors, and finished ceilings, or where apparent.

.2 Escutcheons: chrome-plated brass, nickel, or stainless steel type 302, fitted with set screw.

.3 Escutcheon outside diameter must be greater than that of sleeve opening or sleeve to conceal.

.4 Escutcheon inside diameter must be adjusted to outside diameter of pipe (insulated or not).

.5 When a sleeve projects from finished floor, escutcheon must cover sleeve extension.

1.22 DIELECTRIC FITTINGS

.1 General:

.1 Must be compatible with the type of pipe to be attached and same pressure rating.

.2 Everywhere pipes of different metals to be joined.

.2 Pipes NPS 2 and smaller: union fittings.

.3 Pipes NPS 2-1/2 and larger: flanges.

1.23 DRAINAGE VALVES

.1 Unless otherwise indicated, install drainage valves at all low points and near shut-off valves.

.2 Valves of a diameter of at least NPS¾, unless otherwise indicated, straight, in bronze, threaded end for connection to a flexible hose, fitted with a cap and chain.

1.24 ACCESS DOORS AND FRAMES

.1 Unless otherwise noted, access doors and frames are supplied and installed by General Contractor.

.2 However, the Contractor of this section shall determine the location and size of doors to ensure easy access to all junction boxes, pull boxes, control devices, lighting fixtures, safety switches, starters or other.

.3 Frames and doors must be as described in the NRC Representative's document.

.4 Access doors and frames are not indicated on drawings. The Contractor of the present section is responsible for coordinating with other sub-contractors to minimize quantity to be installed.

1.25 WORK EXECUTION

.1 The present specifies particular requirements, obligations and responsibilities of the Contractor during work execution.

.1 Coordination:

.1 The Contractor shall consult all drawings and specifications for the various trades and coordinate his work with them, and is ultimately responsible for coordination. The devices will be installed to allow access to the different mechanical equipment and accessories.

.2 Coordination of specialized subcontractors:

.1 The contractor responsible for manufacturing and installation of ventilation ducts shall provide all other contractors for mechanical, electrical, walls and ceilings, with a copy of drawings for the fabrication of air ducts. Other contractors will coordinate their installations with these fabrication drawings. A coordinated, signed and approved copy of such drawings (by all Contractors previously appointed by the General Contractor) shall be given to NRC Representative.

.3 Division 23 Work

.1 Levelling and housekeeping pads beneath equipment:

.1 Mechanical drawings indicate approximate location and dimensions of levelling and housekeeping pads beneath equipment and systems in mechanical rooms. The Contractor must indicate in timely manner size and exact positions of concrete bases for incorporation into floor work.

.2 Housekeeping pads, conduit and piping crossings:

.1 Mechanical drawings indicate approximate location of conduit and piping crossings through floors in technical rooms. The Contractor must indicate in timely manner size and exact positions of conduit and piping crossings.

.3 Openings in roof for passage of pipes and conduits:

.1 Mechanical drawings show the approximate location of roof openings required for passage of air ducts. The Contractor will be responsible for the exact location of these openings and installation of sleeves required.

.2 The Contractor shall pay all costs related to non-installation of sleeves and openings required before the roofing is installed.

.3 The General Contractor will install all required steel reinforcements around roof openings.

.4 Where pipe or duct passes through the roof, the Contractor shall take all necessary measures so that expansion and contraction do not damage roofing.

.5 Roof frames to support equipment will be installed by the Contractor, when specifically indicated. In other cases, the General Contractor will supply and install appropriate roof frames. In all cases, the Contractor will be responsible for sealing roof frames and coordination with roofing contractor. The exact location of all roof frames must be done by the Contractor.

.4 Openings in foundation walls for passage of piping:

.1 The Contractor to use these openings will locate them in a timely manner so as not to delay work. He will install all sleeves required. The Contractor shall make all necessary openings for the passage of pipes and ducts. The Contractor to use these sleeves and openings will be responsible for sealing contour of these openings.

.2 The Contractor shall pay all costs related to non-installation and/or provide and install required sleeves and openings in timely manner.

.3 The General Contractor shall provide and install all required reinforcements and lintels.

.5 Openings in walls and ceilings for passage of ducts and piping:

.1 The Contractor must indicate in timely manner exact positions of duct and piping crossings through walls and floors. The Contractor shall provide and install all required sealing in specifications.

.6 Coordinate all work as well as location of all pipes, ducts, and all equipment shown on construction drawings prepared by the Ventilation and Air Conditioning Contractor and coordinate all passages of all ducts, pipes, and all equipment prior to installation. The Contractor shall sign the drawings and obtain

the signature of heads of other divisions before beginning work in accordance with the requirements of section 23.

.7 Method:

.1 Indicate in timely manner spaces to be left in walls, ceilings, roofs, floors and partitions for the installation of various devices and conduits.

.2 To do this, coordinate work to locate in timely manner all sleeves and openings required. Make all openings and fill gaps required for passage of pipes and ducts as necessary.

.3 Each day, remove all waste resulting from work. Once the work is complete, remove from premises all tools, debris, excess material and waste resulting from work, and clean all equipment installed and make sure they are not damaged; if damaged, repair or replace them.

.4 Use of Ram-Set anchors is not permitted.

1.26 CLEANING

.1 Clean equipment and mechanical appliances every day.

.2 Clean the inside and outside of all components and devices, including filters, and vacuum inside air handling units.

.3 Carefully clean all devices and leave them in perfect working order. Replace all filters for ventilation systems and clean water filters in preparation for provisional acceptance.

.4 Do not discharge to sewers cleaning products whose contents do not meet competent authorities' requirements. The Subcontractor must collect these products and dispose of them in manner approved by competent authorities.

.5 Protection of work:

.1 The Contractor shall protect his installation against damage until entire work has been accepted by proper authorities.

.2 All materials will be stored carefully in appropriate locations, without disturbing traffic.

.3 Ensure physical protection of materials and equipment installed and/or stored on site. Promptly remove all debris, tools or materials inside and on top of equipment.

.4 Prevent dust, dirt and other foreign matter from entering the openings of facilities and equipment using appropriate means.

.5 When work benches are installed inside building, the Contractor will protect floor against any deposits or debris that may damage floor.

1.27 SERVICE INTERRUPTIONS

.1 No building service should be interrupted without the written approval of the NRC Representative.

.2 The Contractor's written request must state the zones affected and duration of interruption.

.3 Submit work schedule for approval to the NRC Representative as to temporary interruption of existing networks or services. Indicate the time for service interruption. Perform outages according to approved schedule and notify those affected in advance. The NRC Representative must be notified at least 20 working days in advance. Confirmation will be requested from the NRC Representative 24 hours before said interruption.

.4 Take all precautions necessary to avoid disturbing building operations. When making connections to existing networks, do so at times set by the NRC Representative while minimizing interference with pedestrian and vehicular traffic.

.5 If work or testing must be conducted in occupied premises, the Contractor must obtain permission from the NRC Representative and co-ordinate his work accordingly, for any interruption of service, if applicable.

.6 When required, the Contractor shall ensure continuity of existing services in the zones affected. The supply, installation and connection of all equipment required for this purpose should be included in the present contract.

1.28 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 00 10 00 – General Instructions.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.29 MAINTENANCE

.1 Furnish spare parts in accordance with Section 00 10 00 – General Instructions.

.2 Provide a list of all spare parts recommended by equipment suppliers and provide, among other things, the following change parts:

.1 Three (3) fusible links (at each temperature) for fire dampers.

.3 This list is not exhaustive and does not relieve the Contractor of his responsibility to provide any other spare part considered essential by the NRC Representative.

.4 Once work is complete and just before final acceptance of the installation, replace cartridge filters and filter banks in accordance with specifications.

.5 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 00 10 00 – General Instructions.

1.30 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal in accordance with Section 00 10 00 – General Instructions.

1.31 COORDINATION & COOPERATION WITH OTHER TRADES

.1 Co-ordinate your work with the work of all trades to ensure a proper and complete installation. Notify all trades concerned of the requirement for openings, sleeves, inserts and other hardware necessary in their work for the installation of your work.

.2 The exact locations and routing of mechanical and electrical services must be properly planned, coordinated and established with all affected trades prior to installation such that they will clear each other as well as any obstructions. Generally, piping requiring uniform pitch shall be given the right of way, with other services located and arranged to suit.

1.32 PERMITS, CERTIFICATES & FEES

.1 Display all required permits on worksite and include copies of inspection certificates in operating and maintenance instruction manuals.

.2 Obtain "Hot Work Permit" from the Client prior to commencement of soldering, welding or other high temperature work.

.3 Comply with all requirements of Section 00 10 00.

1.33 FEDERAL HALOCARBON REGULATION

.1 Generate halocarbon records for work on equipment (cooling equipment with CFC's, HCFC's and HFC refrigerants; fire suppression systems; solvent cleaning systems) that may result in the release of a halocarbon.

.2 Tag equipment with duplicate of halocarbon record.

.3 Provide additional copy of halocarbon record to NRC for inclusion in the Zone Halocarbon Service File.

1.34 CLEANING & FINAL ADJUSTMENT

.1 During construction, keep the site reasonably clear of rubbish and waste material resulting from your work on a daily basis to the satisfaction of the Engineer. Notify the general contractor of any requirements for a waste receptacle for disposal of waste materials.

.2 Clean interior and exterior of all systems including strainers, and vacuum interior of air handling units.

.3 Clean and refurbish all equipment and leave in first class operating condition including replacement of all filters in all air and piping systems.

.4 Balance and adjust all systems and each piece of equipment to operate as designed.

1.35 STORAGE OF EQUIPMENT & MATERIALS

.1 Arrange for sufficient storage facilities off the premises for the storage of equipment and materials which will not be allowed to stand in the open, nor to interfere with normal operations in the building.

.2 Bring prefabricated materials on the job site as and when required to be installed.

1.36 HOISTING & SCAFFOLDING

.1 Provide all necessary hoists and scaffolds required for your work.

.2 Design and construction of scaffolding to be in accordance with CSA S269.2

1.37 BUILDING AUTOMATION SYSTEM

.1 Mechanical contractor shall carry all base building BAS contractor “Airtron”.

.2 Airtron will provide all control valves, and actuators, temperature sensors, damper actuators, pressure sensors, and all other sensors outlined in the mechanical drawings. Mechanical dampers, VAVs, VAV controllers shall be by mechanical contractor. Low voltage wiring for associated controls will be by BAS contractor.

.3 Mechanical contractor shall review full scope of work with controls contractor during tender period and allow for installation of all BAS sensors, control valves and other coordination items.

Part 2 Products

2.1 MATERIALS / EQUIPMENT

.1 Not applicable.

Part 3 Execution

3.1 PAINT TOUCH-UPS

.1 Do painting in accordance with Section 09 91 23 - Interior Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore finishes which have been damaged to new condition.

3.2 CLEANING

.1 The Contractor shall be responsible for taking all measures, both ordinary and extraordinary, in order to protect all ducting systems (new and existing) against dust, as well as against all substances that may become dirty such as the inside and outside of ducts and accessories.

.2 If, in the opinion of the NRC Representative, Contractor fails to take adequate protective measures and/or if portions of pipes already installed become contaminated, the Contractor shall clean such portions of ducts at his own expense. If cleaning is inadequate, Contractor shall remove those portions of pipes and replace them with new pipes at his own expense.

.3 Any activity that, in the opinion of the NRC Representative, generates dust and/or dirt and/or contaminants that may affect project environmental quality will be executed outside perimeter of the building.

.4 Obstruct openings: prevent dust, dirt and other foreign matter from entering openings of facilities and equipment using appropriate means.

.5 Clean equipment and mechanical devices every day.

.6 At the end of duct erection, and before ventilation systems start-up, Contractor shall clean inside and outside of all elements, devices and systems, including screens and filters, and vacuum inside the ducts and air handling units and leave them in perfect working order, replace all air unit system filters and clean water filters in anticipation of provisional acceptance. To do this, Contractor shall provide and install all doors required to clean all parts of duct systems.

.7 Do not discharge to sewers cleaning products whose contents do not meet competent authorities' requirements. The Subcontractor must collect these products and dispose of them in manner approved by competent authorities.

.8 Cleaning methods will be presented to the NRC Representative for review prior to cleaning.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 00 10 00 – General Instructions and submit report as described in PART 1 – SUBMITTALS.

.2 Manufacturer's Field Services:

.1 The Contractor will be responsible for establishing and maintaining an on-site quality control system to ensure NRC Representative of the highest quality work.

.2 Obtain written report from the 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.

.3 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.

.4 Schedule site visits to review work as directed in PART 1 – QUALITY ASSURANCE.

3.4 DOCUMENTED QUALITY CONTROL

.1 The Contractor is responsible for establishing and maintaining a system of quality control to ensure full documentation to NRC Representative of the highest quality work. To do this, the Contractor must produce quality control documents to be given to the NRC Representative at the end of work.

.2 Submit methods of quality control to the NRC Representative for verification. Correct according to recommendation of NRC Representative.

.3 Procedures for quality control should include, among others and not limited to, the following:

.1 On-site receiving of equipment and materials

.1 Ensure quality of equipment and materials upon receiving them on site. To confirm quality control system, the Contractor must produce equipment reception sheets (ERF) confirming that the equipment received is in accordance with shop drawings approved by him and verified by the NRC Representative. These equipment sheets must state the following:

.1 Project name and number.

.2 Equipment identification number.

.3 Reference to specification section and shop drawing number.

.4 Information from manufacturer's nameplate.

.5 Date equipment received.

.6 Name and address of the supplier.

.7 Compliance with shop drawings.

.8 Name and signature of person who made verification on behalf of Contractor and NRC Representative.

.9 Any other relevant information.

.2 Installation verification documentation:

.1 Before start-up, check static installation of networks, devices and systems. Produce a static verification sheet (SVS) for each network, equipment and system. SVS should include the following:

.1 Project name and number.

.2 Identification number of the service checked.

.3 Reference to specifications section, drawings and number of shop drawings.

.4 Each network SVS must include confirmation of proper installation of components such as the orientation of valves, strainers, check valves, etc. Confirmation that all low points are drained, compliance with diagrams, supports, seismic systems, approved cleaning procedure, pressure test, cleaning and rinsing done, strainers cleaned, insulation complete, identification system checked and approved by the NRC Representative, network identification, flow direction, confirmation that manufacturer nameplates are intact on equipment, references to datasheets received, references to list of parts and spare parts, and as-built drawings and shop drawings.

.5 Each equipment SVS must include the reception sheet number, confirmation of proper installation for components such as supports, insulators, insulation, electrical connectors, and accessories such as isolation valves, pressure gauge, etc.

.6 Any other relevant information.

.7 Name and signature of person who made verification on behalf of Contractor and NRC Representative.

.8 Spaces for comments.

.3 Documented equipment start-up

.1 Equipment Pre-Operation stage before starting systems. Proceed to start equipment. Correct and adjust until the specified results are obtained.

.2 Document equipment start-up, adjustment and testing stages.

.1 Produce pre-operation start-up verification sheets (POVS) (system start-up) for equipment demonstrating that manufacturer's instructions were followed and that adjustments were made (see sample sheets attached to this section).

.2 POVS to indicate the following:

.1 Project name and number.

.2 Identification number of service checked.

.3 Reference to the specifications section, drawings and shop drawing numbers, test parameters and adjustments made.

.3 Include reception and installation sheet in appendix.

.4 Include references to start-up reports and initial adjustments, vibrations, etc.

.4 These sheets must be part of the operations and maintenance manual.

3.5 INSPECTION

.1 Prior to any request to the NRC Representative for an inspection visit or testing, do preparatory test and correct if necessary. Preparatory test must have been successful before the NRC Representative's visit.

3.6 CONCEALED WORK

.1 No work shall be concealed before NRC Representative's approval. To do so, the Contractor shall notify NRC Representative in writing at least three (3) days in advance. If the Contractor does not comply, he shall pay necessary costs incurred for work inspection.

3.7 TESTS

.1 The Contractor, after completing his work, or any part thereof, will perform tests, at his expense and in the presence of the NRC Representative, to prove that his work meets all requirements. If work appears defective, the Contractor will be required to correct such and repeat tests at his own expense until specified results are obtained.

3.8 SYSTEM START-UP

.1 Apply the setting operation of all systems as prescribed in this Section 00 10 00 – General Instructions and the requirements of this section.

.2 Start up all systems. Ensure that they are operating properly and demonstrate that systems performance meets the requirements of drawings and specifications. Correct and adjust until specified results are obtained.

.3 Appendices (sheets)

.1 List of sheets

.1 EVS

.2 POVS Coils

3.9 DEMONSTRATION

.1 Temporary testing

.1 Provide labor, materials and instruments for carrying out tests.

.2 NRC Representative must be able to use facilities and equipment for testing before they are accepted. Provide labour, equipment and instruments necessary for carrying out tests.

.3 The following facilities and equipment will undergo temporary testing:

.1 Leak testing of ventilation ducts.

.2 Flow balancing of ventilation systems and chilled and heating water.

.3 Performance tests of ventilation and air conditioning equipment.

.4 Leak testing of chilled and heating water systems.

.2 Operating and Maintenance Personnel Training

.1 Provide tools, materials and services of qualified instructors to give training, during normal working hours, to operating and maintenance personnel on the operation, control, adjustment, diagnostics/troubleshooting and maintenance of equipment, materials and systems, before their acceptance.

.2 Training must be provided during normal working hours, prior to acceptance and turn-over of systems and facilities, and prior to substantial completion.

.3 For all equipment such as:

.1 Humidifier

.2 Heating coils

This list is not limited to demonstrations, and instructions will be given by the manufacturer of the equipment concerned.

.4 Learning materials must include, among other things, operations and maintenance manual, and as-built drawings.

.5 Requirements for necessary training hours are listed in each relevant section.

.6 Training courses to be based on contents of the operations and maintenance manual.

.7 Training time must conform to the specifications of the appropriate sections and the manufacturer's recommendations.

.8 The NRC Representative may, if desired, record training on video or audio media for use at a later date.

3.10 PROTECTION

.1 Protection of work:

.1 The Contractor shall protect his installation against damage until entire work has been accepted by proper authorities.

.2 All materials will be stored carefully in appropriate locations, without disturbing traffic.

.3 Ensure physical protection of materials and equipment installed and/or stored on site. Promptly remove all debris, tools or materials inside and on top of equipment.

.4 Prevent dust, dirt and other foreign matter from entering the openings of facilities and equipment using appropriate means.

.5 When work benches are installed inside building, the Contractor will protect floor against any deposits or debris that may damage floor.

END OF SECTION

APPENDICES

- **EVS**
- **SVS**
- **POVS VFD**
- **POVS PUMPS**
- **POVS COILS**
- **POVS AIR HANDLING UNIT**
- **POVS FAN**

EQUIPMENT VERIFICATION SHEET (EVS)

Project:	Project No.:	Date: yr/ ____/m ____ /d ____	Page:
Manufacturer:	Model No.:		Serial No.:
Shop Drawing No.:	Specification No.:		Drawing Ref.:

GENERAL INFORMATION

Reception date:

Conforms to shop drawings:
☐ **YES** ☐ **NO**

Notes if non-compliant:

Nameplate information (if applicable):

Name and address of Supplier:

Comments:

Verified by: _____ Subcontractor _____ Signature _____ Date

Acceptance by Professional: _____ Firm _____ Signature _____ Date

Comments: _____

STATIC VERIFICATION SHEET (Network, Equipment, System (SVS))

Project:_____	Project No.:	Date: yr/ ____/m ____ /d ____	Page:
Manufacturer:_____	Model No.: _____	Serial No.: _____	
Shop Drawing No.: _____	Specification No.: _____	Drawing Ref.: _____	

- **NETWORK: (plumbing, process and controls):**

- Orientation:	- Strainer:	☐ Yes	☐ No	- Earthquake suspension completed:	☐ Yes	☐ No
	- Check valve:	☐ Yes	☐ No	- Cleaning procedure approved and received:	☐ Yes	☐ No
	- Motorized valve:	☐ Yes	☐ No	- Pressure test completed:	☐ Yes	☐ No
	- Pumps:	☐ Yes	☐ No	- Strainer cleaning completed:	☐ Yes	☐ No
	- Rotation direction verified :	☐ Yes	☐ No	- Insulation completed:	☐ Yes	☐ No
- Drainage low point:		☐ Yes	☐ No	- System identification approved and verified:	☐ Yes	☐ No
- Accordance with diagrams:		☐ Yes	☐ No	- Flow direction verified:	☐ Yes	☐ No
- Adequately supported:		☐ Yes	☐ No	- In accordance with construction drawings:	☐ Yes	☐ No

- **NETWORK: (ventilation):**

- Orientation, gravity damper:	☐ Yes	☐ No	- Cleaning procedure approved and received:	☐ Yes	☐ No
- Fan rotation direction:	☐ Yes	☐ No	- Pressure test completed:	☐ Yes	☐ No
- Fan drain connected:	☐ Yes	☐ No	- Insulation completed:	☐ Yes	☐ No
- Accordance with diagrams:	☐ Yes	☐ No	- System identification approved and verified:	☐ Yes	☐ No
- Adequately supported:	☐ Yes	☐ No	- Flow direction verified:	☐ Yes	☐ No
- Earthquake suspension completed:	☐ Yes	☐ No	- In accordance with construction drawings:	☐ Yes	☐ No

- **EQUIPMENT:**

- Adequately supported:	☐ Yes	☐ No	- Thermometer present:	☐ Yes	☐ No
- Earthquake suspension completed:	☐ Yes	☐ No	- Electrical bonding present:	☐ Yes	☐ No
- Insulation completed:	☐ Yes	☐ No	- Adequate elevation (slope for flow):	☐ Yes	☐ No
- Electric connections completed:	☐ Yes	☐ No	- Adequate network connection:	☐ Yes	☐ No
- Isolation valves connected:	☐ Yes	☐ No	- Adequately cleaned:	☐ Yes	☐ No
- Manometer connected:	☐ Yes	☐ No	- Identification completed:	☐ Yes	☐ No

Comments: _____

_____

_____

_____

_____

Verified by: _____ _____ _____

Subcontractor | Signature | Date

Acceptance by Professional: _____ _____ _____

Firm | Signature | Date

Comments: _____

PRE-OPERATIONAL START-UP VERIFICATION SHEET (POVS)
TEST SHEET – VARIABLE FREQUENCY DRIVE

Project:	Project No.:	Date : yr/ ____/m ____ /d ____	Page :
Manufacturer:	Model No.:		Serial No.:
Shop Drawing No.:	Specification No.:		Drawing Ref.:

Location		System supplied	
Starter no.		Nominal voltage	

Equipment	Rating	Identification	Type
Starter	HP		
Fuses	A		
Condenser	kVAR		

Wiring	AWG	Identification	Clamp Fitting	Braiding
Starter				
Condenser				
Motor				
Terminal blocks				

Verification	Connection	Type	Model
Thermistor			
DV/DT filter			
Entry inductance			
Communication port			
Automation system external contacts			
Addressable fire alarm relay			

Verification of motor voltage reading complies with NEMA MG1, part 30 m: Y Phase A: ____V Phase B: ____V Phase C: ____V

Controls Buttons: Indicator lights: Selector switch:

TEST	Voltage	Insulation
Phases A – B		
Phases B – C		
Phases C – A		
Phase A – Grnd		
Phase B – Grnd		
Phase C – Grnd		

TEST	Current	Relay Adjustment
Phase A		
Phase B		
Phase C		

Verified by: _____ (Subcontractor) _____ (Signature) _____ (Date)

Acceptance by Professional: _____ (Firm) _____ (Signature) _____ (Date)

Comments: _____

PRE-OPERATIONAL START-UP VERIFICATION SHEET (POVS)
PUMP

Project:_____	Project no.:	Date: yr/____/m ____ /d ____	Page:
Manufacturer:_____	Model no.: _____	Serial no.: _____	
Shop drawing no.: _____	Specification no.: _____	Drawing ref.: _____	

	Pump no.	**Pump no.**	**Pump no.**	**Pump no.**	**Pump no.**
Location					
Service					
Manufacturer					
Model number					
Serial number					
Flow/head					
NPSH required					
rpm pump					
Impeller diameter					
Manufacturer motor/frame					
HP motor/rpm					
Volt/phase/hertz					
Amperage T_1, T_2, T_3/S.F.					
Type of joint					
Stop pressure					
Classed valve pressure					
Current impeller diameter					
Opened valve pressure					
Flow opened valve					
Final backflow pressure					
Final suction pressure					
Final flow					
Stress					
Amps T_1, T_2, T_3					
Protection O./L. adjustment					

Verified by: _____ Subcontractor _____ Signature _____ Date

Acceptance by Professional: _____ Firm _____ Signature _____ Date

Comments: _____

PRE-OPERATIONAL START-UP VERIFICATION SHEET (POVS)
COIL

Project:_____	Project no.:	Date: yr/____/m ____ /d ____	Page:
Manufacturer:_____	Model no.: _____	Serial no.: _____	
Shop drawing no.: _____	Specification no.: _____	Drawing ref.: _____	

	Coil no.	Coil no.	Coil no.	Coil no.
System no.				
Location				
Coil type				
No. of rows				
Manufacturer				
Model no.				
Surface in sq.ft.				
Air flow (cfm)				
Speed (ppm)				
Pressure loss (inch)				
WB/DB outside air				
WB/DB return air				
WB/DB upstream air				
WB/DB downstream air				
Air ΔT°				
Pressure flow				
Inlet water temperature				
Outlet water temperature				
Water ΔT°				
Exp./refrig. valve				
Refrig. back pressure				
Refrig. back temperature				
Inlet steam pressure				

Verified by: _____ Subcontractor _____ Signature _____ Date

Acceptance by Professional: _____ Firm _____ Signature _____ Date

Comments: _____

PRE-OPERATIONAL START-UP VERIFICATION SHEET (POVS)
AIR HANDLING UNIT

Project:_____	Project no.:	Date: yr/____/m ____ /d ____	Page:
Manufacturer:_____	Model no.: _____	Serial no.: _____	
Shop drawing no.: _____	Specification no.: _____	Drawing ref.: _____	

System no.:				
Serial no.:				
Model no.:				
1. System status				
2. Temperature and humidity detector				
3. Fan motor				
4. Belt tension				
5. Electronics plate connection				
6. Voltage				
7. Supply voltage				
8. Control supply voltage				
T115				
T2				
T3				
T4				
T5				
9. Fan rotation				
10. Fan amperage				
L1				
L2				
L3				
Fuse				

Verified by: _____ Subcontractor _____ Signature _____ Date

Acceptance by Professional: _____ Firm _____ Signature _____ Date

Comments: _____

PRE-OPERATIONAL START-UP VERIFICATION SHEET (POVS)
AIR HANDLING UNIT

Project:_____	Project no.:	Date: yr/____/m ____ /d ____	Page:
Manufacturer:_____	Model no.: _____	Serial no.: _____	
Shop drawing no.: _____	Specification no.: _____	Drawing ref.: _____	

System no.:				
Serial no.:				
Model no.:				
11. Heating amperage:				
Stage 1				
Stage 2				
Stage 3				
Stage 4				
12. Compressor amperage:				
Comp. 1 L_1				
L_2				
L_3				
Fuse				
Comp. 2 L_1				
L_2				
L_3				
Fuse				
13. Regulator valve operation				
14. Compressor operating pressure				
Comp1B				
Comp1H				
Comp2B				
Comp2H				

Verified by: _____ Subcontractor _____ Signature _____ Date

Acceptance by Professional: _____ Firm _____ Signature _____ Date

Comments: _____

PRE-OPERATIONAL START-UP VERIFICATION SHEET (POVS)
AIR HANDLING UNIT

Project:_____	Project no.:	Date: yr/____/m ____ /d ____	Page:
Manufacturer:_____	Model no.: _____	Serial no.: _____	
Shop drawing no.: _____	Specification no.: _____	Drawing ref.: _____	

System no.:				
Serial no.:				
Model no.:				
15. Pressure switch				
High pressure stop				
Low pressure stop				
Low pressure on				
16. Freon load				
17. Microprocessor				

Verified by: _____ Subcontractor _____ Signature _____ Date

Acceptance by Professional: _____ Firm _____ Signature _____ Date

Comments: _____

PRE-OPERATIONAL START-UP VERIFICATION SHEET (POVS)
FAN

Project:________________	Project No.:	Date : yr/ ____/m ____ /d ____	Page :
Manufacturer:______________	Model No.: ______________	Serial No.: ______________	
Shop Drawing No.: __________	Specification No.: __________	Drawing Ref.: __________	

System No.:	
Serial No.:	
Model No.:	
Fan	
Power in cfm	
Outside static pressure in inches WC	
Static pressure in inches WC	
Motor power in CV	
Fan maximum BHP	
System No.:	
Serial No.:	
Model No.:	
Fan	
Power in cfm	
Outside static pressure in inches WC	
Static pressure in inches WC	
Motor power in CV	
Fan maximum BHP	
System No.:	
Serial No.:	
Model No.:	
Fan	
Power in cfm	
Outside static pressure in inches WC	
Static pressure in inches WC	
Motor power in CV	
Fan maximum BHP	

Verified by:	________________ Subcontractor	________________ Signature	________ Date
Acceptance by Professional:	________________ Firm	________________ Signature	________ Date
Comments:	________________		

Part 1 General

1.1 GENERAL

.1 The prescriptions for the sections 21 05 01 - Common Work Results for Mechanical are integral parts of this present section.

1.2 RELATED SECTIONS

.1 Section 22 11 16 – Domestic Water Piping.

.2 Section 22 13 17 – Drainage Waste and Vent Piping – Cast Iron and Copper.

.3 Section 22 42 01 – Plumbing Specialties and Accessories.

.4 Section 22 42 03 – Commercial Washroom Fixtures.

.5 Section 22 42 16 – Commercial Lavatories and Sinks.

.6 Section 22 42 20 – Commercial Showers and Bathtubs

.7 Section 23 05 01 – Mechanical – Use of HVAC Systems During Construction.

.8 Section 23 05 05 – Installation of Pipework

.9 Section 23 05 16 – Expansion Fittings and Loops for HVAC Piping

.10 Section 23 05 17 – Pipe Welding

.11 Section 23 05 19 – Meters, Measuring Instrument, Thermometers, and Pressure Gauges for HVAC Piping

.12 Section 23 05 23.1 – Valves

.13 Section 23 05 29 – Hangers and Supports for Pipes and HVAC Equipment.

.14 Section 23 05 48 – Vibration and Seismic Controls for HVAC Piping and Equipment.

.15 Section 23 05 49.01 – Seismic Restraint Systems (SRS) – Type P2 Buildings.

.16 Section 23 05 53.01 – Mechanical Identification.

.17 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.

.18 Section 23 07 14 – Thermal Insulation for equipment

.19 Section 23 07 15 – Thermal Insulation for Piping.

.20 Section 23 08 02 – Cleaning and Start-up of Mechanical Piping Systems.

.21 Section 23 21 13.01 – Hydronic Systems: Copper and Steel.

.22 Section 23 21 14 – Hydronic Specialties.

1.3 SCOPE OF WORK

.1 The specific tasks generally include, but are not limited to, the supply of all materials, labour, equipment, tools, machinery, transportation, handling, hoisting, surveillance and temporary storage, if required, to build, execute and complete in an expeditious manner substantial and satisfying all the work described below and shown on drawings.

.2 It is important to note that the location of equipment on drawings is approximate and should be verified on site before commencing work.

.3 All skilled labour, equipment, materials and tools required for all openings in roofs, walls and/or floors, and other requirements for installation of plumbing and piping, are the responsibility of the Contractor.

.4 All penetrations in roofs, walls, floors, or other elements required by plumbing and piping works for openings larger than 305 mm dia., or 305 mm x 305 mm required for installation of plumbing and piping are the responsibility of the General Contractor.

.5 Provide and install all required sleeves.

.6 Perform all work for acoustic and air sealing required for all pipe penetrations through walls, floors and any other partitions.

.7 Provide and install all fixtures, sinks, showers and accessories in accordance with drawings and specifications. Also supply and install all required plumbing, fittings and accessories and ensure the necessary coordination.

.8 Provide and install hot and cold domestic water networks, including all equipment and accessories in accordance with drawings and specifications.

.9 Supply and install all drainage and vents shown on drawings or required in specifications. The plan views, elevations and diagrams are complementary. Supply and install all piping vents shown on charts, plan views and elevations.

.10 Provide and install all piping, fittings and accessories for water heating networks shown in drawings, diagrams and elevations

.11 Locate, size, and provide all required architectural access doors for maintenance of equipment. The designated General Contractor is required to install all architectural access doors, even if not necessarily shown on drawings. The Mechanical Contractor shall provide and install all duct access doors, even if they are not shown on drawings. The designated General Contractor is required to install all architectural doors provided by the mechanical contractors, even if they are not shown on drawings.

.12 Supply and install any identification.

.13 Supply and install all pipe and equipment supports required and any additional support elements to connect the pipe supports to the building structure.

.14 Supply and install vibration isolators and inertia bases for ventilation and air conditioning systems equipment.

.15 Design, supply and install all seismic control equipment.

.16 According to seismic requirements in effect on the work site, the Contractor is to cover the cost of having seismic installations approved by an independent certified Engineer.

.17 Supply and install all valves, thermometers and accessories required on the drawings, diagrams and specifications. Elevation views, plan views and diagrams are complementary.

.18 Install all control valves provided by the contractor responsible for work specified in Division 25 such as control valves, water meter, etc. Coordinate as necessary.

.19 Supply and install all wells for installation of elements requiring such wells.

.20 Connect all humidifiers.

.21 Supply and install all piping, vents, vacuum breakers, and accessories for connecting the humidifiers and fan coils.

.22 Provide all cleaning products and clean all hydronic systems. Clean and disinfect all domestic water systems.

.23 Remove existing cabinet heater panels and package for painting by others. Reinstall covers after painting. Clean existing cabinet heater coils.

.24 Provide and install cabinet heater panels.

.25 Supply and install all drainage piping for mechanical systems from systems to nearest floor drains or nearest drainage pipe with trap.

.26 Supply and install all trap guards made of elastomeric memory material.

.27 Supply and install all piping, fittings and accessories required to connect cold water taps, hot water taps, and all services to equipment supplied and installed by others.

.28 Provide labour and all necessary equipment (cranes, etc.) for the transportation of equipment to the final work site location for installation. Pay all required fees including the permit from the municipality and those for temporary closure of streets, if any.

.29 Start up all networks and equipment according to the manufacturer’s instructions and specifications and complete the worksheets provided in the project’s general requirements.

.30 Provide labour required to prepare the documentation (as required by the NRC Representative) for preventive maintenance.

.31 Provide required labour for training of maintenance personnel.

.32 Provide and install piping insulation.

.33 This list is not exhaustive and does not relieve the Contractor from his responsibility to perform all work required in the specifications and provide a complete installation and compliance with good trade practices.

1.4 REFERENCE STANDARDS

.1 Perform work in accordance with project applicable code standards. The following list is not restrictive and does not relieve the Contractor of his responsibility to perform work in accordance with applicable codes and standards.

.2 Perform work in accordance with Ontario Building Code 2012, NFPA and any other applicable standards.

.3 Obtain all authorizations, approvals, permits and certificates required by authorities. Pay all costs for such authorizations, approvals, permits and certificates.

1.5 SUBMITTALS

.1 Submittals: in accordance with Section 00 10 00 – General Instructions.

.1 Submit shop drawings for review by the NRC Representative as follows:

.1 Piping and piping supports.

.2 Drawings and seismic equipment.

.3 Sanitary fixtures:

.1 Water closet.

.2 Urinal.

.3 Sinks.

.4 Showers

.5 Faucets.

.4 Drains:

.1 Floor drains.

.2 Clean outs.

.5 Drainage piping.

.6 Valves and accessories.

.7 Backflow preventers.

.8 Thermometers and pressure gauges.

.9 Filters and accessories.

.10 Water treatment.

.11 Drawings of the locations of penetrations, sleeves, openings and firewalls.

.12 Sealants for caulking.

.13 Firewall products.

.14 Products and procedures for cleaning pipes.

.2 This list is not restrictive and does not relieve the Contractor of his responsibility to submit all shops drawings and/or technical data required by the NRC Representative.

.2 Samples

.1 Submit the following samples for the NRC Representative's review:

.1 A sample of each type of fireproof and acoustic sealing and air tightness required for penetration of piping will be taken on site for prior approval by the NRC Representative.

.2 This list is not restrictive and does not relieve the Contractor of his responsibility to submit all samples required by the NRC Representative.

.3 Obtain the NRC Representative's approval concerning proposed samples before beginning work.

1.6 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 00 10 00 – General Instructions.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.7 MAINTENANCE

.1 Furnish spare parts in accordance with Section 00 10 00 – General Instructions.

.2 Provide a list of all spare parts recommended by equipment suppliers and provide, among other things, the following change parts:

.1 One (1) set of packing for each pump.

.2 One (1) casing joint gasket for each size pump.

.3 One (1) glass for each gauge glass.

.3 This list is not exhaustive and does not relieve the Contractor of his responsibility to provide any other spare part considered essential by the NRC Representative.

.4 Once work is complete and just before final acceptance of the installation, replace cartridge filters and filter banks in accordance with specifications.

.5 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 00 10 00 – General Instructions.

.6 Furnish one (1) commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

1.9 COORDINATION

.1 The Contractor shall locate and indicate in a timely manner to the Construction Manager, the location of sleeves, openings and other work requirements having an impact on other trades.

.2 The Contractor shall not ask for any additional amount for work to be performed by him to coordinate his work with other trades and/or to account for lack of coordination.

.3 The Contractor shall perform, at his own expense, all required sealing, dismantling and reinstallation of equipment and systems already installed in order to coordinate his work with other trades.

1.10 START-UP AND CALIBRATION

.1 The Contractor is responsible for start-up of all equipment and systems supplied and installed by him.

.2 The Contractor is responsible for performance of systems and equipment supplied and installed by him. In this respect, the Contractor is responsible for correcting, modifying and adjusting any equipment, system or network which does not provide adequate performance as stated in specifications.

.3 The Contractor responsible for the scope of work of Section 23 05 93 – Testing, Adjusting and Balancing for HVAC shall supply labour, equipment and material to measure and/or calibrate the performance of networks and systems which are part of his scope of work.

.4 However, the Contractor in charge of work described in the present section is responsible for all work required on systems and networks for which he is responsible, to allow the Contractor responsible for Section 23 05 93 –Testing, Adjusting and Balancing for HVAC, to perform his work.

.5 The Contractor responsible for the scope of control works (Division 25) shall supply and install all automatic control systems in order to provide proper operation and performance of systems and networks which are part of the scope of work of present section.

.6 Consequently, the Contractor responsible for work described in the present section is responsible for all work required on systems and networks for which he is responsible, to allow the Division 25 Contractor to perform his work.

1.11 MOTORS

.1 All motors of all systems and/or equipment in accordance with the requirements of Section 21 05 01 – Common Work Results for Mechanical.

1.12 COORDINATION OF TESTS

.1 Coordination of FPT mentioned in Section 23 05 93 – Testing, Adjusting and Balancing for HVAC and of PPT mentioned in Division 25 is the General Contractor's responsibility.

.2 The Contractor responsible for the scope of work of Section 23 05 93 – Testing, Adjusting and Balancing for HVAC is responsible for all TAB as well as FPT described in Section 23 05 93. However, the Contractor in charge of work described in Section 23 05 00 – Common Work Results for HVAC is responsible for all work and adjusting related to systems for which he is responsible during FPT. Consequently, in the price of his tender, the Contractor responsible for work described in Section 23 05 00 shall include all costs related to his participation in FPT program. No additional amount of money shall be paid by NRC Representative for Subcontractor's participation in test program.

.3 The Contractor responsible for the scope of work of Division 25 is responsible for all PPT described in Division 25. However, the Contractor in charge of work described in Section 23 05 00 – Common Work Results for HVAC is responsible for all work and adjusting related to systems for which he is responsible during PPT. Consequently, in the price of his tender, Contractor responsible for work described in Section 23 05 00 shall include all costs related to his participation in PPT program. No additional amount of money shall be paid by Owner for Subcontractor's participation in test program.

.4 The Contractor in charge of the scope of work of Section 23 05 00 is responsible for supplying all labour, equipment and material required for handling, adjusting and modification of systems that are part of the scope of work so as to allow the Contractor in charge of Section 23 05 93 – Testing, Adjusting and Balancing for HVAC, to calibrate systems pressure and flow to specified values.

1.13 SYSTEMS OPERATION

.1 Pay all costs related to systems operation, from work start-up to substantial completion.

.2 Supply all labour required for systems operation, from work start-up to substantial completion.

Part 2 Products

.1 Not applicable.

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 23 – Interior 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 The Contractor shall be responsible for taking all measures, both ordinary and extraordinary, in order to protect all ducting systems (new and existing) against dust, as well as against all substances that may become dirty such as the inside and outside of ducts and accessories.

.2 If, in the opinion of the NRC Representative, the Contractor fails to take adequate protective measures and/or if portions of pipes already installed become contaminated, the Contractor shall clean such portions of pipes at his own expense. If cleaning is inadequate, Contractor shall remove those portions of pipes and replace them with new pipes at his own expense.

.3 Any activity that, in the opinion of the NRC Representative, generates dust and/or dirt and/or contaminants that may affect project environmental quality will be executed outside perimeter of the building.

.4 Obstruct openings: prevent dust, dirt and other foreign matter from entering openings of installations and equipment using appropriate means.

.5 Clean equipment and mechanical devices every day.

.6 At the end of duct erection, and before ventilation systems start-up, Contractor shall clean inside and outside of all elements, devices and systems, including screens and filters, and vacuum inside the ducts and air handling units and leave them in perfect working order, replace all air unit system filters and clean water filters in anticipation of provisional acceptance. To do this, the Contractor shall provide and install all doors required to clean all parts of duct systems.

.7 Do not discharge to sewers cleaning products whose contents do not meet competent authorities' requirements. The Subcontractor must collect these products and dispose of them in a manner approved by competent authorities.

.8 Cleaning methods will be presented to the NRC Representative for review prior to cleaning.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct the following tests in accordance with Section 00 10 00 – General Instructions and submit reports as described in PART 1 – SUBMITTALS.

.2 Manufacturer's Field Services:

.1 The Contractor will be responsible for establishing and maintaining an on-site quality control system to ensure the NRC Representative of the highest quality work.

.2 Obtain written report from manufacturer verifying compliance of work, in handling, installing, applying, protecting and cleaning of products and submit Manufacturer's Field Reports as described in PART 1 – SUBMITTALS.

.3 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.

.4 Schedule site visits, to review work, as directed in PART 1 – QUALITY ASSURANCE.

3.4 DEMONSTRATION

.1 Temporary testing

.1 Provide labour, materials and instruments for carrying out tests.

.2 The NRC Representative must be able to use facilities and equipment for testing before they are accepted. Provide labour, equipment and instruments necessary for carrying out tests.

.3 The following facilities and equipment will undergo temporary testing:

.1 Leak testing of ventilation ducts.

.2 Flow balancing of ventilation systems and chilled and heating water.

.3 Performance tests of ventilation and air conditioning equipment.

.4 Leak testing of heating water systems.

.5 Operating and Maintenance Personnel Training

.4 Provide tools, materials and services of qualified instructors to give training, during normal working hours, to operating and maintenance personnel on the operation, control, adjustment, diagnostics/troubleshooting and maintenance of equipment, materials and systems, before their acceptance.

.5 Training must be provided during normal working hours, prior to acceptance and turnover of systems and facilities, and prior to substantial completion.

.1 For all equipment such as:

.2 Piping network.

.3 Backflow preventers.

.4 Valves, thermometers and pressure gauges.

.5 Filters and accessories.

.6 Water treatment.

.7 Humidifiers

This list is not limited; demonstrations and instructions will be given by the manufacturer of the equipment concerned.

.8 Learning materials must include, among other things, the operations and maintenance manual, and as-built drawings.

.9 Requirements for necessary training hours are listed in each relevant section.

.10 Training courses to be based on contents of the operations and maintenance manual.

.11 Training time must conform to the specifications of the appropriate sections and the manufacturer's recommendations.

.12 The NRC Representative may, if desired, record training on video or audio media for use at a later date.

3.5 PROTECTION

.1 Protection of work:

.1 The Contractor shall protect his installation against damage until entire work has been accepted by proper authorities.

.2 All materials will be stored carefully in appropriate locations, without disturbing traffic.

.3 Ensure physical protection of materials and equipment installed and/or stored on site. Promptly remove all debris, tools or materials inside and on top of equipment.

.4 Prevent dust, dirt and other foreign matter from entering the openings of installations and equipment using appropriate means.

.5 When work benches are installed inside building, the Contractor will protect floor against any deposits or debris that may damage floor.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 - Common Work Results for Mechanical and 22 05 00 -Plumbing- General Requirements concerning the work results, are integral parts of this present section.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)

.1 ANSI/ASME B16.15-06, Cast Bronze Threaded Fittings, Classes 125 and 250.

.2 ANSI/ASME B16.18-01, Cast Copper Alloy Solder Joint Pressure Fittings.

.3 ANSI/ASME B16.22-01, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

.4 ANSI/ASME B16.24-01, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

.2 ASTM International Inc.

.1 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 ASTM A536-84(2004)e1, Standard Specification for Ductile Iron Castings.

.3 ASTM B88M-05, Standard Specification for Seamless Copper Water Tube (Metric).

.3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)

.1 ANSI/AWWA C111/A21.11-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.4 Canadian Standards Association (CSA International)

.1 CSA B242-05, Groove and Shoulder Type Mechanical Pipe Couplings.

.5 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).

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

.1 Material Safety Data Sheets (MSDS).

.7 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).

.1 MSS-SP-67-02a, Butterfly Valves.

.2 MSS-SP-70-06, Gray Iron Gate Valves, Flanged and Threaded Ends.

.3 MSS-SP-71-05, Gray Iron Swing Check Valves, Flanged and Threaded Ends.

.4 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.

.8 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) - 2010.

.9 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance and engineering data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

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

.3 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

Part 2 Products

2.1 DOMESTIC COLD AND HOT WATER – PIPING / FITTINGS

.1 As specified in tables M-01 and M-02 on drawing M-09.

2.2 JOINTS

.1 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install in accordance with Ontario Plumbing Code and local authority having jurisdiction.

.2 Assemble piping using fittings manufactured to ANSI standards.

.3 Install CWS piping below and away from HWS and HWR and other hot piping so as to maintain temperature of cold water as low as possible.

.4 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.5 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance and equipment removal.

3.3 VALVES

.1 Isolate equipment, fixtures and branches with gate, butterfly or ball valves.

.2 Isolate existing zones from main pipes with ball valves;

.3 Provide valves as indicated on drawing and in specifications.

.4 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

3.4 PRESSURE TESTS

.1 Test pressure: greater of 1.5 time maximum system operating pressure or 860 kPa during a minimum of four (4) hours. All tests must be witnessed and approved by NRC.

.2 Provide NRC with a minimum of 48 hours notice in writing before all pressure tests.

3.5 FLUSHING AND CLEANING

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper to Provincial potable water guidelines. Let system flush for additional 2 hours, then draw off another sample for testing.

3.6 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that air chambers, expansion compensators are installed properly.

3.7 DISINFECTION

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

.2 Upon completion, provide laboratory test reports on water quality for Departmental Representative approval.

3.8 START-UP

.1 Timing: start up after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Certificate of static completion has been issued.

.4 Water treatment systems operational.

.2 Provide continuous supervision during start-up.

.3 Start-up procedures:

.1 Establish circulation and ensure that air is eliminated.

.2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.

.3 Bring HWS storage tank up to design temperature slowly.

.4 Monitor piping HWS and HWR piping systems for freedom of movement, pipe expansion as designed.

.5 Check control, limit, safety devices for normal and safe operation.

.4 Rectify start-up deficiencies.

3.9 PERFORMANCE VERIFICATION

.1 Scheduling:

.1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.

.2 Procedures:

.1 Verify that flow rate and pressure meet Design Criteria.

.2 TAB HWC in accordance with Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

.4 Sterilize HWS and HWR systems for Legionella control.

.5 Verify performance of temperature controls.

.6 Verify compliance with safety and health requirements.

.7 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 re-charge air chambers. Repeat for outlets and flush valves.

.8 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.

.3 Reports:

.1 In accordance with Section 00 10 00 – General Instructions requirements. Reports and diagrams should be prepared on forms conforming to Section 00 10 00 – General Instructions.

.2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

3.10 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.2 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 - Common Work Results for Mechanical and 22 05 00 -Plumbing- General Requirements concerning the work results, are integral parts of this present section.

1.2 REFERENCES

.1 ASTM International Inc.

.1 ASTM B32-08, Standard Specification for Solder Metal.

.2 ASTM B306-02, Standard Specification for Copper Drainage Tube (DWV).

.3 ASTM C564-03a, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

.2 Canadian Standards Association (CSA International).

.1 CSA B67-1972(R1996), Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.

.2 CAN/CSA-B70-06, Cast Iron Soil Pipe, Fittings and Means of Joining.

.3 CAN/CSA-B125.3-05, Plumbing Fittings.

.3 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) - 2010.

.4 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: In accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 COPPER PIPING AND CONNECTORS RELATED

.1 Evacuation piping for sanitary water evacuation and vent piping, type DWV, intended to be installed aboveground: conforming ASTM B306 standard.

.1 Connectors

.1 Cast brass connectors: conforming CAN/CSA-B125.3, ASME B16.23 standards.

.2 Forged copper connectors: conforming CAN/CSA-B125.3, ASME B16.29 standards.

.2 Solder: lead free, tin-antimony 95:5, to ASTM B32.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 In accordance with Section 23 05 05 – Installation of Pipework.

.2 Install in accordance with National Plumbing Code, supplemented as per Provincial Plumbing Code.

3.3 TESTING

.1 Pressure test buried systems before backfilling.

.2 Hydraulically test to verify grades and freedom from obstructions.

3.4 PERFORMANCE VERIFICATION

.1 Cleanouts:

.1 Ensure accessible and that access doors are correctly located.

.2 Open, cover with linseed oil and re-seal.

.3 Verify that cleanout rods can probe as far as the next cleanout, at least.

.2 Test to ensure traps are fully and permanently primed.

.3 Ensure that fixtures are properly anchored, connected to system and effectively vented.

.4 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

3.5 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions

.2 Waste Management: In accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for plumbing specialties and accessories.

.2 Related Sections:

.1 The prescriptions for the sections 21 05 01 - Common Work Results for Mechanical and 22 05 00 -Plumbing- General Requirements concerning the work results, are integral parts of this present section.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM).

.1 ASTM A126-95 (2001), Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.

.2 ASTM B62-02, Specification for Composition Bronze or Ounce Metal Castings.

.2 American Water Works Association (AWWA).

.1 AWWA C700-02, Cold Water Meters-Displacement Type, Bronze Main Case.

.2 AWWA C701-02, Cold Water Meters-Turbine Type for Customer Service.

.3 AWWA C702-1-01, Cold Water Meters-Compound Type.

.3 Canadian Standards Association (CSA International).

.1 CSA-B64 Series-01, Backflow Preventers and Vacuum Breakers.

.2 CSA-B79-94 (R2000), Floor, Area and Shower Drains, and Cleanouts for Residential Construction.

.3 CSA-B356-00, Water Pressure Reducing Valves for Domestic Water Supply Systems.

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

.1 Material Safety Data Sheets (MSDS).

.5 Plumbing and Drainage Institute (PDI).

.1 PDI-G101-96, Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data.

.2 PDI-WH201-92, Water Hammer Arresters Standard.

.6 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) - 2010.

1.3 SUBMITTALS

.1 Submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.

.2 Indicate dimensions, construction details and materials for specified items.

.3 Shop Drawings:

.1 Submit shop drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions construction and assembly details.

.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Instructions: submit manufacturer's installation instructions.

.6 Manufacturers' Field Reports: manufacturers' field reports specified.

.7 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 00 10 00 – General Instructions, include:

.1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year and capacity.

.2 Details of operation, servicing and maintenance.

.3 Recommended spare parts list.

1.4 QUALITY ASSURANCE

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations in accordance with Section 00 10 00 – General Instructions, in which must be considered:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 00 10 00 – General Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Transporting, storing and handling materials and equipment in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials and equipment on site in their original packaging, which must bear a label stating the name and address of the manufacturer.

.3 Waste Management and Disposal:

.1 Separate waste materials in accordance with Section 00 10 00 – General Instructions.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 FLOOR DRAINS

.1 Refer to drawing M-09.

2.2 CLEANOUTS

.1 Line cleanout: in cast iron pipe with bolted neoprene gasketed cover secured to body with brass bolts, with full size pipe opening. Access shall be made by round stainless steel plate and slotted flat head stainless steel screws.

.2 Floor cleanout in unfinished areas: Duco coated cast iron body with flashing flange, and removable positive gasket seal closure plug and heavy duty 6” diameter adjustable cast iron cover secured with stainless steel screws, C.O. cast in cover. For water-proofed areas provide ‘FC’ flange with flashing clamp. In tiled areas: Duco coated cast iron body with flashing flange, and removable positive gasket seal closure plug and square nickel bronze cover and frame with 1/8” tile recess.

.4 In terrazzo areas: Duco coated cast iron body with flashing flange, and removable positive gasket seal closure plug and square nickel bronze cover and frame with 1/2”terrazzo recess.

.5 In carpeted areas: Smith Series 4020Y Floor Cleanout, same as above except with nickel bronze cover and frame (For medium load traffic).

2.3 ACCESS DOORS

.1 General: 14 GA. (1.7mm) steel, rust resistant, continuous concealed hinge, with positive and self-opening screwdriver operated lock. Doors in tile walls shall be stainless steel and

shall suit tile pattern. All other panels shall be prime painted steel. Unless otherwise stated all panel to be 16”x16”.

.1 Fire rated: for walls and ceiling UL/ULC 1-1/2 hour 'B' label with maximum temperature rise of 250 degrees after 30 minutes. Door with 2" (50mm) insulation, steel, 20 GA. (1mm) with 16 GA. (1.6mm) frame, concealed hinge, self latching ring pull and grey baked enamel finish. See as required.

2.4 WATER HAMMER ARRESTORS

.1 Refer to drawing M-09.

2.5 BACK FLOW PREVENTERS

.1 Preventers: to CSA-B64 Series.

.2 Connection to the humidifier: Double Check Valve Assembly Backflow Preventer (medium hazard).

.3 Meeting the standards ASME 1015 and AWWA C510. Verify with local authorities to determine the type of risk present, installation in vertical position, the frequency of testing and other requirements on the installation, model: Wilkins, Watts, Apollo.

.4 All preventers shall be complete with inlet strainer, isolation ball valves.

.5 Drain to be piped to nearest floor drain, exact routing to be coordinated and approved by NRC on site.

2.6 VACUUM BREAKERS

.1 Breakers: to CSA-B64 Series, vacuum breaker hose connection.

.2 Hose Connection Vacuum Breakers: chrome finish stainless steel working parts, a rubber diaphragm and disc, and a draining stem. Maximum Pressure:125psi

2.7 BACKWATER VALVES DRAINAGE

.1 Coated extra heavy cast iron or galvanized body with bronze seat, revolving bronze flapper and threaded cover.

.2 Access:

.1 Surface access.

.2 Access pipe with cover: maximum 300 mm depth.

.3 Steel housing with steel cover gasket.

.4 Concrete access pit with cover, as indicated.

2.8 TRAP SEAL PRIMERS FOR ALL DRAINS

.1 Insertion type water holding drain device. Made of one piece of soft and flexible elastomer PVC, 10 years warranty. Conforming to ASME-A112.6.3, NSF/ANSI 14, CSA B79.

2.9 PRESURE REDUCING VALVE

.1 Triple-coated corrosion preventative iron body construction with flanged inlet and flanged outlet connections, replaceable disc, interchangeable diaphragm chamber, replaceable stainless steel seat and stainless steel stem. Size 100mm is tapped for a bypass line and an auxiliary regulator. Maximum Working Pressure: 12.06 bar, Adjustable Reduced Pressure Range: 1.7 to 7.0 bar.

2.10 PIPE ESCUTCHEON

.1 Chrome plated brass solid type with set screws.

.2 Outside diameter shall cover opening or sleeve

Part 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 data sheet.

3.2 INSTALLATION

.1 Install in accordance with latest version of Ontario Building Code.

.2 Install in accordance with manufacturer's instructions and as specified.

3.3 ACCESS DOORS

.1 Supply access doors to give access to all valves, cleanouts, strainers, duct access doors, and other similar mechanical work which may need maintenance or repair but which is concealed in inaccessible construction, except as otherwise specified herein or on the drawings.

.2 Locate access doors in walls and partitions to the Engineer's approval, and arrange mechanical work to suit.

.3 Group piping and ductwork to ensure the minimum number of access doors is required. Access doors will be installed by the trades responsible for the particular type of construction in which the doors are required.

.4 Access doors shall be, wherever possible, of a standard size for all applications. Confirm exact dimensions prior to ordering.

3.4 CLEANOUTS

.1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required code, and as indicated.

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

.3 Building drain cleanout and stack base cleanouts: line size to maximum NPS4.

3.5 WATER HAMMER ARRESTORS

.1 Install on branch supplies to fixtures or group of fixtures where indicated.

3.6 BACK FLOW PREVENTERS

.1 Install in accordance with CSA-B64 Series, where indicated and elsewhere as required by code.

.2 Pipe discharge to terminate over nearest drain.

3.7 BACKWATER VALVES

.1 Install in main sewer lines, where indicated and at weeping tile connection in pit provided at building cleanout.

.2 Install in access pit as indicated.

3.8 HOSE BIBBS AND SEDIMENT FAUCETS

.1 Install at bottom of risers, at low points to drain systems, and as indicated.

3.9 TRAP SEAL PRIMERS

.1 Install for floor drains and elsewhere, as indicated.

.2 Install on cold water supply to nearest frequently used plumbing fixture, in concealed space, to approval of Departmental Representative.

.3 Install soft copper or plastic tubing to floor drain.

3.10 STRAINERS

.1 Provide strainers in piping where shown on the drawings and where specified herein.

.2 Equip strainers 50mm (2") diameter and larger with valved blowdown piping.

.3 Terminate blowdown piping over the nearest funnel and floor drain unless otherwise noted.

.4 Locate strainers so they are easily accessible for service.

.5 Install ahead of each automatic control valve and radiation and as indicated on drawing.

.6 Install ahead of each pump.

3.11 WATER MAKE-UP ASSEMBLY

.1 Install on valved bypass.

.2 Pipe discharge from relief valve to nearest floor drain.

3.12 START-UP

.1 General:

.1 In accordance with Section 00 10 00 – General Instructions: General Requirements, supplemented as specified herein.

.2 Timing: start-up only after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Certificate of static completion has been issued.

.4 Operational water treatment systems.

.3 Provide continuous supervision during start-up.

3.13 TESTING AND ADJUSTING

.1 General:

.1 Contractor shall be responsible to verify that all equipment operates as per manufacturer specification to the satisfaction of NRC.

.2 Contractor shall be responsible to train NRC staff in the use of all equipment. Exact training schedule to be coordinated with NRC.

.2 Timing:

.1 After start-up deficiencies rectified.

.2 After certificate of completion has been issued by authority having jurisdiction.

.3 Application tolerances:

.1 Pressure at fixtures: +/- 20 kPa.
.2 Flow rate at fixtures: +/- 20%.

.4 Adjustments:

.1 Verify that flow rate and pressure meet design criteria.

.2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.

.5 Floor drains:

.1 Verify operation of trap seal primer.

.2 Prime, using trap primer. Adjust flow rate to suit site conditions.

.3 Check operations of flushing features.

.4 Check security, accessibility and removability of strainer.

.5 Clean out baskets.

.6 Vacuum breakers, backflow preventers, backwater valves:

.1 Test tightness, accessibility for O&M of cover and of valve.

.2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.

.3 Verify visibility of discharge from open ports.

.7 Access doors:

.1 Verify size and location relative to items to be accessed.

.8 Cleanouts:

.1 Verify covers are gas-tight, secure, yet readily removable.

.9 Water hammer arrestors:

.1 Verify proper installation of correct type of water hammer arrester.

.10 Pressure regulators, PRV assemblies:

.1 Adjust settings to suit locations, flow rates and pressure conditions.

.11 Strainers:

.1 Clean out repeatedly until clear.

.2 Verify accessibility of cleanout plug and basket.

.3 Verify that cleanout plug does not leak.

3.14 COMMISSIONING REPORTS:

.1 In accordance with Section 00 10 00 – General Instructions: Reports, supplemented as specified.

.2 Include:

.1 PV results on approved PV Report Forms.

.2 Product Information report forms.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS:

.1 The prescriptions for the sections 21 05 01 - Common Work Results for Mechanical and 22 05 00 -Plumbing- General Requirements concerning the work results, are integral parts of this present section.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-B45 Series-02(R2008), Plumbing Fixtures.

.2 CAN/CSA-B125.3-05, Plumbing Fittings.

.3 CAN/CSA-B651-04, Accessible Design for the Built Environment.

.2 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) - 2010.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for washroom fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Indicate fixtures and trim:

.1 Dimensions, construction details, roughing-in dimensions.

.2 Factory-set water consumption per flush at recommended pressure.

.3 (For water closets, urinals): minimum pressure required for flushing.

.4 Shop Drawings:

1.4 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for washroom fixtures, for incorporation into manual specified in Section 00 10 00 – General Instructions.

.2 Include:

.1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.

.2 Details of operation, servicing, maintenance.

.3 List of recommended spare parts.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: In accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.

.2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.

.3 Exposed plumbing brass to be chrome plated.

.4 Fixture piping:

.1 Hot and cold water supplies to fixtures:

.1 Chrome plated rigid or flexible supply pipes with screwdriver or handwheel stop, reducers, escutcheon.

.2 Waste:

.1 Brass P trap with clean out on fixtures not having integral trap.

.2 Chrome plated in exposed places.

.5 Chair carriers:

.1 Factory manufactured floor-mounted carrier systems for wall-mounted fixtures.

.6 Refer to drawing P-260 for list of plumbing fixtures.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Mounting heights:

.1 Standard: to manufacturer's recommendations measured from finished floor.

.2 Wall-hung fixtures: to manufacturer's recommendations, measured from finished floor.

.3 Barrier free: to most stringent NBCC or CAN/CSA B651.

3.3 ADJUSTING

.1 Conform to water conservation requirements specified this section.

.2 Adjustments:

.1 Adjust water flow rate to design flow rates.

.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

.3 Adjust flush valves to suit actual site conditions.

.4 Adjust urinal flush timing mechanisms.

.5 Set controls of automatic flush valves for WCs and urinals to prevent unnecessary flush cycles.

.3 Checks:

.1 Water closets, urinals: flushing action.

.2 Aerators: operation, cleanliness.

.3 Vacuum breakers, backflow preventers: operation under all conditions.

.4 Thermostatic controls:

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

3.4 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 - Common Work Results for Mechanical and 22 05 00 -Plumbing- General Requirements concerning the work results, are integral parts of this present section.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-B45 Series-02(R2008), Plumbing Fixtures.

.2 CAN/CSA-B125.3-05, Plumbing Fittings.

.3 CAN/CSA-B651-04, Accessible Design for the Built Environment.

.2 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) - 2010.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data: Provide manufacturer's printed product literature and datasheets for fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data in accordance with Section 00 10 00 – General Instructions.

.2 Include:

.1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.

.2 Details of operation, servicing, maintenance.

.3 List of recommended spare parts.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.

.2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.

.3 Exposed plumbing brass to be chrome plated.

.4 Number, locations: architectural drawings to govern.

.5 Fixture piping:

.1 Hot and cold water supplies to each fixture:

.1 Chrome plated rigid flexible supply pipes each with screwdriver handwheel stop, reducers, escutcheon.

.2 Waste:

.1 Brass P trap with clean out on each fixture not having integral trap.

.2 Chrome plated in all exposed places.

.6 Chair carriers:

.1 Factory manufactured floor-mounted carrier systems for all wall-mounted fixtures.

.7 Refer to drawing M-09 for list of plumbing fixtures.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Mounting heights:

.1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.

.2 Wall-hung fixtures: According to the manufacturer's recommendations, unless otherwise stated in the specifications or drawings. Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA-B651.

3.3 ADJUSTING

.1 Conform to water conservation requirements specified this section.

.2 Adjustments:

.1 Adjust water flow rate to design flow rates.

.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

.3 Checks:

.1 Aerators: operation, cleanliness.

.2 Vacuum breakers, backflow preventers: operation under all conditions.

.3 Wash fountains: operation of flow-actuating devices.

.4 Thermostatic controls:

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

3.4 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: In accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 - Common Work Results for Mechanical and 22 05 00 -Plumbing- General Requirements concerning the work results, are integral parts of this present section.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-B45 Series-02(R2008), Plumbing Fixtures.

.2 CAN/CSA-B125.3-05, Plumbing Fittings.

.3 CAN/CSA-B651-04, Accessible Design for the Built Environment.

.2 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) - 2010.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data including monitoring requirements for incorporation into manuals specified in Section 00 10 00 – General Instructions.

.2 Include:

.1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.

.2 Details of operation, servicing, maintenance.

.3 List of recommended spare parts.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.

.2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.

.3 Exposed plumbing brass to be chrome plated.

.4 Number, locations: architectural drawings to govern.

.5 Fixture piping:

.1 Hot and cold water supplies to each fixture.

.1 Chrome plated rigid or flexible supply pipes each with screwdriver handwheel stop, reducers, escutcheon.

.2 Waste:

.1 Brass P trap with cleanout on each fixture not having integral trap.

.2 Chrome plated in all exposed places.

.6 Refer to drawing M-09 for list of plumbing fixtures.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Mounting heights:

.1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.

.2 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651.

3.3 ADJUSTING

.1 Conform to water conservation requirements specified this section.

.2 Adjustments:

.1 Adjust water flow rate to design flow rates.

.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

.3 Checks:

.1 Aerators: operation, cleanliness.

.2 Vacuum breakers, backflow preventers: operation under all conditions.

.4 Thermostatic controls:

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

3.4 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 GENERAL

1.1 GENERAL

.1 Contents of sections – "Mechanical – Scope of Work" and 21 05 01 – Common Work Results for Mechanical apply to this section as if entirely reproduced.

1.2 RELATED SECTIONS

.1 Section 23 05 01 – Mechanical – Use of HVAC Systems During Construction.

.2 Section 23 05 19 – Meters, Measuring Instruments, Thermometers, and Pressure Gauges for HVAC Piping

.3 Section 23 05 29 – Hangers and Supports for HVAC Piping and Equipment.

.4 Section 23 05 48 – Vibration and Seismic Controls for HVAC Piping and Equipment.

.5 Section 23 05 53.01 – Mechanical Identification.

.6 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.

.7 Section 23 07 13 – Ductwork Insulation.

.8 Section 23 07 14 – Thermal Insulation for Equipment.

.9 Section 23 31 13.01 – Metal Ducts – Low Pressure to 500 Pa.

.10 Section 23 31 13.02 – Metal Ducts – High Pressure to 2500 Pa.

.11 Section 23 32 48 – Acoustical Air Plenums.

.12 Section 23 33 00 – Air Duct Accessories.

.13 Section 23 33 14 – Dampers – Balancing.

.14 Section 23 33 15 – Dampers – Operating.

.15 Section 23 33 16 – Dampers – Fire and Smoke.

.16 Section 23 33 46 – Flexible Ducts.

.17 Section 23 33 53 – Duct Liners.

.18 Section 23 34 00 – Air Handling Fans.

.19 Section 23 36 00 – Air Terminal Units.

.20 Section 23 37 13 – Diffusers, Registers and Grilles.

.21 Section 23 44 00 – HVAC Air Filtration.

.22 Section 23 55 01 – Duct Heater

.23 Section 23 73 10 – Air Handling – Built-Up.

.24 Section 23 82 19 – Fan Coil Units.

.25 Section 23 84 13 – Humidifiers.

1.3 SCOPE OF WORK

.1 The content of Section 21 05 01 – Common Work Results for Mechanical provides a definition of the mechanical scope of work, and its content applies to this section as if entirely reproduced.

.2 The specific tasks generally include, but are not limited to, the supply of all materials, labour, equipment, tools, machinery, transportation, handling, hoisting, surveillance and temporary storage, if required, to build, execute and complete in an expeditious manner substantial and satisfying all the work described below and shown on drawings.

.3 It is important to note that the location of equipment on drawings is approximate and should be verified on site before commencing work.

.4 All penetrations in roofs, walls, floors, or other elements of more than 305 mm diameter or 305 mm x 305 mm required for installation of ventilation and air conditioning are the responsibility of the General Contractor.

.5 Supply and install all sleeves required.

.6 Perform all waterproofing, acoustic and air tightness work required for all duct penetrations through walls, floors and any other partition.

.7 Provide and install all fans, air handling unit, coils, and supply and exhaust plenums.

.8 Provide and install all ductwork and accessories.

.9 Provide and install all acoustical insulation for air transfer ducts.

.10 Provide all labour and tools required for leak testing of ventilation ducts. Take into account work phasing for these tests.

.11 Provide and install all grilles and diffusers. All door grilles will be provided by the Mechanical Contractor and installed by the General Contractor.

.12 Supply and install all balancing dampers required to balance HVAC systems. All balancing dampers are not necessarily shown on drawings. The Mechanical Contractor shall provide and install all the components needed to complete the balancing, even if they are not shown on drawings.

.13 Supply and install all duct access doors required to allow thorough cleaning of air ducts and allow access to dampers, controls and accessories that require access for maintenance. The doors will be installed at intervals up to 15 m on all ducts. All duct access doors are not necessarily shown on drawings. The Mechanical Contractor shall provide and install all duct access doors, even if they are not shown on drawings.

.14 Locate, size, and provide all required architectural access doors for maintenance of equipment. The designated General Contractor is required to install all architectural access doors, even if not necessarily shown on drawings. The Mechanical Contractor shall provide and install all duct access doors, even if they are not shown on drawings. The designated General Contractor is required to install all architectural doors provided by the mechanical contractors, even if they are not shown on drawings.

.15 Supply and install any identification.

.16 Supply and install all dampers and accessories specified in Section 23 33 14 – Dampers – Balancing, and 23 33 15 – Dampers – Operating and/or shown on drawings.

.17 Install all smoke detectors provided by Division 26.

.18 Provide all labour and all the tools required to assist the contractor responsible for the work in Section 23 05 93 – Testing, Adjusting and Balancing for HVAC to perform system testing in accordance with Section 23 05 93 and according to established work phasing. Supply and install all pulleys and belts required when balancing networks for all project phases.

.19 Supply and install all duct and equipment supports required to connect duct supports to the building structure.

.20 Construction and sealing ratings specified in Sections 23 31 13.01 – Metal Ducts – Low Pressure to 500 Pa, and 23 31 13.02 – Metal Ducts – High Pressure to 2500 Pa, should be followed by the Mechanical Contractor. In this regard, the Mechanical Contractor must necessarily perform all tests required by specifications and ducts must be sealed until such tests have demonstrated acceptable results.

.21 Start up all networks and equipment according to specifications and manufacturer's instructions and complete the worksheets provided.

.22 Supply and install heating coils.

.23 Supply and install new heating cabinet panels, control valves and required accessories.

.24 Supply and install all the terminal elements.

.25 The contractor responsible for the work specified in Division 25 is responsible for installing all control components and accessories for all ventilation systems, except where otherwise indicated.

.26 Supply and install the humidifier.

.27 Supply and install filters and additional filters.

.28 Install all terminal elements.

.29 Supply and install the cover plate, thermal insulation and inner cover plate on all unused sections of louvers and plenums of air intakes and exhausts.

.30 Supply and install all dampers, fire dampers, damper actuators, as well as hangers needed. The contractor responsible for the work of the Division 25 shall supply and install damper actuators.

.31 Supply and install sound attenuators, acoustic housings, soundproofing equipment and materials for ventilation units and ducts.

.32 Supply and install vibration isolators and inertia bases for ventilation and air conditioning systems equipment.

.33 Design, supply and install all seismic control equipment.

.34 Supply and install drain connections and drain connection siphons for the following: coil basins; air intakes and exhaust plenums; and ducts with installed humidifiers; etc.

.35 Supply and install water cooling coils and heating coils.

.36 Provide all materials and labour required to perform duct cleaning.

.37 Provide all labor required for preparing the documentation required for preventive maintenance.

.38 Provide all labour required for the training of maintenance personnel.

.39 Provide labour and all necessary equipment (cranes, etc.) for the transportation of equipment to the final work site location for installation.

.40 Start up all networks and equipment according to the manufacturer's instructions and specifications and complete the worksheets provided in the project's general requirements.

.41 Provide labour required to prepare the documentation (as required by the NRC Representative) for preventive maintenance.

.42 This list is not exhaustive and does not relieve the Contractor from his responsibility to perform all work required in the specifications / drawings and provide a complete installation and compliance with good trade practices.

1.4 REFERENCE STANDARDS

.1 Perform work in accordance with project applicable code standards.

.2 Obtain all authorizations, approvals, permits and certificates required by authorities. Pay all costs for such authorizations, approvals, permits and certificates.

1.5 SUBMITTALS

.1 Submittals: in accordance with Section 00 10 00 – General Instructions and 21 05 01 – General Requirements for Mechanical.

.1 Shop Drawings

.1 Submit shop drawings for review by the NRC Representative as follows:

.1 Air handling units.

.2 Fans and accessories, motors.

.3 Manufacturing standards for metallic ducts and supports.

.4 Duct manufacturing and erection drawings.

.5 Drawings and seismic control equipment.

.6 Drawings of the locations of penetrations, sleeves, openings and fire dampers.

.7 Flexible air ducts.

.8 All accessories and dampers for air ducts.

.9 Acoustic lining for air ducts.

.10 Grilles and diffusers.

.11 Terminal air volume boxes.

.12 Sound attenuators.

.13 Anti-vibration devices.

.14 Cooling coils.

.15 Heating coils.

.16 Humidifiers.

.17 Filters and filter housings.

.18 Products for sealing air ducts.

.19 Sealants for caulking.

.20 Firewall products.

.21 Products and procedures for cleaning ducts.

.2 This list is not restrictive and does not relieve the Contractor of his responsibility to submit all shops drawings and/or technical data required by the NRC Representative.

.2 Samples

.1 Submit the following samples for the NRC Representative's review:

.1 Sample of each type of transverse and longitudinal joint for all types of ducts.

.2 Sample of balancing dampers.

.3 Sample of access doors.

.4 Sample of flexible ducts.

.5 Sample of each type of fireproof and acoustic sealing and air tightness required for penetration of duct will be taken on site for prior approval by the NRC Representative before the erection of air ducts.

.2 This list is not restrictive and does not relieve the Contractor of his responsibility to submit all samples required by the NRC Representative.

.3 Obtain the NRC Representative's approval concerning proposed samples before beginning work.

1.6 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 00 10 00 – General Instructions.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 10 00 – General Instructions.

1.7 MAINTENANCE

.1 Furnish spare parts in accordance with Section00 10 00 – General Instructions.

.2 Provide a list of all spare parts recommended by equipment suppliers and provide, among other things, the following change parts:

.1 One (1) filter cartridge or (1) filter media set for each filter or filter bank, in addition to final operating set.

.2 One (1) set of pulleys for each fan for flow balancing.

.3 Three (3) fusible links (at each temperature) for fire dampers.

.3 This list is not exhaustive and does not relieve the Contractor of his responsibility to provide any other spare part considered essential by the NRC Representative.

.4 Once work is complete and just before final acceptance of the installation, replace cartridge filters and filter banks in accordance with specifications.

.5 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 00 10 00 – General Instructions.

.6 Furnish one (1) commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

1.9 COORDINATION

.1 The Contractor shall locate and indicate in a timely manner to the Construction Manager, the location of sleeves, openings and other work requirements having an impact on other trades.

.2 The Contractor shall not ask for any additional amount for work to be performed by him to coordinate his work with other trades and/or to account for lack of coordination.

.3 The Contractor shall perform, at his own expense, all required sealing, dismantling and reinstallation of equipment and systems already installed in order to coordinate his work with other trades.

1.10 START-UP AND CALIBRATION

.1 The Contractor is responsible for start-up of all equipment and systems supplied and installed by him.

.2 The Contractor is responsible for performance of systems and equipment supplied and installed by him. In this respect, the Contractor is responsible for correcting, modifying and adjusting any equipment, system or network which does not provide adequate performance as stated in specifications.

.3 The Contractor responsible for the scope of work of Section 23 05 93 – Testing, Adjusting and Balancing for HVAC shall supply labour, equipment and material to measure and/or calibrate the performance of networks and systems which are part of his scope of work.

.4 However, the Contractor in charge of work described in the present section is responsible for all work required on systems and networks for which he is responsible, to allow the

Contractor responsible for Section 23 05 93 Testing, Adjusting and Balancing for HVAC to perform his work.

.5 The Contractor responsible for the scope of control works (Division 25) shall supply and install all automatic control systems in order to provide proper operation and performance of systems and networks which are part of the scope of work of present section.

.6 Consequently, the Contractor responsible for work described in the present section is responsible for all work required on systems and networks for which he is responsible, to allow the Division 25 Contractor to perform his work.

1.11 MOTORS

.1 All motors of all systems and/or equipment in accordance with requirements of Section 21 05 01 – Common Work Results for Mechanical.

1.12 COORDINATION OF TESTS

.1 Coordination of FPT mentioned in Section 23 05 93 – Testing, Adjusting and Balancing for HVAC and of PPT mentioned in Division 25 is the General Contractor's responsibility.

.2 The Contractor responsible for the scope of work of Section 23 05 93 – Testing, Adjusting and Balancing for HVAC is responsible for all TAB as well as FPT described in Section 23 05 93. However, the Contractor in charge of work described in Section 23 05 00 – Common Work Results for HVAC is responsible for all work and adjusting related to systems for which he is responsible during FPT. Consequently, in the price of his tender, the Contractor responsible for work described in Section 23 05 00 shall include all costs related to his participation in FPT program. No additional amount of money shall be paid by the NRC Representative for Subcontractor's participation in test program.

.3 The Contractor responsible for the scope of work of Division 25 is responsible for all PPT described in Division 25. However, the Contractor in charge of work described in Section 23 05 00 – Common Work Results for HVAC is responsible for all work and adjusting related to systems for which he is responsible during PPT. Consequently, in the price of his tender, Contractor responsible for work described in Section 23 05 00 shall include all costs related to his participation in PPT program. No additional amount of money shall be paid by Owner for Subcontractor's participation in test program.

.4 The Contractor in charge of the scope of work of Section 23 05 00 is responsible for supplying all labour, equipment and material required for handling, adjusting and modification of systems that are part of the scope of work so as to allow the Contractor in charge of Section 23 05 93 – Testing, Adjusting and Balancing for HVAC, to calibrate systems pressure and flow to specified values.

1.13 SYSTEMS OPERATION

.1 Pay all costs related to systems operation, from work start-up to substantial completion.

.2 Supply all labour required for systems operation, from work start-up to substantial completion.

1.14 BUILDING AUTOMATION SYSTEM

.1 Mechanical contractor shall carry all base building BAS contractor “Airtron”.

.2 Airtron will provide all control valves, and actuators, temperature sensors, damper actuators, pressure sensors, and all other sensors outlined in the mechanical drawings. Mechanical dampers, VAVs, VAV controllers shall be by mechanical contractor. Low voltage wiring for associated controls will be by BAS contractor.

.3 Mechanical contractor shall review full scope of work with controls contractor during tender period and allow for installation of all BAS sensors, control valves and other coordination items.

Part 2 Products

2.1 MATERIALS / EQUIPMENT

.1 Not applicable.

Part 3 Execution

3.1 PAINT TOUCH-UPS

.1 Do painting in accordance with Section 09 91 23 – Interior 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 The Contractor shall be responsible for taking all measures, both ordinary and extraordinary, in order to protect all ducting systems (new and existing) against dust, as well as against all substances that may become dirty such as the inside and outside of ducts and accessories.

.2 If, in the opinion of the NRC Representative, the Contractor fails to take adequate protective measures and/or if portions of pipes already installed become contaminated, the Contractor shall clean such portions of pipes at his own expense. If cleaning is inadequate, Contractor shall remove those portions of pipes and replace them with new pipes at his own expense.

.3 Any activity that, in the opinion of the NRC Representative, generates dust and/or dirt and/or contaminants that may affect project environmental quality will be executed outside perimeter of the building.

.4 Obstruct openings: prevent dust, dirt and other foreign matter from entering openings of installations and equipment using appropriate means.

.5 Clean equipment and mechanical devices every day.

.6 At the end of duct erection, and before ventilation systems start-up, Contractor shall clean inside and outside of all elements, devices and systems, including screens and filters, and vacuum inside the ducts and air handling units and leave them in perfect working order, replace all air unit system filters and clean water filters in anticipation of provisional acceptance. To do this, the Contractor shall provide and install all doors required to clean all parts of duct systems.

.7 Do not discharge to sewers cleaning products whose contents do not meet competent authorities' requirements. The Subcontractor must collect these products and dispose of them in a manner approved by competent authorities.

.8 Cleaning methods will be presented to the NRC Representative for review prior to cleaning.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct the following tests in accordance with Section 00 10 00 – General Instructions and submit reports as described in PART 1 – SUBMITTALS.

.2 Manufacturer's Field Services:

.1 The Contractor will be responsible for establishing and maintaining an on-site quality control system to ensure the NRC Representative of the highest quality work.

.2 Obtain written report from manufacturer verifying compliance of work, in handling, installing, applying, protecting and cleaning of products and submit Manufacturer's Field Reports as described in PART 1 – SUBMITTALS.

.3 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.

.4 Schedule site visits, to review work, as directed in PART 1 – QUALITY ASSURANCE.

3.4 SYSTEM START-UP

.1 Apply the setting operation of all systems as prescribed in this Section00 10 00 – General Instructions and the requirements of this section

.2 Provide labour, materials and instruments for carrying out tests.

.3 The NRC Representative must be able to use facilities and equipment for testing before they are accepted. Provide labour, equipment and instruments necessary for carrying out tests.

.4 The following facilities and equipment will undergo temporary testing:

.1 Leak testing of ventilation ducts.

.2 Flow balancing of ventilation systems and chilled and heating water.

.3 Performance tests of ventilation and air conditioning equipment.

.4 Leak testing of chilled and heating water systems.

3.5 OPERATING AND MAINTENANCE PERSONNEL TRAINING

.1 Conduct staff training as prescribed in Section 00 10 00 – General Instructions and the requirements of this section.

.1 Provide tools, materials and services of qualified instructors to give training, during normal working hours, to operating and maintenance personnel on the operation, control, adjustment, diagnostics/troubleshooting and maintenance of equipment, materials and systems, before their acceptance.

.2 Training must be provided during normal working hours, prior to acceptance and turnover of systems and facilities, and prior to substantial completion.

.3 For all equipment such as:

.1 HVAC units.

This list is not limited; demonstrations and instructions will be given by the manufacturer of the equipment concerned.

.2 Learning materials must include, among other things, the operations and maintenance manual, and as-built drawings.

.3 Requirements for necessary training hours are listed in each relevant section.

.4 Training courses to be based on contents of the operations and maintenance manual.

.5 Training time must conform to the specifications of the appropriate sections and the manufacturer’s recommendations.

.6 The NRC Representative may, if desired, record training on video or audio media for use at a later date.

3.6 PROTECTION

.1 Protection of work:

.1 The Contractor shall protect his installation against damage until entire work has been accepted by proper authorities.

.2 All materials will be stored carefully in appropriate locations, without disturbing traffic.

.3 Ensure physical protection of materials and equipment installed and/or stored on site. Promptly remove all debris, tools or materials inside and on top of equipment.

.4 Prevent dust, dirt and other foreign matter from entering the openings of installations and equipment using appropriate means.

.5 When work benches are installed inside building, the Contractor will protect floor against any deposits or debris that may damage floor.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 -Mechanical- General Requirements concerning the work results and 23 05 00 -HVAC- General Requirements concerning the work results, are both integral parts of this present section.

1.2 REFERENCES

.1 ASTM International Inc.

.1 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A105/A105M-05, Standard Specification for Carbon Steel Forgings, for Piping Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

.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.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance and operation data in accordance with Section 00 10 00 – General Instructions.

.1 Data to include:

.1 Servicing requirements, including special requirements, stuffing box packing, lubrication and recommended procedures.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: In accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 EXPANSION JOINTS

.1 Hot water system:

.1 Free flexible expansion joint, T-321stainless steel 304 bellow. Flange connections with retaining rods and guides designed and manufactured according to ASME B31.3, Appendix X or Section VIII, if applicable.

.1 Operation pressure: 2 060 kPa.

2.2 ANCHORS AND GUIDES

.1 Anchors:

.1 Provide as indicated.

.2 Concrete: to Section 03 30 00 - Cast-in-Place Concrete.

.3 Reinforcement: to Section 03 20 00 - Concrete Reinforcing.

.2 Alignment guides:

.1 Provide and installed as indicated.

.2 To accommodate specified thickness of insulation.

.3 Vapour barriers, jackets to remain uninterrupted.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install expansion joints with cold setting, as instructed by NRC. 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.

.4 Do welding in accordance with section 23 05 17 - Pipe Welding.

3.3 PIPE CLEANING AND START-UP

.1 In accordance with Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.

3.4 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.2 Waste Management: In accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 The requirements of Section 22 05 00 – Common Works Results for Plumbing are an integral part of this section.

1.2 REFERENCES

.1 American Society of Mechanical Engineers (ASME)

.1 ASME Fluid Meter's Handbook: Their Theory and Application, Sixth Edition 1971.

.2 ASME B40.100-01, Pressure Gauges and Gauge Attachments.

.3 ASME B40.200-01, Thermometers, Direct Reading and Remote Reading.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-14.4-M88, Thermometers, Liquid-in-Glass, Self-Indicating, Commercial/Industrial Type.

.2 CAN/CGSB-14.5-M88, Thermometers, Bimetallic, Self-Indicating, Commercial/Industrial Type.

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

.1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Submit manufacturer's printed product literature and datasheets for measuring instruments and the following components:

.1 Meters and measuring instruments.

.2 Thermometers.

.3 Pressure gauges.

.4 Stop cocks.

.5 Siphons.

.6 Thermowells.

.3 Shop Drawings:

.1 Shop drawing submittals for measuring instruments shall include:

.1 Piping configuration and sizing.

.2 Lengths of straight pipe upstream and downstream of each primary element.

.3 Distances to first weld.

.4 Protrusions.

.5 Thermowells.

.6 Pressure taps.

.7 Service conditions.

.8 Full details of primary elements, including:

.1 Standard of design and construction.

.2 Materials.

.3 Type

.4 Serial number.

.5 Flow rate.

.6 Differential pressure.

.7 Irrecoverable head loss (IHL).

.8 Calculation sheets.

.9 Accuracy statements for each component at specified flow rates and other conditions.

.10 Flow and temperature ranges.

.11 Signal processor calibration data.

.12 Minimum turndown ratio.

.4 Samples

.1 Samples to include:

.1 Full size samples of recorder charts, integrator readings.

.5 Certificates

.1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Instructions

.1 Submit manufacturer's installation instructions.

.2 The NRC Representative will make available one (1) copy of systems supplier's installation instructions.

.7 Closeout Submittals

.1 Submit maintenance data including monitoring requirements for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials and equipment to site in original factory packaging, labelled with manufacturer's name and address.

.3 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 GENERAL

.1 Measuring points

.1 Thermometers and pressure gauges to operate at mid-point of scale or range.

.2 Temperature range/pressures: Scales to be in metric and imperial units.

.2 Accuracy

.1 Calculate overall accuracy of each installation using following expression: Overall accuracy = (~~E~~ **Σ** (accuracy of individual components of system)^2)$^{1/2}$.

.2 Components to include:

.1 Primary flow measuring elements.

.2 Transmitters: flow, differential pressure, pressure, temperature, and temperature differential.

.3 RTD's.

.4 Signal processors, recorders.

.5 Calibration of signal processors: assume 0.20% per processor.

.6 Installation tolerances: assume 1% for concentricity of pipe, and difference in height of transmitter piping.

.3 Show in proposal overall accuracy at 100%, 70%, 10%, and minimum specified design flow rate.

.4 Indicate minimum measurable flow rate.

2.2 DIRECT READING THERMOMETERS

.1 Industrial, variable angle type, 225 mm scale length to CAN/CGSB 14.4 and/or ASME B40.200.

.1 Standard of acceptance: Weiss, model 9VS9, Trerice, Ashcroft.

2.3 THERMOWELLS

.1 For copper pipe: use copper or bronze.

.2 For steel pipe: stainless steel.

2.4 PRESSURE GAUGES

.1 115 mm dia., dial type: to ASME B40.100, Grade 2A, stainless steel or phosphor bronze bourdon according to the fluid, tube having 0.5% accuracy full scale unless otherwise specified and liquid fill.

.1 Standard of acceptance: Ashcroft 1279, Trerice, Weiss.

.2 Features or the following elements must be provided for each of the pressure gauges installed:

.1 Siphon for steam systems.

.2 Snubber for networks subject to pressure pulses.

.3 Diaphragm seal assembly for corrosive fluid networks.

.4 Collar and safety vent in the back, a bead reinforcement at the front.

.5 Bronze stop cock.

.6 Oil bath type for installations subject to severe vibration.

.7 Additional 150 mm pipe above the shutoff valve for temperatures above 60°C.

Part 3 Execution

3.1 GENERAL

.1 Install instruments so they can be easily read from floor or platform. If this cannot be accomplished, install remote reading units.

.2 Install instruments between equipment and first fitting or valve (upstream or downstream, accordingly).

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.3 PREPARATION

.1 Before final calculations for orifice diameter, and before purchase of venturi, measure:

.1 Internal diameter of main at the primary element to +/-0.01 mm accuracy.

.2 For concentricity of pipe.

3.4 THERMOMETERS

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

.2 Install in locations as indicted and on inlet and outlet of:

.1 Heat exchangers.

.2 Water heating and cooling coils.

.3 DHW heaters.

.4 Other locations as indicated on drawings.

.3 Use extensions where thermometers are installed through insulation.

3.5 PRESSURE GAUGES

.1 Install in following locations:

.1 Suction and discharge of pumps.

.2 Upstream and downstream of PRVs.

.3 Upstream and downstream of control valves.

.4 Inlet and outlet of water heating and cooling coils.

.5 Inlet and outlet of heat exchangers, water side.

.6 In all other locations as indicated.

.2 Provide pressure gauges with isolating valve.

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

3.6 INSTALLATION OF DIFFERENTIAL PRESSURE TAPS AND PIPING

.1 Differential pressure taps horizontal and level with each other to within ± 1.5 mm.

.2 Tubing: straight, supported throughout its length, sloped 5–10% upward to main for drainage and venting, without air pockets, with blowdown valves at bottom.

3.7 INSTALLATION OF TRANSMITTERS NOT FORMING INTEGRAL PART OF PRIMARY ELEMENTS

.1 Mount transmitters on pipe stand installed and located to ensure no damage by passing traffic.

3.8 NAMEPLATES

.1 Install engraved lamicoid nameplates as specified in Section 23 05 53.01 –Mechanical Identification, identifying medium.

3.9 VERIFICATION KIT

.1 Provide gauge and thermometer verification kit.

.2 Calibrate all thermometers and pressure gauges as required.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 -Mechanical- General Requirements concerning the work results and 23 05 00 -HVAC- General Requirements concerning the work results, are both integral parts of this present section.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)

.1 ANSI/ASME B1.20.1-1983 (R2006), Pipe Threads, Généralités Purpose (Inch).

.2 ASME B16.1, Cast Iron Pipe Flanges and Flanged Fittings.

.3 ANSI/ASME B16.5-2003, Pipe Flanges and Flanged Fittings.

.4 ANSI/ASME B16.10, Face-to-Face and End-to-End Dimensions Valves.

.5 ANSI/ASME B16.11-2001, Forged Fittings, Socket-Welding and Threaded.

.6 ANSI/ASME B16.18-2001, Cast Copper Alloy Solder Joint Pressure Fittings.

.7 ANSI/ASME B16.25-1997, Buttwelding Ends.

.8 ANSI/ASME B16.34-1996, Valves - Flanged, Threaded and Welding End.

.2 ASTM International

.1 ASTM A49-01 (2006), Standard Specification for Heat-Treated Carbon Steel Joint Bars.

.2 ASTM A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

.3 ASTM A193/A193M-04, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.

.4 ASTM A194/A194M-03b, Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.

.5 ASTM A216/A216M-1993 (03), Specification for Steel Castings, Carbon Suitable for Fusion Welding for High-Temperature Service.

.6 ASTM A276-08, Standard Specification for Stainless Steel Bars and Shapes.

.7 ASTM A536-84 (2004)e1, Standard Specification for Ductile Iron Castings.

.8 ASTM B61-08, Standard Specification for Steam or Valve Bronze Castings.

.9 ASTM B62-02, Standard Specification for Composition Bronze or Ounce Metal Castings.

.10 ASTM B85/B85M-08, Standard Specification for Aluminum-Alloy Die Castings.

.11 ASTM B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.12 ASTM B283-08a, Standard Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).

.13 ASTM B505/B505M-08a, Standard Specification for Copper-Base Alloy Continuous Castings.

.3 American Petroleum Institute (API).

.1 API 598-1996, Valve Inspection and Testing.

.2 API Std. 609-[04], Butterfly Valves: Double Flanged, Lug- and Wafer-Type.

.4 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS)

.1 MSS-SP-25-1998, Standard Marking System for Valves, Fittings, Flanges and Unions.

.2 MSS SP-61-03, Pressure Testing of Steel Valves.

.3 MSS SP-70-06, Grey Iron Gate Valves, Flanged and Threaded Ends.

.4 MSS SP-71-05, Grey Iron Swing Check Valves, Flanged and Threaded Ends.

.5 MSS SP-78-1998, Cast Iron Plug Valves, Flanged and Threaded Ends.

.6 MSS-SP-80-2008, Bronze Gate Globe, Angle and Check Valves.

.7 MSS SP-82-1992, Valve Pressure Testing Methods.

.8 MSS SP-85-2002, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

.9 MSS-SP-110-1996, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for equipment and systems and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

.3 Shop Drawings:

.1 Submit data for valves specified in this Section.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials/Spare Parts:

.1 Furnish following spare parts:

.1 Valve seats: one for every 10 valves each size, minimum 1.

.2 Discs: one for every 10 valves, each size. Minimum 1.

.3 Stem packing: one for every 10 valves, each size. Minimum 1.

.4 Valve handles: 2 of each size.

.5 Gaskets for flanges: one for every 10 flanged joints.

.2 Tools:

.1 Furnish special tools for maintenance of systems and equipment.

.2 Include following:

.1 Lubricant gun for expansion joints.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 00 10 00 – General Instructions and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 MATERIALS

.1 General :

.1 In addition to the information in Table M-03 standard valves, the following requirements apply.

.1 Lubricated ball valve

.2 Valve supplied with control lever until DN 100 and with shielded gear control, worm type, with position indicator and steering wheel to DN 150 and above. These valves are lubricated type.

.1 These valves have undergone testing at the factory according to ANSI B16-1 and B16-3.

.2 Butterfly valve:

.1 Supplied with locking lever and 8-position quadrant with slotted hole marks corresponding to the notches of the lever to DN-100, Supplied with armored command, worm gear type, permanently lubricated, quadrant and steering wheel to DN 150 or more, body with pins

.3 Ball valve:

.1 Supplied with vinyl lever cover.

.2 Regular passage hole.

.3 Elongated rod to suit the thickness of the insulation.

.4 With dial and stop memory when scheduled for commissioning.

.4 Chain Pulley:

.1 Supplied valve with a pulley-chain located more than 2.1 m above the floor. Chains extend to a height of 1.5 m above the floor, and tie them so as to release corridors or circulation areas.

.5 Drain valve:

.1 Ball valve or gate valve with bronze body, threaded, with cap, chain and nets for hoses.

System diameter	Valve diameter
Until DN 32 mm	20 mm
From DN 38 to DN 65 mm	25 mm
To DN 75 and over	50 mm

Part 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.

3.2 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition

VALVE	DIAMETER FROM	DIAMETER TO	SPÉCIFI-CATION(*)	DESCRIPTION
GATE VALVE	13 mm 65 mm 450 mm	50 mm 400 mm 600 mm	Class 125 Class 125 Class 150	Jenkins, fig. 2810J; Crane, fig. 431, Kitz n° 25, Toyo n° 298; Milw., fig.148 Jenkins, fig. 454J; Crane, fig. 465 ½, Kitz n° 72, Toyo/R-W n° 421, Milw. fig. F-2885-M Jenkins, fig. 454J; Crane, fig. 465 ½, Kitz n° 150SCLS (Acier)
GLOBE VALVE	13 mm 65 mm 300 mm	50 mm 250 mm +	Class 150 Class 125 Class 125	Jenkins, fig. 106-BJ ; Crane, fig. 7, Kitz n° 09, Toyo/R-W n° 221A; Milw, fig. 590-T Jenkins, fig. 2342J ; Crane, fig. 351, Kitz n° 76, Toyo/R-W n° 400A, Milw., Fig. 2981-M Crane, fig. 351 (on request), Kitz n° 150SCJS (Acier), Milw., Fig. 2981-M
CHECK VALVE	13 mm 65 mm 350 mm	50 mm 300 mm 500 mm	Class 150 Class 125 Class 150	Jenkins, fig. 4092J ; Crane, fig. 137 (Refer to note 1(1)), Kitz n° 29, Milw., Fig. 509-T Jenkins, fig. 587J ; Crane, fig. 373 ((1)), Kitz n° 78, Toyo n° 435A, Milw., Fig. 2974-M Jenkins, fig. 587J ; Crane, fig. 373 ((1)),Kitz n° 150SCOS
BALL VALVE	13 mm	50 mm	150 lb/po²	Jenkins, fig. 901S ; Crane, fig. 9302S , Kitz n° 68AM; Milwaukee, Fig. BA-100S-LD; corps en bronze : bille 316SS ; siège et joints en PTFE renforcé
BUTTERFLY	65 mm 350 mm	300 mm 600 mm	150 lb/po² 150 lb/po²	Jenkins, fig. 2232-ELJ ; Keystone F. 222, Milw.ML-223-E (2) Jenkins, fig. 2232-EGJ, Keystone AR-2, Milw. fig. ML-323-E (2), corps en fonte A126 cl. B, disque en aluminium-bronze, tige en acier inox., siège en EPDM, corps à oreilles (« full lug body »)
PIPING AND VALVE STANDARDS			HEATING, COOLING OR TOWER WATER	M-03

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 The requirements of sections 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are an integral part of this section.

1.2 REFERENCES

.1 American Society of Mechanical Engineers (ASME)

.1 ASME B31.1-07, Power Piping.

.2 ASTM International

.1 ASTM A125-1996 (2007), Standard Specification for Steel Springs, Helical, Heat Treated.

.2 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.3 ASTM A563-07a, Standard Specification for Carbon and Alloy Steel Nuts.

.3 Factory Mutual (FM)

.4 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)

.1 MSS SP58-200, Pipe Hangers and Supports – Materials, Design and Manufacture.

.2 MSS SP69 2003, Pipe Hangers and Supports – Selection and Application.

.3 MSS SP89-2003, Pipe Hangers and Supports – Fabrication and Installation Practices.

.5 Underwriters' Laboratories of Canada (ULC).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with sections 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC and Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and data sheets for hangers and supports and include product characteristics, performance criteria, physical size, finish and limitation.

.3 Shop Drawings:

.1 Submit shop drawings for:

.1 Bases, hangers and supports;

.2 Connections to equipment and structure;

.3 Structural assemblies.

.4 Identify the following items listed on manufacturer's documentation, including:

.1 Upper attachment.

.2 Middle attachment.

.3 Pipe attachment.

.4 Riser clamps.

.5 Shields and saddles.

.6 Sway braces.

.5 Certificates:

.1 Submit certificates signed by the manufacturer certifying that products, materials and equipment comply with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions:

.1 Provide manufacturer's installation instructions.

.1 The NRC Representative will provide one (1) copy of systems supplier's installation instructions.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into manual specified in Section00 10 00 – General Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials and equipment in accordance with Section 00 10 00 – General Instructions and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Deliver materials and equipment to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

Part 2 PRODUCTS

2.1 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 and 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, catwalks, hangers to withstand seismic events as specified in Section 23 05 48, article 1.4.

2.2 GENERAL

.1 Fabricate hangers, supports and sway braces according to ANSI B31.1 and MSS SP58.

.2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.3 PIPE HANGERS

.1 Finishes:

.1 Pipe hangers and supports must be galvanized or painted with zinc-rich paint after manufacture for corrosive environment.

.2 Use electro-plating or hot dipped galvanizing process.

.3 Ensure steel hangers in contact with copper piping are epoxy coated.

.2 Upper attachment structural: suspensions 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.

.2 Cold piping NPS 2½ 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, 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, to MSS SP69.

.2 Cold piping NPS 2½ or greater, hot piping: malleable iron top-of-beam jaw clamp with hooked rod, spring washer, plain washer and nut, UL listed.

.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 larger than rod diameter.

.2 Concrete inserts: wedge shaped body with knockout protector plate, UL listed to MSS SP69.

.5 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.

.6 Pipe attachments: compliant to MSS SP58:

.1 Attachments for steel piping: carbon steel black or galvanized.

.2 Attachments for copper piping: copper plated black steel.

.3 Use insulation shields for hot pipework.

.4 Oversize pipe hangers and supports.

.7 Adjustable clevis: material to MSS SP69, UL listed, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.

.1 Ensure “U” has a hole in for riveting to insulation shields.

.8 Yoke style pipe roll: carbon steel yoke, rod and nuts with cast iron roll to MSS SP69.

.9 U-bolts: carbon steel to MSS SP69 with two (2) nuts at each end to ASTM A563.

.1 Finishes for steel pipework: black or galvanized finish.

.2 Finishes for copper, glass, brass or aluminum pipework: black or galvanized finish.

.10 Pipe rollers: cast iron roll and roll stand with carbon steel rod to MSS SP69.

2.4 RISER CLAMPS

.1 Steel or cast iron pipe: galvanized black carbon steel to MSS SP58, type 42, UL listed.

.2 Copper piping: Carbon steel copper plating to MSS SP58, Type 42.

.3 Bolts: to ASTM A307.

.4 Nuts: to ASTM A563.

2.5 INSULATION PROTECTION SHIELDS

.1 Insulated cold piping:

.1 64 kg/m^3 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 centre plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP69.

2.6 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) for each spring.

.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.

2.7 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 two (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 for each spring.

2.8 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 Supply and install all necessary metal supports for the equipment, exchangers, tanks and accessories indicated on drawings and in specifications of the present section.

.3 These hangers will be constructed of welded metal channels by skilled labor according to good trade practices and to provincial codes for this type of work.

2.9 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

.1 Provide templates to ensure accurate location of anchor bolts.

2.10 HOUSEKEEPING PADS

.1 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.

Part 3 PERFORMANCE

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 datasheets.

3.2 INSTALLATION

.1 Install hangers and supports in accordance with the following:

.1 Manufacturer's instructions and recommendations.

.2 Vibration Control Devices:

.1 Install on piping systems at pumps, 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.

.3 Steel pipes: install below coupling or shear lugs welded to pipe.

.4 Cast iron pipes: install below joint.

.4 Clevis plates attached to concrete:

.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 Canadian Plumbing Code or authority having jurisdiction.

.2 Fire protection piping: as per pertinent fire protection code.

.3 Gas and oil piping NPS ½ and smaller: 1 hanger every 1.8 m.

.4 Copper piping NPS ½ and smaller: 1 hanger every 1.5 m.

.5 Flexible joint roll groove pipe, flexible joints: in accordance with table below, but not less than one hangar at joints. Table listings for straight runs without concentrated loads and where full linear movement is not required.

.6 One (1) hanger within 300 mm of each elbow.

MAXIMUM HANGER SPACING AND MINIMUM ROD SIZE

O.D		STEEL PIPE				COPPER TUBE		ROD SIZE	
INCHES	mm	WATER		STEAM / AIR				INCH	mm
		FT	METER	FT	METER	FT	METER		
<= 1/2	12.7	7	2.13	8	2.44	5	1.52	1/4'	6.4
3/4'	19.1	7	2.13	9	2.74	5	1.52	1/4'	6.4
1	25.4	7	2.13	9	2.74	6	1.83	1/4'	6.4
1-1/4'	31.7	8	2.44	10	3.05	7	2.13	1/4'	6.4
1-1/2'	38.1	9	2.74	12	3.66	8	2.44	3/8'	9.5
2	50.8	10	3.05	13	3.96	8	2.44	3/8'	9.5
2-1/2'	63.5	11	3.35	14	4.27	9	2.74	3/8'	9.5
3	76.2	12	3.66	15	4.57	10	3.05	3/8'	9.5
4	101.6	14	4.27	17	5.18	12	3.66	1/2'	12.7
6	152.4	17	5.18	21	6.40	14	4.27	1/2'	12.7
8	203.2	19	5.79	24	7.31	16	4.88	5/8'	15.8
10	254.0	20	6.10	26	7.92	18	5.49	3/4'	19.0
12	304.8	23	7.01	30	9.14	19	5.79	7/8'	22.2
14	355.6	25	7.62	32	9.75			1	25.4
16	406.4	27	8.23	35	10.67			1	25.4
18	457.2	28	8.53	37	11.28			1-1/4'	31.7
20	508.0	30	9.14	39	11.89			1-1/4'	31.7

.7 Piping plumbing system NPS 4 and greater, attached to roof structure: one (1) hanger to each beam when run is perpendicular to structural elements; minimum two (2) beams when run is parallel to structural members.

.8 Pipework greater than NPS 12, conform to MSS SP69.

3.4 HANGER INSTALLATION

.1 Install hanger so that rod is vertical under operating conditions.

.2 Offset hangers so that hanger rods are perfectly straight when network is in operation.

.3 Adjust rod height so that the load is evenly distributed between hangers.

.4 Attach hanger anchoring elements to core of steel beams.

.5 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.

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.

3.7 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 00 10 00 – General Instructions and submit report as described in PART 1 – ACTION AND INFORMATIONAL SUBMITTALS.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of work, in handling, installation, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 – ACTION AND INFORMATIONAL 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 in accordance with QUALITY ASSURANCE, PART 1.

3.8 CLEANING

.1 Clean in accordance with section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: In accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Contents

.1 Systems, vibration and seismic devices and associated installation methods.

1.2 RELATED SECTIONS

.1 The requirements of sections 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are an integral part of this section.

1.3 REFERENCES

.1 Requirements of the NBC 2015.

.2 ANSI B31.1 (SI), Power Piping (SI Edition).

.3 ANSI / MSS SP58 Pipe Hangers and Supports – Materials, Design and Manufacturer.

.4 CAN / CSA S832: Seismic Risk Reduction of Operational and Functional Components of Buildings.

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

.1 Material Safety Data Sheets (MSDS).

.6 National Fire Protection Association (NFPA)

.1 NFPA 13-2002, Standard for the Installation of Sprinkler Systems.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

1.5 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.6 SCOPE OF WORK

.1 The work largely includes the calculations, supply, installation, supervision and responsibility for all necessary materials and equipment of seismic restraint systems for piping works and their related equipment in mechanical rooms and everywhere in new mechanical building installations for all trades:

.1 Seismic restraint systems calculations and installation details to meet the required standards.

.2 The supply and delivery of these seismic restraint systems to the site fall under the responsibility of the present section.

.3 Supervision and installation of all devices for seismic restraint systems and presentation of a compliance report.

.4 Seismic restraint systems include, without being limited to, the crossbracing of mechanical piping supports and equipment such as pumps, exchangers, etc.

.2 The Contractor must hire an experienced manufacturer to design, supply and supervise the installation of all seismic restraint systems.

.3 The seismic restraint systems manufacturer is responsible vis-à-vis the Contractor for designing, supplying and supervising the installation of seismic restraint systems. The manufacturer remains responsible for the structural integrity of the seismic restraint systems.

.4 The manufacturer must have a professional engineer who specializes in seismic restraint systems design to make the calculations and develop the installation details of the seismic restraint systems.

.5 Submit shop drawings and specifications in accordance with Section00 10 00 – General Instructions.

.6 Identify the following elements indicated in the manufacturer's documentation:

.1 Anchors.

.2 Median elements.

.3 Supports.

.4 Riser clamps.

.5 Protection shields.

.6 Crossbracings.

.7 Design, prepare and supply the shop drawings including those that illustrate the type of seismic restraint systems and their location.

.*8* Provide the calculations used. The shop drawings must bear the seal of a professional engineer who is a member of the *Professional Engineers of Ontario (PEO)*

1.7 SEISMIC RESTRAINT SYSTEMS

.1 Unless otherwise indicated, the seismic control measures must be designed and chosen to meet the requirements of the latest edition of the National Building Code 2010 and it supplement:

.1 Seismic zone:

.1 To be defined.

.2 Seismic importance factor:

.1 To be defined.

.3 The other coefficients (Cp, A_r, A_x) will be taken from the Code and its supplement.

.4 The Contractor must take into consideration floor level in which equipment is installed within the building, i.e. basement, ground floor, upper floor) during the seismic control equipment design.

.2 During or following a seismic event, the anchored equipment may not necessarily remain in operational state as in normal use conditions. Mandatory requirements state that seismic restraint systems shall prevent the systems and mechanical equipment from causing personal injury and the equipment from moving from its normal position during a seismic event.

.3 The manufacturer of seismic restraint systems must obtain from each Mechanical section involved, all information relating to the devices, pipes and equipment necessary for seismic restraint system calculations (weight, fluid type, number, thermal insulation, run, spacing between supports, grouping on trapezoid supports).

.4 The seismic restraint systems manufacturer must obtain the required characteristics from the manufacturer of each device or equipment for calculation purposes.

.5 The calculations and installation details of anchoring bolts and seismic restraint systems shall be approved by a professional engineer specializing in seismic restraint systems design.

1.8 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.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: in accordance with Section 00 10 00 – General Instructions.

Part 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; 50 durometer, 9 mm minimum thick; maximum loading 350 kPa.

.2 Type EP2 – rubber waffle or ribbed; 30 durometer, 9 mm minimum thick; maximum loading 415 kPa.

.3 Type EP3 – neoprene-steel-neoprene; 9 mm minimum thick neoprene bonded to 1.71 mm 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: ration 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 levelling devices.

.2 Ratio of height when loaded to diameter of spring between 0.8 and 1.0.

.3 Cadmium plate for outdoor 100% relative humidity installations.

.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 thick ribbed neoprene or rubber friction and acoustic pad.

.3 Type M3 – stable open spring: support on bonded 6 mm thick ribbed neoprene or rubber friction and acoustic pad, levelling bolt for rigidly mounting to equipment.

.4 Type M4 – restrained stable open spring: supported on bonded 6 mm thick ribbed neoprene or rubber friction and acoustic pad; built-in resilient limit stops, removable space plates.

.5 Type M5 – enclosed spring mounts with snubbers for isolation up to 950 kg maximum.

.6 Performance: as indicated.

2.6 HANGERS

.1 Colour coded springs, rust resistant, painted box type hangers. Arrange to permit hanger box or rod to move through 30 degrees arc without metal to metal contact.

.2 Type H1 – neoprene – in-shear, moulded with rod isolation bushing which passes through hanger box.

.3 Type H2 – stable spring, elastomeric washer, cup with moulded isolation bushing which passes through hanger box.

.4 Type H3 – stable spring, elastomeric element, cup with moulded isolation bushing which passes through hanger box.

.5 Type H4 – stable spring, elastomeric element with precompression washer and nut with deflection indicator.

.6 Performance: as indicated.

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 centreline of thrust.

2.9 STRUCTURAL BASES

.1 Type B1 – Pre-fabricated 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.

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.

2.11 SEISMIC CONTROL MEASURES

.1 General

.1 All equipment connected to emergency electrical power and their associated distribution networks must remain in operation during and after an earthquake. The seismic restraint systems to work in every direction.

.2 Fasteners and attachment points shall be capable of sustaining the same loads as the seismic restraint systems.

.3 Drilled or power driven anchors and fasteners not permitted.

.4 No equipment, equipment supports or mounts to fail before failure of structure.

.5 Supports of cast iron or threaded pipe not permitted.

.6 Seismic control measures not to interfere with integrity of firestopping.

.7 All seismic restraint systems must be entirely integrated and compatible with building mechanical and structural design. They must not hinder normal operation of mechanical systems.

.8 Manufacturers of seismic restraint systems to offer vibration isolators, integral and separate seismic shock absorbers, cable fasteners and other fastening systems from manufacturers that regularly fabricate this type of material.

.9 The seismic restraint systems shall be capable of resisting forces in all directions.

.10 Fasteners and fastener fittings must be able to resist same loads as seismic restraint equipment.

.11 For longitudinal crossbracings, the pipe fastener must be directly on the pipe (under thermal insulation).

.12 Seismic anchorings on pipes must be compatible with the anchoring and support specifications for the piping networks.

.13 High resistance mechanical expansion anchors must be used to secure seismic restraint systems to the concrete structures. Use of anchors and supports installed with a nail gun is prohibited.

.14 Supports of cast iron or threaded pipe or other breakable materials not permitted.

.15 The seismic restraint systems must not interfere with the functioning or integrity of firestopping equipment.

.16 Stiffeners shall be added to the suspension rods when necessary in order to avoid buckling.

.17 Seismic restraint crossbracings may be omitted for:

.1 32 mm and under piping.

.2 Individually suspended piping whose length of supports is 300 in. and under.

.18 Cast iron, glass or other pipes containing mechanical joints with rings and tightening screws with supports longer than 300 mm shall be equipped with a seismic restraint crossbracing at every change in direction (90º and +). Riser joints must be stabilized or have a crossbracing between the floors.

.19 Maximum spacing for seismic restraint crossbracings must be 24 m. in a longitudinal direction and 12 m in a transversal direction. The seismic restraint system calculations may necessitate shorter lengths.

.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 as per site conditions or as indicated.

.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: approved by Consultant hired by Sub-contractor (see scope of work 1.7).

.1 Structural angles or channels.

.1 Cable resistant 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.

2.12 MEDIAN ELEMENT (SUSPENSION ROD)

.1 Threaded, carbon steel rod, black finish and electrogalvanized for mechanical rooms, stiffened with forged steel.

.1 Acceptable product: Anvil, Fig. 146 or approved equal

2.13 SUPPORTS

.1 Cold water steel or cast iron pipes, hot water steel piping, with less than 25 mm horizontal movement; hot water steel piping suspended on rods longer than 300 mm: adjustable stirrup in accordance with Standard MSS-SP58-1983, type 1.

.1 Acceptable products: Anvil, Fig. 260 or 260 ISS or approved equal.

.2 If Fig. 260 ISS from Anvil is used, a protection shield (Fig. 167) is not necessary (see manufacturer's installation details).

.2 Cold water copper pipes, hot water copper pipes, with less than 25 mm horizontal movement, hot water copper piping suspended on rods longer than 300 mm: adjustable stirrup in accordance with Standard MSS-SP58-1979, type 1, with copper finish.

.1 Acceptable product: Anvil, Fig. CT-65 or approved equal.

.3 Suspended hot water steel and copper pipes with more than 25 mm horizontal movement, hot water steel piping suspended on rods 300 mm in length or shorter: roller stirrup in accordance with Standard MSS-SP58-1979, type 43.

.1 Acceptable product: Anvil, Fig. 181 or approved equal.

.4 Steel or copper hot water piping, base supported: roller base in accordance with Standard MSS-SP58-1983, type 45.

.1 Acceptable product: Anvil, Fig. 271 or approved equal.

.5 Non-metallic piping: adjustable stirrup in accordance with Standard MSS-SP-69, type 9.

.1 Acceptable product: Anvil, Fig. 97C or approved equal.

.6 Type of supports:

.1 Roll stands shall be installed for the following cases:

.1 Case no.1:

.1 On 60°C and + piping networks, with a suspension rod 500 mm or shorter; however, when the suspension rod is longer than 500 mm, the ratio between pipe expansion and suspension rod length must be greater than 1:24 (0.041) to install pipe roll stands.

.2 Example:

.1 50 mm expansion, 1 000 mm rod, ratio 1:20 (= 0.05). In this case, pipe roll stands are required.

.2 Case no. 3*:

.1 When there is vertical movement up to 32 mm expansion maximum, add Anvil Fig. 178 springs with Anvil Fig. 171. Choice of spring strength will be based on piping weight and content.

.3 Case no. 4:

.1 On 43°C and + piping networks, with piping supported by angle irons or another type of metal member.

.2 Acceptable products:

Diameter including insulation	Anvil
50 mm Ø to 1 065 mm Ø	271

.4 Case no. 5:

.1 Unless otherwise mentioned above, the supports will be vertical adjustment type.

.2 Acceptable products:

Rod-suspended Roll Stands		
Diameter including insulation	**Anvil**	**No. of rods per support**
13 mm Ø to 760 mm Ø	260	1
for vertical piping support 200 mm Ø to 510 mm Ø	261	---

2.14 RISER CLAMP

.1 For steel or cast iron piping: carbon steel clamp, black finish, in accordance with Standard MSS-SP58-1983, type 42, ULC stamped.

.1 Product of acceptance: Anvil, Fig. 261 or approved equal.

.2 For copper piping: carbon steel clamp, copper finish, in accordance with Standard MSS-SP58-1983, type 42.

.1 Product of acceptance: Anvil, Fig. CT-121 or approved equal.

.3 Non-metallic piping: carbon steel clamp in accordance with Standard MSS-SP-69, type 8.

.1 Acceptable product: Anvil, Fig. 261C or approved equal.

2.15 INSULATION PROTECTION SHIELDS

.1 Cold water piping NPS 32 mm and +: protection shield for piping with high density thermal insulation and continuous vapour barrier.

.1 Acceptable product: Anvil, Fig. 167 or approved equal.

.2 It is not acceptable under any circumstances for cold water piping to come into direct contact with a shield.

.3 The contractor responsible for this section must present the shields to the contractor responsible for piping insulation. The latter shall install the shields and supply a wood block between the piping and shield for larger diameter piping. Refer to Section 27 07 15.

.2 Hot water piping NPS 32 mm and +: protection shield for insulated piping.

.1 Acceptable product: Anvil, Fig. 160 and 166 or approved equal.

.2 Protection shields are not necessary only when Anvil Fig. 260 ISS is used.

2.16 EQUIPMENT SUPPORTS

.1 Supply and install all necessary metal supports for the equipment, exchangers, tanks and accessories indicated on drawings and in specifications of the present section.

.2 These supports will be made with U metal channels welded and manufactured by skilled labour according to trade practices and provincial code standards for this type of work.

2.17 RUBBER PADS

.1 Supply and install pads between copper piping and each suspension element to eliminate contact between the copper and iron. This pad shall exceed 25 mm on each side of the collar.

Part 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 instruction, and datasheets.

3.2 INSTALLATION

.1 Seismic control measures to meet requirements of NBC 2015.

.2 Install vibration isolation equipment in accordance with manufacturer's 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 otherwise indicated, support piping connected to isolated equipment with spring mounts or spring hangers with 25 mm minimum static deflection as follows:

.1 Up to NPS 4: first 3 points of support NPS 5 to NPS 8: first 4 points of support, NPS 10 and over: first 6 points of support.

.2 Fire protection piping: as per pertinent fire protection code.

.3 Copper piping NPS 12.7 mm and smaller: 1 mount/hanger every 1.5 m.

.4 Gas piping NPS 12.7 mm and smaller: 1 mount/hanger every 1.8 m.

.5 Corrugate pipe, flexible joints: in accordance with table below, but not less than one hangar at joints.

.6 Flexible joint roll groove pipe, flexible joints: in accordance with table below, but not less than one hangar at joints.

.7 First point of support: static deflection of twice deflection of isolated equipment, but not more than 50 mm.

3.3 INSTALLATION OF HANGERS/SUPPORTS

.1 Space the anchoring points so that the suspension rods remain straight when the network is in service.

.2 Adjust the height of suspension rods so that the load is spread uniformly between the hangers/supports.

.3 Secure anchoring elements to the truss joints of steel columns.

3.4 INSTALLATION

.1 Where isolation is bolted to floor use vibration isolation rubber washers.

.2 Block and shim level bases so that ductwork and piping connections can be made to a rigid system at the operating level, before isolator adjustment is made. Ensure that there is no physical contact between isolated equipment and building structure.

.3 Do not weld seismic restraint crossbracings directly to the supports or guides on mechanical pipe runs.

.4 Verify on site that the anchoring bolts, insert diameters (anchors), depth of borings in the concrete, and length of welds are in accordance with the presented drawings and instructions.

.5 The opening around bolts must be 1/16 in. maximum larger than the bolt diameter.

.6 Anchoring points in concrete slabs must be at a distance from concrete sides and edges; follow the manufacturer's anchoring instructions.

.7 Secure cables to the ceiling-suspended equipment so that the cables' axial projection does not exceed the equipment's centre of gravity.

.8 Install cables using grommets, assembly lugs and other appropriate hardware to ensure the alignment of restraint devices. Anticipate bending cables at anchoring points.

.9 Position support cables of ceiling-suspended equipment to create a 90º angle (approx.) between them (on drawing), then secure them to the ceiling slab so that the latter does not exceed 45º.

.10 Always use identical crossbeams within the same bracing (do not use a rigid crossbeam with a cable).

.11 All seismic restraint systems must be verified once the mechanical systems are put into service to ensure that the recommended clearances have been obtained (but not more than those recommended because the equipment's delicateness may be affected). Make any necessary adjustments. Ensure that vibration isolation seismic restraints do not cause short circuits at the vibration isolators, if applicable.

.12 A clearance of at least 25.4 mm must be anticipated between the seismic restraint systems and all service equipment and components

3.5 INSPECTION AND CERTIFICATION

.1 Seismic control measures equipment 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 Provide NRC Representative with notice 24 hours in advance of commencement of tests.

.3 Establish adequacy of equipment isolation and acceptability of noise levels in occupied areas and where appropriate, remedial recommendations.

.4 Submit complete report of test results.

3.6 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Materials and requirements for the identification of piping systems, ductwork, valves and controllers, including the installation and location of identification used.

1.2 RELATED SECTIONS:

.1 The requirements of sections 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are an integral part of this section.

1.3 REFERENCES

.1 Canadian Gas Association (CGA):

.1 CSA / CGA B149.1-10, Natural Gas and Propane Installation Code.

.2 Canadian General Standards Board (CGSB)

.1 CAN / CGSB-1.60-97, Interior Alkyd Gloss Enamel.

.2 CAN / CGSB-24.03-92, Identification of Piping Systems.

.3 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.

1.4 SUBMITTALS

.1 Product Data:

.1 Submittals: in accordance with data sheets required under Section 00 10 00 – General Instructions.

.2 Product data to include paint colour chips and other products specified in this sections.

.2 Samples:

.1 Submit samples in accordance with Section 00 10 00 – General Instructions.

.2 Samples to include nameplates, labels, tags, and lists of proposed legends.

1.5 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packaging, shipping, handling and unloading:

.1 Deliver, store and handle equipment and materials in accordance with Section 00 10 00 – General Instructions.

.2 Deliver, store and handle equipment and materials in accordance with Manufacturer's written instructions.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

.2 Do not dispose of unused paint or coating material into sewer system, into streams, lakes onto ground or in locations where it will pose health or environmental hazard.

Part 2 PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

.1 Provide nameplates with raised or recessed lettering, and mechanically secured to each piece of equipment.

.2 Provide CSA or Underwriters' Laboratories plates as required by the respective organizations.

.3 Nameplate manufacturers must indicate size, model, manufacturer name, serial number, voltage, power factor, phases, and motor rating.

.4 Install nameplates in plain view and not covered with insulation or paint.

2.2 NAMEPLATES – GENERAL REQUIREMENTS

.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.

2.3 EXISTING IDENTIFICATION SYSTEM

.1 Apply existing identification system to new work.

.2 Where existing identification system does not cover for new work, use identification system specified in this section.

.3 Before starting work, obtain written approval of identification system from NRC Representative.

2.4 PIPING SYSTEMS GOVERNED BY CODES

.1 Identification:

.1 Natural gas: to CSA / CGA B149.1 and authority having jurisdiction.

.2 Sprinklers: NFPA 13.

.3 Standpipe and Hose Systems: NFPA14.

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) regulation.

.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/insulation less than 75 mm: 100 mm long x 50 mm in high.

.2 OD of pipe/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 Height: to full circumference of pipe/insulation.

.2 Length: to accommodate pictogram, full length or 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 or vinyl stickers, with protective overcoating, waterproof contact adhesive undercoating, suitable for

ambient of 100% RH and continuous operating temperature of 150°C and intermittent temperature of 200°C.

.7 Colours and legends:

.1 Where not listed, obtain direction from the NRC Representative.

.2 Colours for legends and arrows: to following table:

Background Color	Legends, Arrows
Yellow	BLACK
Green	WHITE
Red	WHITE

.3 Background color markings and legends for piping systems:

Contents	Background Color Marking	Legend
** Add design temperature		
+ + Add design temperature and pressure		
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
Make-up water	Yellow	MAKE-UP WTR
Steam [_____] kPa	Yellow	[_____] kPa STEAM
Steam condensate (gravity)	Yellow	ST.COND.RET (GRAVITY)
Steam condensate (pumped)	Yellow	ST.COND.RET (PUMPED)
Safety valve vent	Yellow	STEAM VENT
Chilled drinking water	Green	CH. DRINK WTR
Drinking water return	Green	CH. DRINK WTR CIRC.
Domestic hot water supply	Green	DOM. HW SUPPLY
Dom. HWS recirculation	Green	DOM. HW CIRC
Domestic cold water supply	Green	DOM. CWS
Sanitary	Green	SAN
Plumbing vent	Green	SAN. VENT
Sprinklers	Red	SPRINKLERS

2.6 IDENTIFICATION DUCTWORK SYSTEMS

.1 50 mm high stencilled letters and directional arrows 150 mm long x 50 mm high.

.2 Color: black or coordinated with base colour to ensure strong contrast.

2.7 IDENTIFICATION OF VALVES

.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 CONTROL COMPONENTS IDENTIFICATION

.1 Identify all systems, equipment, components, controls and sensors with system nameplates specified in this section.

.2 Inscriptions to include function and (where appropriate) fail-safe position.

2.9 LANGUAGE

.1 Identification in English only.

Part 3 PERFORMANCE

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product bulletins, handling, storage and installation instructions, and datasheets.

3.2 TIMING

.1 Provide identification only after painting specified in Section 09 91 23 –Interior Painting.

3.3 INSTALLATION

.1 Perform work in accordance with CAN / CGSB 24.3 except as specified otherwise.

.2 Provide ULC and/or CSA registration plates as required by respective agency.

3.4 NAMEPLATES

.1 Locations:

.1 In conspicuous locations 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.

.4 Secure plates in conspicuous places. If they cannot be installed on cold surfaces, supply and install spacers.

.5 Provide type and number of the device (e.g. pump no. 2), and the service provided, the area or sector of the building served (e.g. southern zone, chilled water, primary).

.6 Have list of plates verified prior to etching message.

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. Where this is not possible, place identification as close as possible, preferable 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 or personal damage or injury and reduce visibility over time due to dust and dirt.

3.6 VALVES

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 NRC representative. 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 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, waste, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 TAB is used throughout this section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.

.2 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this section.

1.2 RELATED REQUIREMENTS

.1 The requirements of section 21 05 01 – Common Work Results for Mechanical are an integral part of this section.

.2 The requirements of section 23 05 00 – Common Work Results for HVAC are an integral part of this section.

.3 The requirements of section 00 10 00 – General Instructions requirements are an integral part of this section

1.3 REFERENCE STANDARDS

.1 Perform TAB of mechanical systems over full operating range in accordance with the strictest requirements of the following organizations:

.1 AABC (Associated Air Balance Council), MN-1-2002 (National Standards for Total System Balance).

.2 ASHRAE (American Society of Heating Refrigeration and Air Conditioning Engineers).

.3 NEBB (National Environmental Balancing Bureau).

.4 NABC (National Air Balance Council).

.5 TABES (Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems – 1998).

.6 SMACNA (Sheet Metal and Air Conditioning Contractors National Association), HVAC TAB HVAC Systems (Testing, Adjusting and Balancing – 2002).

.7 Public Works and Government Services Canada (MD 15128; Laboratory fume hoods: Guidelines for owners, design professionals and maintenance personnel).

.8 The requirements of this section or another section of the Contract Documents.

1.4 GENERAL

.1 TAB: means to test, adjust and balance all systems, including equipment, to perform in accordance with contract documents.

.2 FPT: means flow rate and pressurization tests.

.3 FPTR: means flow rate and pressurization tests report.

.4 PPT: means performance and pressurization tests.

.5 PPTR: means performance and pressurization tests reports.

.6 Follow start-up procedures as recommended by manufacturers.

.7 Special start-up procedures may be specified elsewhere.

.8 Perform TAB and FPT only when work is essentially completed, including:

.1 Installation of ceilings, doors, windows and other elements affecting TAB and FPT.

.2 Application of sealing and caulking, as well as weather stripping.

.3 Start-up by contractors responsible for work involving mechanical installations and systems.

.4 NRC Representative's approval.

1.5 QUALIFICATIONS OF TAB PERSONNEL

.1 Submit to NRC Representative the names of personnel to perform TAB.

.2 TAB: performed in accordance with the requirements of standard under which TAB firm's qualifications are approved.

.1 Associated Air Balance Council (AABC), National Standards for Total System Balance, MN-1-2002.

.2 National Environmental Balancing Bureau .1.2 (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems, 1998.

.3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems – Testing, Adjusting and Balancing-2002.

.3 Recommendations and suggested practices contained in the TAB Standard: mandatory.

.4 Use TAB Standard provisions, including checklists and report forms to satisfy Contract requirements.

.5 Use TAB Standard for TAB, including qualifications for TAB Firm and Specialist and calibration of TAB instruments.

.6 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.

.7 TAB Standard quality assurance provisions such as performance guarantees form part of this contract.

.1 For systems or system components not covered in TAB Standard, use TAB procedures developed by TAB Specialist.

.2 Where new procedures and requirements applicable to Contract requirements have been published or adopted by body responsible for TAB Standard (AABC, NEBB or TABB), requirements and recommendations contained in these procedures and requirements are mandatory.

1.6 PURPOSE OF TAB

.1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual and simulated loads.

.2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.

.3 Balance systems and equipment to regulate flow rates to match load requirements over full operating range.

1.7 EXCEPTIONS

.1 TAB of systems and equipment regulated by codes, standards to satisfaction of authority having jurisdiction.

1.8 COORDINATION

.1 Schedule time required for TAB (including repairs and re-testing) into project construction schedule to ensure completion before acceptance of project.

.2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.

1.9 PRE-TAB REVIEW

.1 Review manufacturing documentation submitted by the Contractor before project construction is started and confirm in writing to the NRC Representative adequacy of provision for TAB and other aspects of design and installation pertinent to success of TAB.

.2 Review specified standards and other reference documents and notify the NRC Representative in writing of proposed procedures which vary from standard.

.3 During construction, coordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.

1.10 START-UP

.1 Unless otherwise specified, follow start-up procedure as recommended by equipment manufacturer.

.2 Follow special start-up procedures specified elsewhere in Division 23.

1.11 OPERATION OF SYSTEMS DURING TAB

.1 Operate systems for length of time required for TAB and as required by the NRC Representative for verification of TAB reports.

1.12 START OF TAB

.1 Notify NRC Representative seven (7) days prior to start of TAB.

.2 Start TAB when building is essentially completed, including:

.1 Installation of ceilings, doors, windows and other building elements affecting TAB;

.2 Application of weatherstripping, sealing and caulking;

.3 Pressure, leakage and other tests specified elsewhere in Division 23 have been completed;

.4 Provisions for TAB installed and operational;

.5 Start-up, verification for proper operation of mechanical and associated electrical and control systems affecting TAB including but not limited to the elements below.

.6 Proper thermal overload protection in place for electrical equipment.

.7 Air systems:

.1 Filters in place and clean.

.2 Duct systems clean.

.3 Ducts, air shafts, ceiling plenums airtight to within specified tolerances.

.4 Correct fan rotation.

.5 Fire and smoke volume control dampers installed and open.

.6 Coil fins combed and clean.

.7 Access doors and panels installed and closed.

.8 Outlets installed and volume control dampers open.

.8 Fluid systems flushed, filled and vented.

.1 Correct pump rotation.

.2 Strainers in place and baskets clean.

.3 Isolating and balancing valves installed and open.

.4 Calibrating balancing valves installed at factory settings.

.5 Chemical treatment systems complete and operational.

1.13 APPLICATION TOLERANCES

.1 Do TAB to following tolerance of design values:

.1 HVAC systems: plus 5%, minus 0%.

.2 Fluid systems: plus or minus 5%.

1.14 ACCURACY TOLERANCES

.1 Measured values accurate to within plus or minus 5% of actual values.

1.15 INSTRUMENTS

.1 Prior to TAB, submit to the NRC Representative a list of instruments used together with their serial numbers.

.2 Instrument calibration

.1 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.

.2 Calibrate within three (3) months of TAB. Provide certificate of calibration to NRC Representative.

.1 Report to indicate, among other things, serial number of all instruments that have been calibrated.

.1 Any TAB work performed using instruments whose serial numbers are not listed in the calibration report will be rejected and must be re-performed by Contractor at his own expense.

.2 Any TAB work performed by Contractor before instrument calibration report has been submitted and accepted by the NRC Representative will be rejected and must be re-performed by Contractor at his own expense.

.3 Instrument calibration must be performed using NIST traceable, or Canadian equivalent.

.4 Measurements to be accurate to within plus or minus 2% of actual value.

.5 Perform TAB until within plus or minus 5% of design values.

1.16 SUBMITTALS

.1 Submittals: in accordance with submittals required under Section 00 10 00 – General Instructions.

.2 Submit, prior to commencement of TAB:

.3 Proposed methodology and procedures for performing TAB if different from referenced standard.

1.17 PRELIMINARY TAB REPORT

.1 Submit for verification and approval of NRC Representative, prior to submission of formal TAB report, sample of rough TAB sheets as follows:

.1 Details of instruments used.

.2 Details of TAB procedures employed;

.3 Calculations procedures;

.4 Summaries.

1.18 TAB REPORT

.1 Format of report in accordance with referenced TAB standard.

.2 TAB report to show results in SI units and to include:

.1 Project record drawings;

.2 System schematics.

.3 Submit one (1) copies in PDF format for review and approval before insertion into O&M manuals.

.4 Verification:

.1 Reported results subject to verification by the NRC Representative. Provide personnel and instrumentation to verify up to 30% of reported results. Number and location of verified results as directed by NRC Representative.

.2 Pay costs to repeat TAB as required to satisfaction of NRC Representative.

.5 Settings: Lock devices in set positions and settings permanently marked.

.6 Measurements as required by reference standards for air handling units include but are not limited to the following:

.1 Measurements:

.1 Air velocity.

.2 Static pressure.

.3 Velocity pressure.

.4 Temperature:

.1 Dry bulb.

.2 Wet bulb.

.5 Cross-sectional area.

.6 RPM.

.7 Electrical characteristics:

.1 Voltage.

.2 Current draw.

.2 Location of equipment measurements:

.1 Inlet and outlet of each:

.1 Fan.

.2 Coil.

.3 Filter.

.4 Damper.

.3 Location of systems measurements at:

.1 Main ducts.

.2 Main branch ducts.

.3 Sub-branch ducts.

.4 Each supply, exhaust and return air inlet and outlet.

.5 Each grille and air diffuser.

.6 Other auxiliary equipment.

.7 All areas served by system.

.7 Measurements as required by reference standards for fluid systems including, but not limited to the following:

.1 Measurements:

.1 Flow.

.2 Pressure.

.3 Temperature.

.4 Density.

.5 RPM.

.6 Electrical power:

.1 Voltage.

.2 Current draw.

.8 Location of equipment measurements:

.1 Inlet and outlet of each:

.1 Coil.

.2 Pump.

.3 PRV.

.4 Make-up system (water).

.5 Other auxiliary equipment.

.9 Location of systems measurements:

.1 Inlet and outlet of each loop of following fluid systems:

.1 Heating water.

.2 Chilled water.

1.19 VERIFICATION

.1 Reported results subject to verification by NRC Representative.

.2 Provide personnel and instrumentation to verify up to 30% of reported results.

.3 Number and location of verified results as directed by NRC Representative.

.4 Pay costs to repeat TAB as required to satisfaction of NRC Representative.

1.20 SETTINGS

.1 After TAB is completed to satisfaction of NRC Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.

.2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

1.21 COMPLETION OF TAB

.1 TAB considered complete when final TAB Report received and approved by NRC Representative.

1.22 AIR SYSTEMS

.1 Standard: TAB to most stringent of this section or TAB standards of AABC, NEBB, SMACNA and ASHRAE.

.2 Do TAB of systems, equipment, components and controls as specified in Division 23.

.3 Qualifications: personnel performing TAB current member in good standing of AABC or NEBB, qualified to standards of AABC or NEBB.

.4 Quality assurance: perform TAB under direction of supervisor qualified to standards of AABC or NEBB.

.5 Measurements: to include as appropriate for systems, equipment, controls: air velocity, static pressure, flow, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise and vibration.

.6 Locations of equipment measurements: to include as appropriate:

.1 Inlet and outlet of dampers, filter, coil, humidifier, fan, other equipment causing changes in conditions.

.2 At controllers and controlled devices.

.7 Locations of systems measurements to include as appropriate: main ducts, main branch, sub-branch, run-out (or grille, register or diffuser).

1.23 OTHER TAB REQUIREMENTS

.1 General requirements applicable to work specified in this paragraph:

.1 Qualifications of TAB personnel: as for air systems specified in this section.

.2 Quality Assurance: as for air systems specified in this section.

.2 Smoke management systems

.1 Test for proper operation of all smoke and fire dampers, sensors, detectors installed as component parts of air systems specified in Division 23.

.2 Emergency evacuation: see post-occupancy TAB activities specified below.

.3 Measurement of noise and vibration from the equipment specified in Division 23.

1.24 POST-OCCUPANCY TAB

.1 Measure DBT, WBT (or % RH), air velocity, air flow patterns, NC levels in occupied zone.

.2 Emergency evacuation: participate in full-scale emergency evacuation exercises. Repeat smoke management tests at this time.

.3 Participate in systems checks twice during Warranty Period: the first approximately three (3) months after acceptance; and the second within one (1) month of termination of warranty period.

Part 2 List of Tabs

2.1 DESCRIPTION OF FPT

.1 General:

.1 The FPT lists only represent a minimum of activities for which Contractor shall submit a complete and documented report. However, these lists are not restrictive and they do not relieve Contractor of his responsibility to supply all labor, material and equipment required to adjust and balance systems until adequate operation.

.2 FPTR shall include results of measures under table format.

2.2 FPT OF AHU SYSTEM

.1 Variable flow systems.

.1 Air supply, return and exhaust fans are in operation.

.2 Simulate dirty filter condition for air supply system equipped with air flow control devices.

.3 Simulate dirty filter condition for exhaust systems equipped with air flow control devices.

.4 Close doors of all rooms.

.5 In each room:

.1 Simulate occupied mode maximum air flow.

.1 Measure supply airflow as well as static pressure at each air diffuser or each grille. Calibrate and adjust dampers and terminal units of system so as to obtain indicated flow rates.

.2 Measure exhaust airflow as well as static pressure at each grille. Calibrate and adjust dampers of system and terminal units so as to obtain indicated flow rates.

.3 Create a supply, return and exhaust flows sheet for each room and zone.

.2 Simulate occupied mode minimum air flow:

.1 Perform same operations as described above for maximum flow.

2.3 FLOW TESTS ON FLUID SYSTEMS

.1 General:

.1 Measurements and calibration of following:

.1 Flow at each coil.

.2 Flow at each pump.

.3 Pressure drop in each coil.

.4 Pressure at inlet and outlet of each pump.

.2 Chilled water system:

.1 Primary and secondary pumps are in operation.

.2 Filter sashes have been cleaned.

.3 Calibrate network once network operating temperature has been reached.

.4 Simulate maximum demand for each coil:

.1 Calibrate flow of branch to design value using main balancing valve of each coil.

.5 Simulate 50% demand for each coil:

.1 Measure flow and temperatures at each branch.

.6 Simulate 10% demand for each coil:

.1 Measure flow and temperatures at each branch.

.7 Measure flow and temperatures at each branch.

.3 Heating water systems:

.1 Main pumps are in operation.

.2 Filter sashes have been cleaned.

.3 Calibrate network once network operating temperature has been reached.

.4 Calibrate flow of branch to design value using main balancing valve of each coil.

.5 Measure flow and pressure and calibrate each upstream pressure maintenance valve.

Part 3 Products

N/A.

Part 4 Execution

N/A.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes

.1 Materials and methods for pressure testing ducts over 5 m in length, forming part of a supply, return or exhaust ductwork system directly or indirectly connected to air handling equipment.

1.2 RELATED SECTIONS

.1 The requirements of section 21 05 01 – Common Work Results for Mechanical are an integral part of this section.

.2 The requirements of section 23 05 00 – Common Work Results for HVAC are an integral part of this section.

.3 The requirements of section 00 10 00 – General Instructions are an integral part of this section.

1.3 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

.2 Sheet Metal and Air Conditioning Contractor's National Association (SMACNA).

.1 SMACNA HVAC Duct Air Leakage Test Manual, 1985.

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 00 10 00 – General Instructions.

.2 Test Reports: Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties. Include pressure test information and results as follows.

.1 Submit proposed report form and test report format to NRC Representative for approval at least one (1) months before proposed date of first series of tests. Do not start tests until approval received in writing from NRC Representative.

.2 Prepare report of results and submit to NRC Representative within 24 hours of completion of tests. Include:

.1 Schematic of entire system.

.2 Schematic of section under test showing test site.

.3 Required and achieved static pressures.

.4 Orifice differential pressure at test sites.

.5 Permissible and actual leakage flow rate (L/s) for test sites.

.6 Witnessed certification of results.

.3 Include test reports in final TAB report.

.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Instructions: submit manufacturer's installation instructions.

.6 Manufacturer's field reports specified.

1.5 QUALITY ASSURANCE

.1 Pre-installation Meetings:

.1 Convene pre-installation meeting one (1) week prior to beginning of work covered by this section and installation of equipment, holding a meeting in accordance with Section 00 10 00 – General Instructions, in which must be considered:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review Manufacturer's installation instructions and warranty requirements.

1.6 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.7 PRESSURE TESTING – DUCTS

.1 The Contractor shall perform tests and verifications on sealed ducts and pipes manufactured, supplied and installed under the terms of this contract and specifications for the following systems:

.1 AHU systems: all ducts, from outside air intake fitting to duct up to diffuser registers.

.2 Do not perform leak tests on air transfer ducts.

.3 The Contractor shall perform all seal tests on all required ducts to demonstrate that duct sealing meets requirements specified in this section.

.4 The Contractor shall seal all pipes and ducts found defective, without additional compensation.

.5 The Contractor shall fabricate and seal all ducts so that leakage rates do not exceed the maximum allowed.

.6 Provide all labor, equipment and tools necessary to achieve all duct leak testing.

.7 Perform leak test as per procedures of HVAC Air Duct Leakage Test Manual, first edition 1985 published by SMACNA.

.8 Seal all ducts whose leakage rates are higher than those measured by the test method. Repeat tests until results comply with the test procedure requirements. The Contractor shall seal the ducts and proceed with further testing, if necessary, without additional compensation.

.9 Complete testing before ducts are covered, concealed and insulated.

.10 Ducts tested shall not show excessive deformation or leaks, as specified in reference standards. Tests shall be repeated, as necessary, until the results meet the standards requirements.

Part 2 PRODUCTS

2.1 TEST INSTRUMENTS

.1 Test apparatus to include:

.1 Fan capable of producing required static pressure.

.2 Duct section with calibrated orifice plate mounted and accurately located pressure taps.

.3 Flow measuring instrument compatible with the orifice plate.

.4 Calibration curves for orifice plates used.

.5 Flexible duct for connecting to ductwork under test.

.6 Smoke bombs for visual inspections.

.2 Test apparatus: accurate to within ±3% of flow rate and pressure.

.3 Submit details of test instruments to be used to NRC Representative at least one (1) month before anticipated start date.

.4 The instruments: calibrated and certificate of calibration deposited with NRC Representative no more than 28 days prior to testing.

.5 Re-calibrated every six (6) months.

2.2 EQUIPMENT LEAKAGE TOLERANCES

.1 Equipment and system components such as VAV boxes, duct heating leakage: 1%.

Part 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including technical bulletins, instructions for handling, storage and installation instructions, and datasheets.

3.2 TEST PROCEDURES

.1 Maximum length of ducts to be tested consistent with capacity of test equipment.

.2 Section of duct to be tested to include fittings, branch ducts and tap-ins.

.3 Repeat tests until specified pressures are attained. Bear costs for repairs and repetition of tests.

.4 Base partial system leakage calculation on SMACNA HVAC Air Duct Leakage Test Manual.

.5 Seal leaks that can be heart or felt, regardless of their contribution to total leakage.

3.3 SITE TOLERANCES

.1 System leakage tolerances specified are stated as percentage of total flow rate handled by system. Pro-rate specified system leakage tolerances. Leakage for sections of duct systems: not to exceed total allowable leakage.

.2 Leakage tests on following systems not to exceed specified leakage rates.

3.4 AIR LEAKAGE RATE

.1 For leak tests use the lowest leak rate between the two following methods:

.1 Sealtight class:

.1 Refer to Sections 23 31 13.01 and 23 31.13.02 for the classification of air ducts, class sealing and tightness class.

.2 Test results must be evaluated based on following two parameters:

.1 Effective surface area of duct

.2 Its internal pressure.

.2 Percentage:

.1 Small duct systems up to 250 Pa: 2% acceptable leakage rate.

.2 VAV boxes and ducts downstream of VAV boxes: 2% acceptable leakage rate.

.3 Low pressure large duct systems up to 500 Pa: 2% acceptable leakage rate.

.4 High pressure duct systems up to 1000 Pa, including ducts upstream of VAV boxes: 1% acceptable leakage rate.

3.5 TESTING

.1 Test ducts before installation of insulation or other forms of concealment.

.2 Test after seals have cured.

.3 Test when ambient temperature will not affect effectiveness of seals and gaskets.

.4 Flexible connections to VAV boxes.

3.6 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services

.1 Have manufacturer of products supplied under this section, review work involved in the handling, installation/application, protection and cleaning, of products and then submit written reports, in acceptable format, to verify compliance of work with Contract.

.2 Manufacturer's Field Services: provide manufacturer's field services consisting of product use recommendation and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review work, at stages listed:

.1 After delivery and storage of products, and when preparatory work, or other work, on which the work of this section depends, is complete but before installation begins.

.2 Twice during the progress of work at 25% and 60% complete.

.3 Upon completion of the work, after cleaning is carried out.

.4 Obtain reports within three (3) days of review, and submit, immediately, to the NRC Representative.

.2 Performance Verification

.1 The NRC Representative to witness tests and to verify reported results.

.2 To be certified by same TAB agency approved by NRC Representative to undertake TAB on this project.

3.7 CLEANING

.1 Upon completion and verification of performance of installation, remove surplus materials, waste materials, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 -Mechanical- General Requirements concerning the work results and 23 05 00 -HVAC- General Requirements concerning the work results, are both integral parts of this present section.

1.2 DEFINITIONS:

.1 For purposes of this section:

.1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" - means “not concealed" as previously defined.

.3 Insulation systems - insulation material, fasteners, jackets and other accessories.

.2 TIAC Codes:

.1 CRD: Code Round Ductwork,

.2 CRF: Code Rectangular Finish.

1.3 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

.1 ANSI/ASHRAE/IESNA 90.1-04, SI; Energy Standard for Buildings Except Low-Rise Residential Buildings.

.2 ASTM International Inc.

.1 ASTM B209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

.2 ASTM C335-05ae1, Standard Test Method for Steady State Heat Transfer Properties of Pipe Insulation.

.3 ASTM C411-05, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.4 ASTM C449/C449M-00, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.

.5 ASTM C547-[07e1], Standard Specification for Mineral Fiber Pipe Insulation.

.6 ASTM C553-02e1, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

.7 ASTM C612-04e1, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

.8 ASTM C795-03, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.9 ASTM C921-03a, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.3 Canadian General Standards Board (CGSB)

.1 CGSB 51-GP-52Ma-89, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.

.4 Green Seal Environmental Standards (GSES)

.1 Standard GS-36-00, Commercial Adhesives.

.5 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (2005).

.6 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S102-03, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for air duct insulation and include product characteristics, performance criteria, physical size, finish and limitations including the following data.

.1 Description of equipment and materials including manufacturer's name, type, model, year, airflow and capacity.

.2 Details of operation, servicing and maintenance.

.3 Recommended spare parts list.

.2 Provide two (2) copies of WHMIS MSDS – Material Safety Data Sheets in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

.3 Samples:

.1 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed.

.2 Mount sample on 12 mm plywood board.

.3 Affix typewritten label beneath sample indicating service.

.4 Manufacturers' Instructions:

.1 Provide manufacture's written duct insulation jointing recommendations, and special handling criteria, installation sequence and cleaning procedures.

1.5 QUALITY ASSURANCE

.1 Certificates

.1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Installation Instructions

.1 Submit manufacturer’s installation instructions.

.2 The NRC Representative will make available one (1) copy of systems supplier’s installation instructions.

1.6 QUALIFICATIONS:

.1 Installer: specialist in performing work of this section with at least (3) years successful experience in this size and type of project, qualified to standards of TIAC.

1.7 HEALTH AND SAFETY:

.1 Do construction occupational health and safety in accordance with 00 15 45 – General Safety Section & Fire Instructions.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Store at temperatures and conditions recommended by manufacturer.

.4 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 FIRE AND SMOKE RATING

.1 To CAN/ULC-S102:

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre: as specified, includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C335.

.3 TIAC Code C-1: Rigid mineral fibre board to ASTM C612, with and without factory applied vapour retardant jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this Section).

.4 TIAC Code C-2: Mineral fibre blanket to ASTM C553 faced with factory applied vapour retardant jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this section).

.1 Mineral fibre: to ASTM C553.

.2 Jacket : to CGSB 51-GP-52Ma.

.3 Maximum "k" factor: to ASTM C553.

2.3 JACKETS

.1 Canvas:

.1 220 g/m^2 cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.

.2 Lagging adhesive: compatible with insulation.

.3 Aluminum:

.1 To ASTM B209 with and without moisture barrier as scheduled in PART 3 of this section.

.2 Thickness: 0.50 mm sheet.

.3 Finish: Corrugated.

.4 Jacket banding and mechanical seals: 19 mm wide, 0.5 mm thick stainless steel.

.1 Stainless steel:

.5 Type: 316.

.6 Thickness: 0.25 mm sheet.

.7 Finish: Corrugated.

.8 Jacket banding and mechanical seals: 19 mm wide, 0.5 mm thick stainless steel.

2.4 ACCESSORIES

.1 Vapour retardant lap adhesive:

.1 Water based, fire retardant type, compatible with insulation.

.2 Indoor Vapour Retardant Finish:

.1 Vinyl emulsion type acrylic, compatible with insulation.

.3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C449.

.4 ULC Listed Canvas Jacket:

.1 220 g/m^2 cotton, plain weave, treated or untreated with dilute fire retardant lagging adhesive to ASTM C92.

.5 Outdoor Vapour Retardant Mastic:

.1 Vinyl emulsion type acrylic, compatible with insulation.

.2 Reinforcing fabric: Fibrous glass, untreated 305 g/m^2.

.6 Tape: self-adhesive, aluminum, reinforced 75 mm wide minimum.

.7 Contact adhesive: quick-setting

.8 Canvas adhesive: washable.

.9 Tie wire: 1.5 mm stainless steel.

.10 Banding:12 mm wide, 0.5 mm thick stainless steel.

.11 Facing: 25 mm galvanized steel hexagonal wire mesh stitched on one face of insulation and insulation with expanded metal lath on other face.

.12 Fasteners: 4 mm diameter pins with 35 mm diameter clips, length to suit thickness of insulation.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation, instructions and datasheets.

3.2 PRE-INSTALLATION REQUIREMENTS

.1 Pressure test ductwork systems complete, witness and certify.

.2 Ensure surfaces are clean, dry and free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturer’s instructions and as indicated.

.3 Use 2 layers with staggered joints when required nominal thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retardant jacket and finishes.

.1 Ensure hangers and supports are outside vapour retardant jacket.

.5 Hangers and supports in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

.1 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.

.6 Fasteners: install at 300 mm on centre in horizontal and vertical directions, minimum 2 rows each side.

3.4 DUCTWORK INSULATION SCHEDULE

.1 Insulation types and thicknesses: conform to following table:

	TIAC Code	**Vapour Retardant**	**Thickness (mm)**
Rectangular cold supply air ducts	C-1	yes	50
Round cold air supply ducts	C-2	yes	50
Rectangular warm air ducts	C-1	no	25
Round warm air ducts	C-1	no	25
Supply, return and exhaust ducts exposed in space being served			none
Outside air ducts to mixing plenum	C-1	yes	25
Mixing plenums	C-1	yes	25
Exhaust duct between dampers and louvers	C-1	no	25
Rectangular ducts outside	C-1	yes with jacket	50
Round ducts outside	C-1	yes with jacket	50
Acoustically lined ducts	None		

.2 Exposed round ducts 600 mm and larger, smaller sizes where subject to abuse:

.1 Use TIAC code C-1 insulation, scored to suit diameter of duct.

.3 Finishes:

.1 All exposed duct should be covered with a primed linen canvas ready for painting.

3.5 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove the site materials / equipment surplus, waste, tools and equipment.

.2 Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 -Mechanical- General Requirements concerning the work results and 23 05 00 -HVAC- General Requirements concerning the work results, are both integral parts of this present section.

1.2 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

.1 ANSI/ASHRAE 90.1-04-SI Edition, Energy Standard for Buildings Except Low-Rise Residential Buildings.

.2 ASTM International Inc.

.1 ASTM C335-05ae1, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.

.2 ASTM C449/C449M-07, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.

.3 ASTM C533-07, Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.

.4 ASTM C547-07, Standard Specification for Mineral Fiber Pipe Insulation.

.5 ASTM C553-02, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

.6 ASTM C612-04e1, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

.7 ASTM C795-03, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.8 ASTM C921-03a, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.3 Canadian General Standards Board (CGSB):

.1 CGSB 51-GP-52MA-89, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.

.2 CAN/CGSB 51.53-95, Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts.

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

.1 Material Safety Data Sheets (MSDS).

.5 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

.6 Thermal Insulation Association of Canada (TIAC)

.1 National Insulation Standards 2005.

.7 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102-07, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide two (2) copies of WHMIS MSDS – Material Safety Data Sheets in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

.3 Samples:

.1 Provide for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed.

.1 Mount sample on 12-mm plywood board.

.2 Affix typewritten label beneath sample indicating service.

.4 Manufacturer's Instructions:

.1 Include procedures to be used and installation standards to be achieved.

1.4 QUALITY ASSURANCE

.1 Certificates

.1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Installation Instructions

.1 Submit manufacturer's installation instructions.

.2 The NRC Representative will make available one (1) copy of systems supplier's installation instructions.

1.5 QUALIFICATIONS

.1 Installer to be specialist in performing work of this section, and have at least three (3) years successful experience in this size and type of project, qualified to standards of TIAC.

1.6 HEALTH AND SAFETY:

.1 Do construction occupational health and safety in accordance with 00 15 45 – General Safety Section & Fire Instructions.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 01 61 00 – Common Product Requirements.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Store at temperatures and conditions recommended by manufacturer.

.4 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

1.8 OPERATING TEMPERATURES

.1 Operating temperatures for the equipment are as follows:

.1 Heating water circulating pump: 45°C.

.2 Steam control valve: 176.6°C.

1.9 SCOPE OF WORK

.1 Insulate the following equipment to suit the operating temperatures specified above and materials specified in Part 2:

.1 Hot water pump.

.2 Steam control valve

.3 All manual valves DN4 and greater for insulated networks: with removable lining.

.4 Suction diffusers and strainer DN4 and greater for insulated networks: with removable lining.

Part 2 Products

2.1 FIRE AND SMOKE RATING

.1 Fire and smoke ratings to CAN/ULC-S102.

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fiber

.1 Glass fibre, rock wool and slag wool

.1 Inorganic fibers include glass wool, rock wool and slag wool.

.2 The coefficient of thermal conductivity (coefficient “k”) not to exceed the specified values at 24°C mean temperature when tested in accordance with ASTM C335.

.2 Rigid molded mineral fiber

.1 Without vapor retarder jacket

.1 Insulation with TIAC Code A-1: molded mineral fiber, without factory applied vapor retarder jacket.

.1 Sleeve mineral fiber: comply with ASTM C547.

.2 Coefficient “k” maximum compliant with ASTM C547.

.2 With vapor retarder jacket

.1 Insulation with TIAC Code A-3: molded sleeve mineral fibers with factory applied vapor barrier jacket.

.1 Duct mineral fiber: comply with ASTM C547.

.2 Jacket: complies with CGSB 51-GP-52Ma.

.3 Coefficient “k” maximum compliant with ASTM C547.

.3 Rigid mineral fiber board

.1 Without vapor retarder jacket

.1 Insulation with TIAC Code C-1: rigid mineral fiber without vapor retarder jacket.

.1 Mineral fiber board: comply with ASTM C612.

.2 Coefficient “k” maximum compliant with ASTM C612.

.2 With vapor retarder jacket

.1 Insulation with TIAC Code C-4: rigid mineral fiber board with factory applied vapor barrier jacket.

.1 Mineral fiber board: comply with ASTM C612.

.2 Jacket: compliant to CGSB 51-GP-52Ma.

.3 Coefficient “k” maximum compliant with ASTM C612.

.3 With or without vapor retarder jacket

.1 Insulation with TIAC Code C-2: mineral fiber blanket with or without factory applied vapor retarder jacket (as indicated in table in PART 3 below).

.1 Mineral fiber blanket: comply with ASTM C553.

.2 Barrier: compliant to CGSB 51-GP-52Ma.

.3 Coefficient “k” maximum compliant with ASTM C553.

.2 Elastomeric unicellular

.1 Flexible tubular elements

.1 Insulation with TIAC Code A-6: flexible unicellular tubular elastomer.

.1 Insulation with vapor barrier to CAN/CGSB-51.40.

.2 Jacket: compliant to CGSB 51-GP-52Ma.

.3 Coefficient (“k”) maximum.

.4 Certified by manufacturer free of potential stress corrosion cracking corrodents.

.2 Flexible sheet

.1 Type E-5 insulation: flexible elastomer sheet with operating temperature ranging from -40°C to 95°C.

.2 Use: for cold surfaces:

.1 Pumps

.2 Chillers

.3 Chilled water storage

.4 Chilled water flash tanks

.3 Material: flexible elastomeric unicellular insulation, according to Standard CAN2-51.40-M80 and Reform of January 1982.

.4 Insulation thickness:

Nominal thickness of insulation	Operating temperature
25 mm	from 5°C to 13°C
25 mm	Lower than 5°C

.5 Acceptable product: Armaflex II.

.3 Calcium silicate

.1 Rigid moulded sections and blocks

.1 Insulation with TIAC Code A-2: rigid moulded calcium silicate in sections and blocks, and with special shapes to suit project requirements.

.1 Insulation: comply with ASTM C533.

.2 Coefficient “k” maximum compliant with ASTM C533.

.3 Design to permit periodic removal and re-installation.

2.3 CEMENT

.1 Thermal insulating and finish

.1 To: ASTM C 449/C 449M.

.2 Air drying on mineral wool, to ASTM C 449.

2.4 TAPES, ADHESIVES AND FASTENINGS

.1 Self-adhesive tape, 100 mm wide, rated under 25 for flame spread and under 50 for smoke development.

.2 Contact adhesive: quick-setting, non-flammable fire resistive adhesive to adhere insulation material to equipment and tanks. Flame spread 15, smoke development 0.

.3 Lap seal adhesive: quick-setting for joints and lap sealing of vapor barriers. Flame spread 10, smoke development 0.

.4 For insulation type E-5:

.1 Contact adhesive: quick setting for transverse and longitudinal joints of flexible unicellular insulation, rated flame spread 5 and smoke development 0, Armaflex 520.

2.5 COATING

.1 Systems E-5:

.1 Finish coat type WB Armaflex, white color.

2.6 PRODUCT ACCESSORIES

.1 Tape: self-adhesive, aluminum, 50 mm wide minimum.

.2 Contact adhesive: quick setting.

.3 Canvas adhesive: washable.

.4 Tie wire: 1.5 mm diameter stainless steel.

.5 Bands: stainless steel, 19 mm wide, 0.5 mm thick.

.6 Facing: 25 mm galvanized steel hexagonal wire mesh on one face of insulation with expanded metal lath on other face.

.7 Fasteners: 2 mm diameter pins with 35 mm diameter clips. Length of pin to suit thickness of insulation.

2.7 VAPOUR RETARDER LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

.1 Maximum VOC limit 30 g/L to SCAQMD Rule 1168 and GSES GS-36.

2.8 INDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

2.9 OUTDOOR VAPOUR RETARDER MASTIC

.1 Vinyl emulsion type acrylic, compatible with insulation.

.2 Reinforcing fabric: fibrous glass, untreated 305 g/m^2.

2.10 JACKETS

.1 Polyvinyl Chloride (PVC)

.1 One-piece moulded type and sheet to CAN/CGSB 51-GP-53M with pre-formed shapes as required.

.2 Colours: to match adjacent finish paint.

.3 Minimum service temperature: -20°C.

.4 Maximum service temperature: 65°C.

.5 Moisture vapour transmission: 0.02 perm.

.6 Thickness: 0.35 mm.

.7 Fastenings:

.1 Use solvent weld adhesive compatible with insulation to seal laps and joints.

.2 Tacks.

.3 Pressure sensitive vinyl tape of matching colour.

.8 Special requirements:

.1 Indoor: N/A.

.2 Outdoor: UV rated material at least 0.5 mm thick.

.9 Covering adhesive: compatible with insulation.

.2 Canvas

.1 120 g/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.

.2 Lagging adhesive: compatible with insulation.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PRE-INSTALLATION REQUIREMENTS

.1 Pressure testing of equipment and adjacent piping systems complete, witnessed and certified.

.2 Surfaces clean, dry and free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.1 Hot equipment: to TIAC code 1503-H.

.2 Cold equipment: to TIAC code 1503-C.

.2 Elastomeric insulation: to remain dry. Overlaps to manufacturer's instructions. Joints tight and sealed properly.

.3 Provide vapour retarder as recommended by manufacturer.

.4 Apply materials in accordance with insulation and equipment manufacturer's instructions and this specification.

.5 Use two (2) layers with staggered joints when required nominal wall thickness exceeds 75 mm.

.6 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Hangers and supports outside vapour retarder jacket.

.7 Supports and hangers:

.1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 REMOVABLE, PRE-FABRICATED INSULATION AND ENCLOSURES

.1 Application: at expansion joints, valves, primary flow measuring elements, flanges and unions at equipment.

.2 Installation to permit movement of expansion joints and to permit periodic removal and replacement without damage to adjacent insulation

3.5 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 -Mechanical- General Requirements concerning the work results and 22 05 00 -Piping- General Requirements concerning the work results, are both integral parts of this present section.

1.2 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

.1 ANSI/ASHRAE 90.1-04-SI Edition, Energy Standard for Buildings except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM B209M-04, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate [Metric].

.2 ASTM C335-04, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.

.3 ASTM C411-04, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.4 ASTM C449/C449M-00, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.

.5 ASTM C547-2003, Mineral Fiber Pipe Insulation.

.6 ASTM C795-03, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.7 ASTM C921-03a, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.3 Canadian General Standards Board (CGSB)

.1 CGSB 51-GP-52Ma, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.

.2 CAN/CGSB-51.53, Poly (Vinyl Chloride) Jacketting Sheet, for Insulated Pipes, Vessels and Round Ducts.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 33.

.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

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

.1 Material Safety Data Sheets (MSDS).

.6 Manufacturer’s Trade Associations

.1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).

.7 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC-S701, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.3 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings.

.4 CAN/ULC-S702, Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

1.3 DEFINITIONS

.1 For the purposes of this section:

.1 "Concealed" – insulated mechanical services and equipment trenches and pipe shafts in hung ceilings and non-accessible chases and furred-in spaces.

.2 "Exposed" – will mean "not concealed" as defined herein.

.2 TIAC codes:

.1 CRF: Code Rectangular Finish.

.2 CPF: Code Piping Finish (Plumbing).

1.4 SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer’s printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide two (2) copies of WHMIS MSDS – Material Safety Data Sheets in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

.3 Manufacturer’s Instructions:

.1 Include procedures to be used and installation standards to be achieved.

1.5 QUALITY ASSURANCE

.1 Certificates

.1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Installation Instructions

.1 Submit manufacturer's installation instructions.

.2 The NRC Representative will make available one (1) copy of systems supplier's installation instructions.

1.6 QUALIFICATIONS

.1 Installer to be specialist in performing work of this section, and have at least three (3) years successful experience in this size and type of project, qualified to standards of TIAC.

1.7 HEALTH AND SAFETY:

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Store at temperatures and conditions recommended by manufacturer.

.4 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

1.9 OPERATING TEMPERATURES

.1 Operating temperatures for the equipment are as follows:

.1 Domestic cold water: 4.4°C.

.2 Domestic hot water: 82°C.

.3 Domestic hot water recirculation: 82°C.

.4 Vent pipe for the following elements:

.1 Sanitary drainage: -5°C.

.2 Steam safety valve: 82°C.

.3 Condensate tank: 100°C.

.4 All other vents: 50°C.

.5 All make-up water networks for various pieces of equipment (humidifier): 4.4°C.

.6 All indirect drains for HVAC units, plenums, fan coils, cooling coil drainage pans, etc.: 5.6°C.

.7 Reheat water terminal (supply only): 35°C.

.8 Perimeter heating water: 93°C.

.9 Chilled water network: -4°C.

.10 Hot water heating network: 93°C.

.11 Condensate and drainage: 104°C.

.12 Humidification steam: 176.6°C.

1.10 SCOPE OF WORK

.1 Insulate the following networks to suit the operating temperatures specified above and materials specified in Part 2.

.1 Domestic cold water.

.2 Domestic hot water.

.3 Domestic hot water recirculation.

.4 Reheat water terminal (supply only).

.5 Perimeter heating.

.6 Chilled water.

.7 Hot water heating network.

.8 Condensate and drainage.

.9 Humidification steam.

.10 Vent pipe for the following elements:

.1 Partial length:

.1 Sanitary drainage for a distance of 5 meters to roof.

.2 Distance along the entire length:

.1 Humidifier steam safety valve.

.2 Equipment safety valve.

.3 Condensate tank.

.4 Chillers.

.5 All other vents.

.11 All make-up water networks for various pieces of equipment (humidifier).

.12 All indirect drains for HVAC units, plenums, fan coils, cooling coil drainage pans, etc.

.13 Supply and install all jackets and lines as indicated.

.14 All temporary services that require thermal insulation shall be insulated according to pipe type and temperature.

.15 Existing pipes for which insulation as been removed as part of asbestos containing material (ACM) removal.

.16 This list is not exhaustive and does not relieve the Contractor of his responsibility to provide a complete installation in accordance with the regulations on energy conservation in new buildings.

Part 2 Products

2.1 FIRE AND SMOKE RATING

.1 To CAN/ULC-S102:

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fiber

.1 Glass fibre, rock wool and slag wool

.1 Inorganic fibers include glass wool, rock wool and slag wool.

.2 The thermal conductivity coefficient (“k”) shall not exceed the specified values at 24°C mean temperature when tested in accordance with ASTM C335.

.2 Molded mineral fiber

.1 Without vapour barrier jacket

.1 Insulation with TIAC Code A-1: molded mineral fiber, without factory applied vapour barrier jacket.

.1 Sleeve mineral fiber: comply with ASTM C547.

.2 Coefficient (“k”) maximum compliant with ASTM C547.

.2 With vapour barrier jacket

.1 Insulation with TIAC Code A-3: molded sleeve mineral fibers with factory applied vapour barrier jacket.

.1 Duct mineral fiber: comply with ASTM C547.

.2 Jacket: complies with CGSB 51-GP-52Ma.

.3 Coefficient ("k") maximum compliant with ASTM C547.

.3 Mineral fiber blanket

.1 With or without vapour barrier jacket

.1 Insulation with TIAC Code C-2: mineral fiber blanket with or without factory applied vapour barrier jacket (as indicated in table in PART 3 below).

.1 Mineral fiber blanket: comply with ASTM C553.

.2 Barrier: compliant to CGSB 51-GP-52Ma.

.3 Coefficient ("k") maximum compliant with ASTM C553.

.2 Elastomeric unicellular

.1 Flexible tubular elements

.1 Insulation with TIAC Code A-6: flexible unicellular tubular elastomer.

.1 Insulation with vapour barrier to CAN/CGSB-51.40.

.2 Jacket: compliant to CGSB 51-GP-52Ma.

.3 Coefficient ("k") maximum.

.4 Certified by manufacturer free of potential stress corrosion cracking corrodents.

.3 Calcium silicate

.1 Rigid moulded sections and blocks

.1 Insulation with TIAC Code A-2: rigid moulded calcium silicate in sections and blocks, and with special shapes to suit project requirements.

.1 Insulation: comply with ASTM C533.

.2 Coefficient ("k") maximum compliant with ASTM C533.

.3 Design to permit periodic removal and re-installation.

2.3 CEMENT

.1 Thermal insulating and finishing

.1 To: ASTM C449/C449M.

.2 Air-drying on mineral wool, to ASTM C449.

2.4 TAPES, ADHESIVES AND FASTENINGS

.1 Self-adhesive tape, 100 mm wide, rated for less than 25 flame spread and less than 50 smoke development.

.2 Contact adhesive: quick-setting, non-flammable fire resistive adhesive to adhere insulation material to equipment and tanks. Flame spread 15, smoke development 0.

.3 Vapour barrier lap adhesive

.1 Water-based adhesive, flame retardant, quick setting used to seal joints and overlap the vapour barrier, Flame spread 10, smoke development 0. Compatible with insulation.

.2 VOC content up to 30 g/L, according to Green Seal Standard GS-36 and less than Regulation 1168 of SCAQMD.

.4 For insulation type E-5:

.1 Contact adhesive: quick setting for transverse and longitudinal joints of flexible unicellular insulation, Flame spread 5, smoke development 0, Armaflex 520.

.5 Tie wire: 1.5 mm diameter stainless steel.

.6 Bands: stainless steel, 19 mm wide, 0.5 mm thick

2.5 COATING

.1 Systems E-5

.1 Finish coating type WB Armaflex, white color.

.2 Vapour retarder finish

.1 Indoor piping

.1 Vinyl emulsion, acrylic type, compatible with insulation.

.2 Outdoor piping

.1 Vinyl emulsion, acrylic type, compatible with insulation.

.2 Reinforcing fabric: fibrous glass, untreated, 305 g/m^2.

2.6 JACKETS

.1 Polyvinyl Chloride (PVC)

.1 One-piece moulded type and sheet to CAN/CGSB 51-GP-53M with pre-formed shapes as required.

.2 Colours: to match adjacent finish paint.

.3 Minimum service temperature: -20°C.

.4 Maximum service temperature: 65°C.

.5 Moisture vapour transmission: 0.02 perm.

.6 Thickness: 0.35 mm.

.7 Fastenings:

.1 Use solvent weld adhesive compatible with insulation to seal laps and joints.

.2 Tacks.

.3 Pressure sensitive vinyl tape of matching colour.

.8 Special requirements:

.1 Indoor: N/A.

.2 Outdoor: UV rated material at least 0.5 mm thick.

.9 Covering adhesive: compatible with insulation.

.2 Canvas

.1 120 g/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.

.2 Lagging adhesive: compatible with insulation.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer’s Instructions: comply with manufacturer’s written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PRE-INSTALLATION REQUIREMENTS

.1 Pressure testing of equipment and adjacent piping systems complete, witnessed and certified.

.2 Surfaces clean, dry and free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.1 Hot equipment: to TIAC code 1503-H.

.2 Cold equipment: to TIAC code 1503-C.

.2 Apply materials in accordance with insulation and equipment manufacturer's instructions and this specification.

.3 Use two (2) layers with staggered joints when required nominal wall thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Hangers and supports outside vapour retarder jacket.

.5 Supports and hangers:

.1 Apply high compressive strength insulation, suitable for service, where insulation saddles and shoes have not been provided.

.6 Elastomeric insulation: to remain dry. Overlaps as manufacturer's instructions. Joints tight and sealed properly.

.7 Provide vapour retarder as recommended by manufacturer.

3.4 REMOVABLE, PRE-FABRICATED INSULATION AND ENCLOSURES

.1 Application: At expansion joints, valves, primary flow measuring elements, flanges and unions at equipment piping connections.

.2 Installation shall permit movement of expansion joint and permit periodic removals and replacements without damaging adjacent insulation.

.3 Description

.1 Insulation, products or fasteners and finish coats: complex corresponding to adjacent insulation.

.2 Jacket: corresponding to the complex adjacent insulation.

3.5 ELASTOMERIC INSULATION

.1 Insulation shall remain dry. Overlap as manufacturer's instructions. Ensure tight joints.

.2 Provide vapour retarder as recommended by manufacturer.

3.6 PIPING INSULATION SCHEDULES

.1 Unless otherwise specified, insulation of pipes includes valves, valve bonnets, filters and strainers, flanges and fittings.

.2 TIAC Code: A-1.

.1 Securements: bands at 300 mm on centre.

.2 Seals: lap seal adhesive, lagging adhesive.

.3 Installation: TIAC Code 1501-H.

.3 TIAC Code: A-3.

.1 Securements: bands at 300 mm on centre.

.2 Seals: VR lap seal adhesive, VR lagging adhesive.

.3 Installation: TIAC Code: 1501-C.

.4 TIAC Code: C-2 with vapour retarder jacket.

.1 Securements: tape.

.2 Seals: lap seal adhesive, lagging adhesive.

.3 Installation: TIAC Code: 1501-C.

.5 Thickness of insulation as listed in following table.

.1 Run-outs to individual units and equipment not exceeding 4000 mm long.

.2 Do not insulate exposed run-outs to plumbing fixtures, chrome plated piping, valves, or fittings.

Piping/Service	Temp. °C	TIAC Code	Pipe Sizes (NPS) and Insulation Thickness (mm)					
			Run- out	to 1	1¼ to 2	2½ to 4	5 to 6	8 and larger
Steam	up to 175	A-1	38	50	65	75	90	90
Steam vent		A-1		38	38	38	38	38
Condensate return	60–94	A-1	25	38	38	38	38	38
Return and pumped condensate	up to 94	A-1	25	38	38	38	38	38
Hot water heating	60–94	A-1	38	38	38	38	38	38
Hot water heating	up to 59	A-1	38	38	38	38	38	38
Glycol heating	60–94	A-1	38	38	38	38	38	38
Glycol heating	up to 59	A-1	38	38	38	38	38	38

Piping/Service	**Temp. °C**	**TIAC Code**	**Pipe Sizes (NPS) and Insulation Thickness (mm)**					
			Run- out	**to 1**	**1¼ to 2**	**2½ to 4**	**5 to 6**	**8 and larger**
Domestic hot water and recirculation		A-1	25	25	25	38	38	38
Glycol chilled water	4–13	A-3	38	38	38	38	38	38
Chilled water pump		A-3	25	25	25	25	25	25
Condenser water (outdoor)		A-1					100	100
Domestic cold water		A-3	25	25	25	25	25	25
Domestic cold water (with vapour barrier)		C-2	25	25	25	25	25	25
Rainwater leader and sanitary drain		C-2	25	25	25	25		

.6 Finishes

.1 Exposed indoor piping: canvas jacket.

.2 Exposed piping in mechanical rooms: canvas and PVC jacket.

.3 Concealed indoor piping: canvas on valves and fittings. No further finish.

.4 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.

.5 Outdoor piping: waterproof aluminum jacket.

.6 Finish attachments: SS screws at 150 mm on centre.

.7 Installation: to appropriate TIAC code CRF/1 through CPF/5.

3.7 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, rubbish, tools and equipment.

.2 Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Procedures and cleaning solutions for cleaning mechanical piping systems.

1.2 RELATED SECTIONS:

.1 The prescriptions for the sections 21 05 01 -Mechanical- General requirements concerning the work results and 23 05 00 -HVAC- General requirements concerning the work results, are both integral parts of this present section.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM E202-00, 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).

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.2 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.1 Instructions: submit manufacturer's installation instructions.

.1 Departmental Representative will make available 1 copy of systems supplier's installation instructions.

1.5 QUALITY ASSURANCE

.1 Certificates

.1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Installation Instructions

.1 Submit manufacturer’s installation instructions.

.2 The NRC Representative will make available one (1) copy of systems supplier's installation instructions.

1.6 HEALTH AND SAFETY:

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 00 10 00 – General Instructions.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: In accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 CLEANING SOLUTIONS

.1 Tri-sodium phosphate: 0.40 kg per 100 L water in system.

.2 Sodium carbonate: 0.40 kg per 100 L water in system.

.3 Low-foaming detergent: 0.01 kg per 100 L water in system.

Part 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 AND STEAM 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 Fill system with water; ensure air is vented from system.

.2 Fill expansion tanks 1/3 to 1/2 full, charge system with compressed air to at least 35 kPa (does not apply to diaphragm type expansion tanks).

.3 Use water metre to record volume of water in system to +/- 0.5%.

.4 Add chemicals under direct supervision of chemical treatment supplier.

.5 Closed loop systems: circulate system cleaner at 60 degrees C for at least 36 h. Drain as quickly as possible. Refill with water and inhibitors. Test concentrations and adjust to recommended levels.

.6 Flush velocity in system mains and branches to ensure removal of debris. System pumps may be used for circulating cleaning solution provided that velocities are adequate.

.7 Add chemical solution to system.

.8 Establish circulation, raise temperature slowly to maximum design temperature. Circulate for 12h, ensuring flow in all circuits. Remove heat; continue to circulate until temperature is below 38 degrees C. Drain as quickly as possible. Refill with clean water. Circulate for 6 h at design temperature. Drain and repeat procedures specified above. Flush through low point drains in system. Refill with clean water adding to sodium sulphite (test for residual sulphite).

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 Check water level in expansion tank with cold water with circulating pumps OFF and again with pumps ON.

.7 Repeat with water at design temperature.

.8 Check pressurization to ensure proper operation and to prevent water hammer, flashing, cavitation. Eliminate water hammer and other noises.

.9 Bring system up to design temperature and pressure slowly over a 48 hour period.

.10 Perform TAB as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.11 Adjust pipe supports, hangers, springs as necessary.

.12 Monitor pipe movement, performance of expansion joints, loops, guides, anchors.

.13 If sliding type expansion joints bind or if bellows type expansion joints flex incorrectly, shut down system, re-align, repeat start-up procedures.

.14 Re-tighten bolts using torque wrench, to compensate for heat-caused relaxation. Repeat several times during commissioning.

.15 Check operation of drain valves.

.16 Adjust valve stem packings as systems settle down.

.17 Fully open balancing valves (except those that are factory-set).

.18 Check operation of over-temperature protection devices on circulating pumps.

.19 Adjust alignment of piping at pumps to ensure flexibility, adequacy of pipe movement, absence of noise or vibration transmission.

3.4 CLEANING

.1 Flush and clean in presence of NRC Representative.

.2 Flush after pressure test for a minimum of 4h.

.3 Fill with solution of water and non-foaming, phosphate-free detergent 3% solution by weight. Circulate for minimum of 8h.

.4 Refill system with clean water. Circulate for at least 4h. Clean out strainer screens/baskets regularly. Then drain.

.5 Refill system with clean water. Circulate for at least 2h. Clean out strainer screens/baskets regularly. Then drain.

.6 Drainage to include drain valves, dirt pockets, strainers, low points in system.

.7 Re-install strainer screens/baskets only after obtaining NRC Representative Approval.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Copper and steel piping for hydronic systems.

1.2 RELATED SECTIONS:

.1 The prescriptions for the sections 21 05 01 -Mechanical- General Requirements concerning the work results and 22 05 00 -Piping- General Requirements concerning the work results, are both integral parts of this present section.

1.3 REFERENCES

.1 American Society of Mechanical Engineers (ASME).

.1 ASME B16.1-98, *Cast Iron Pipe Flanges and Flanged Fittings*.

.2 ASME B16.3-98, *Malleable Iron Threaded Fittings.*

.3 ASME B16.5-03 Pipe *Flanges and Flanged Fittings*.

.4 ANSI/ASME B16.4-98, Gray-Iron Threaded Fittings.

.5 ASME B16.9-01, *Factory-Made Wrought Buttwelding Fittings*.

.6 ANSI/ASME B16.15-1985(2004), *Cast Bronze Threaded Fittings*.

.7 ANSI B16.18-2001, *Cast Copper Alloy, Solder Joint Pressure Fittings.*

.8 ANSI/ASME B16.22-2001, Wrought Copper and Copper-Alloy Solder Joint Pressure Fittings.

.9 ASME B18.2.1-03, *Square and Hex Bolts and Screws (Inch Series*).

.10 ASME B18.2.2-87(R1999), *Square and Hex Nuts (Inch Series*).

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A47/A47M-99, *Standard Specification for Ferritic Malleable Iron Castings.*

.2 ASTM A53/A53M-02, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless.*

.3 ASTM A536-84(1999)e1, *Standard Specification for Ductile Iron Castings*.

.4 ASTM B32-04, Standard Specification for Solder Metal.

.5 ASTM B61-02, *Standard Specification for Steam or Valve Bronze Castings.*

.6 ASTM B62-02, *Standard Specification for Composition Bronze or Ounce Metal Castings*.

.7 ASTM B88M-03, *Standard Specification for Seamless Copper Water Tube Metric*.

.1 ASTM E202-04, Standard Test Methods for Analysis of Ethylene Glycols and Propylene Glycols.

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

.1 Material Safety Data Sheets (MSDS).

.4 Manufacturers Standardization Society (MSS)

.1 MSS SP67-2002a, Butterfly Valves.

.2 MSS SP70-1998, Cast Iron Gate Valves, Flanged and Threaded Ends.

.3 MSS SP71-1997, Grey Iron Swing Check Valves, Flanged and Threaded Ends.

.4 MSS SP80-2003, Bronze Gate, Globe, Angle and Check Valves.

.5 MSS SP85-2002, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

.5 American Water Works Association (AWWA).

.1 AWWA C111-00, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.6 Canadian standards association (CSA)/CSA International.

.1 CSA B242-M1980 (R1998), *Groove and Shoulder Type Mechanical Pipe Couplings.*

.2 CAN/CSA W48-01, Filler Metals and Allied Materials for Metal Arc Welding (Developed in cooperation with the Canadian Welding Bureau).

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 00 10 00 – General Instructions.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 00 10 00 – General Instructions.

.2 Indicate on manufacturer’s catalogue literature the following: VALVES.

.3 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.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 The NRC Representative will make available 1 copy of systems supplier's installation instructions.

.4 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with Provincial regulations.

1.6 HEALTH AND SAFETY:

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.7 MAINTENANCE

.1 Extra Materials:

.1 Furnish following spare parts:

.1 Valve seats: one for every ten valves, each size. Minimum one.

.2 Discs: one for every ten valves, each size. Minimum one.

.3 Stem packing: one for every ten valves, each size. Minimum one.

.4 Valve handles: two of each size.

.5 Gaskets for flanges: one for every ten flanges.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 00 10 00 – General Instructions.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

.1 Supply and install piping and fittings as specified in tables entitled "Standards of pipe" attached.

Part 3 Execution

3.1 PIPING INSTALLATION

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

.2 Install concealed pipes close to building structure to keep furring space to minimum. Install to conserve headroom and space. Run exposed piping parallel to walls. Group piping where ever practical.

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

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

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

.6 Assemble piping using fittings manufactured to ANSI standards.

3.2 VALVE INSTALLATION

.1 Install rising stem valves in upright position with stem above horizontal.

.2 Install butterfly valves on chilled water and condenser water lines only.

.3 Install gate, all or butterfly valves at branch take-offs and to isolate each piece of equipment, and as indicated.

.4 Install globe valves for balancing and in by-pass around control valves as indicated.

.5 Install silent check valves on discharge of pumps and in vertical pipes with downward flow and as indicated.

.6 Install swing check valves in horizontal lines on discharge of pumps and as indicated.

.7 Install chain operators on valves NPS 2 1/2 and over where installed more than 2400 mm above floor in Boiler Rooms and Mechanical Equipment Rooms.

.8 Install plug cocks or ball valves for glycol service.

3.3 CIRCUIT BALANCING VALVES

.1 Install flow measuring stations and flow balancing valves as indicated.

.2 Remove hand wheel after installation and TAB is complete.

.3 Tape joints in prefabricated insulation on valves installed in chilled water mains.

3.4 FLUSHING AND CLEANING

.1 Flush and clean piping network with Section 23 08 02.

3.5 FILLING OF SYSTEM

.1 Refill system with clean water adding water treatment as specified glycol.

3.6 FIELD QUALITY CONTROL

.1 Testing:

.1 Test system in accordance with Section 21 05 01 - Common Work Results for Mechanical.

.2 Balancing:

.1 Balance water systems to within plus or minus 5% of design output.

.2 Refer to Section 23 05 93 for applicable procedures.

3.7 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

	DIAMETER		SPECIFICATION (*)	DESCRIPTION	Materials & A.S.T.M. standards
	FROM	TO			
PIPING	ND ½	ND 2	Cal. 40	Continuous seal (CW) Threaded ends	Black Steel A.53
	ND 2 ½	ND 4	Cal.40	Continuous seal (CW) Chamfered ends	Black Steel A.53
	ND 5	ND 12	Cal. 40	Elect. joint (ERW), Chamfered ends	Black Steel A.53
	ND 14	ND 24	Cal. 30	Elect. joint (ERW), Chamfered ends	Black Steel A.53
ASSEMBLY	ND ½	ND 2		Screwed	
	ND 2 ½	ND 24		But welded	Welding according to the section covering the welding
FITTINGS	ND ½	ND 2	150 psi	Screwed	Malleable cast iron A.197
	ND 2 ½	ND 24	Std.	No joint, Chamfered ends	Steel A-234-WPB
FLANGES	ND 2 ½	ND 24	150 psi	Collar and a) Salient of 1/16 in or b) Surface plate (flat face)	Forged Steel A.105
UNIONS	ND ½	ND 2	300 psi	Bronze round joint to cast iron, screwed	Malleable cast iron A.47
BOLTS	Robust hex screws and nuts, semi-finished				Steel A.307
PACKING FOR THE FLANGE	Thickness: 1/8 in (''full face'')				EPDM 150 psi

FAUCET	DIAMETER		SPECIFICATION (*)	DESCRIPTION
	FROM	TO		
VALVE	ND ½	ND 2	Class 150	Jenkins 106BJ, Crane 7TF, Kitz 9 (AK150D), Toyo 221A, Nibco TY-235-Y
	ND 2 ½	+	Class 200 CWP	Jenkins 2342J, Crane 351, Kitz 76 (125FCJ), Toyo 400, Nibco F718N
HOLDING VALVE	ND ½	ND 2	Class 150	Jenkins 4092J, Crane 137, Kitz 29 (AK150YR), Toyo 239, Nibco T-433
	ND 2 ½	+	Class 150	Type ''wafer'' ; Rite 210, Prince 810, Crane Uni-Check II
SPHERICAL PLUG VALVE (1)	ND ½	ND 2	Class 600 CWP	Stainless steel rod and ball: Jenkins 201SJLD, Crane F9222-LD, Toyo 5044SLH, Nibco T-585-70-66-LL
BUTTERFLY (2)	ND 2 ½	+	Class 250	''lug type'' Keystone F222, Nibco LD-2000-3 et –6
SCREEN	ND ½	ND 2	Class 250	Screwed cast iron. Armstrong Int., Spirax, Mueller or approved equivalent
	ND 2 ½	+	Class 200 CWP	Flange cast iron; Armstrong Int., Spirax, Mueller or approved equivalent
FAUCET DRAIN FOR LOWER POINT	ND ½	ND 2	Class 600 CWP	Welded or screwed by hose connection, bronze body, chromium-plated brass ball, safety lock with cap and chain: Kitz 68C/69C, Crane F9202, Jenkins 201J, Nibco T-585-70-HC
NOTE:	(1) With latch			
	(2) Drive member for butterfly type: DN6 and less use a lever, DN8 and greater use gear			

FAUCET AND PIPING STANDARDS	Hydronic network

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 The prescriptions for the sections 21 05 01 -Mechanical- General Requirements concerning the work results and 22 05 00 -Piping- General Requirements concerning the work results, are both integral parts of this present section.

1.2 REFERENCES

.1 American Society of Mechanical Engineers (ASME)

.1 ASME-04(2007), Boiler and Pressure Vessel Code.

.2 ASTM International Inc.

.1 ASTM A47/A47M-99(2004), Standard Specification for Ferritic Malleable Iron Castings.

.2 ASTM A278/A278M-01(2006), Standard Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650 degrees F (350 degrees C).

.3 ASTM A516/A516M-06, Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate - and Lower - Temperature Service.

.4 ASTM A536-84(2004), Standard Specification for Ductile Iron Castings.

.5 ASTM B62-02, Standard Specification for Composition Bronze or Ounce Metal Castings.

.3 Canadian Standards Association (CSA International):

.1 CSA B51-03(R2003), Boiler, Pressure Vessel, and Pressure Piping Code.

.2 CSA B51-03(R2005), Boiler, Pressure Vessel, and Pressure Piping Code, Supplement #1.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for expansion tanks, air vents, separators, valves, and strainers and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Submit maintenance and operation data in accordance with Section 00 10 00 – General Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: In accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 FLEXIBLE CONNECTIONS

.1 Internal Pipe: corrugated stainless steel flexible pipe.

.2 External guidance consists of a stainless steel trellis.

.3 Dimensions and end elements: carbon steel, threaded ND-13 mm to 50 mm and flanges for ND-65 mm to 600 mm.

.4 The flexible connections must be designed to support a pressure and an operating temperature of 1 035 kPa, respectively, and 121°C.

.5 The connections must be able to absorb a lateral displacement of 150 mm. The ratio between the length of the flexible portion and the diameter of the fitting must not be less than six. The length of the pipe should not exceed 600 mm.

2.2 AUTOMATIC AND MANUAL VENTS FOR COOLING AND HEATING WATER SYSTEM

.1 High-capacity servitude type, all or nothing action non-modulating until 1 035 kPa. Cast iron fitted with internal components of stainless steel, brass, Buna-N. Operating temperature of 121 ° C.

.2 Vent float with an operating pressure of 1 035 kPa and an operating temperature of 116°C.

.1 For all coils and air heaters.

.3 Manual vent operated with a coin specially designed for coils with a respective pressure and temperature operation of 350 kPa at 100°C.

.4 High capacity servitude type, all or nothing action non-modulating up to 515 kPa.

.1 For the main heating and cooling water system.

.5 Medium capacity servitude type, all or nothing action non-modulating up to 200 kPa or 345 kPa.

.1 For coil heater, radiator and branch connection.

.6 Supply and install a valve at each vent.

2.3 SAFETY VALVES FOR HEATING SYSTEMS USING A HEAT TRANSFER FLUID IN A CLOSED CIRCUIT

.1 Safety valve in accordance with Section IV of the ASME code.

.2 Body: brass.

.3 Adjustable pressure.

.4 Manual test lever.

.5 Capacity: see pressure indicated on diagram.

2.4 STRAINER FOR HEATING AND COOLING SYSTEM

.1 Cast iron Filters, with threaded connections: ND 13 to 50 mm.

.2 Filter body made of cast iron, with flange connection "Y" or basket as indicated: ND 65 mm to 600 mm.

.3 Diameter: as indicated.

.4 Drain Connection: as required.

.5 Screen: stainless steel, with perforations of 0.13 mm (100 mesh) before the control valves and 0.8 mm (20 mesh) elsewhere.

.6 Pressure: 863 kPa.

.7 Provide and install a 19 mm (diameter) valve on each strainer.

2.5 BALANCING VALVE

.1 Characteristics:

.1 Body bronze-copper alloy: ND 13 to 50 mm.

.2 Body Cast iron: ND 65 mm or more.

.3 Connection for pressure gauge equipped with isolation valve.

.4 Four, eight, twelve or sixteen rounds of 360 ° adjustments, vernier type, with a memory to program the valve with precision to enable its use as an isolation valve without losing the balancing adjustment.

.5 Operation pressure 1 725 kPa; operating temperature of 121°C.

.6 Thermal insulation with an R factor of 4.5 for each valve.

2.6 VACUUM BREAKER, 0-69 KPA

.1 Application: vacuum breaker mounted downstream heat exchangers and as indicated for operation up to 1 000 kPa and 260 ° C.

.2 Material: body and cap, stem and seat made of brass or stainless steel, stainless steel spring.

2.7 MECHANICAL SEAL

.1 Rigid coupling Zero-Flex Style 07 with trim, Class E will be accepted as an alternative to screwed or welded coupling in areas accessible and only for chilled water and heating water, according to Table M 15B.

.2 The flexible couplings the 77 style, will be accepted as an alternative to flexible couplings and flexible connections, according to the manufacturer's recommendations.

2.8 FLEXIBLE CONNECTIONS

.1 Flexible elastomeric connector made of EPDM. Arch manufacturing design, capable of absorbing, compression and extension axial movements, deflection and angular movements. Flanged fittings. Flanges are reinforced by a steel ring flange. Flanges shall conform to the standards AINSI.B-16.1 and AWWAC-207.

.2 Standard operating pressure: 1 035 kPa.

.3 Overall normal length:

.1 Up to 200 mm diameter = 150 mm.

.2 Diameter up to 250 mm and more: 200 mm.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 GENERAL

.1 Run drain lines and blow off connections to terminate above nearest drain.

.2 Maintain adequate clearance to permit service and maintenance.

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

.4 Check shop drawings for conformance of tappings for ancillaries and for equipment operating weights.

3.3 STRAINERS

.1 Install in horizontal or down flow lines.

.2 Ensure clearance for removal of basket.

.3 Install ahead of each pump when required as showed.

.4 Install ahead of each automatic control valve larger than NPS 1 and radiation except at radiation and as indicated.

3.4 AIR VENTS

.1 Install at high points of systems.

.2 Install ball valve on automatic air vent inlet. Run discharge to nearest drain or service sink.

3.5 EXPANSION TANKS

.1 Adjust expansion tank pressure as indicated or to suit design criteria.

.2 Install lockshield type valve at inlet to tank.

3.6 PRESSURE SAFETY RELIEF VALVES

.1 Run discharge pipe to terminate above nearest drain.

3.7 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: In accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENT

.1 The requirements for section 21 05 01 -Mechanical- General Requirements concerning the work results and 22 05 00 -Piping- General Requirements concerning the work results, are both an integral part of this present section.

1.2 REFERENCES

.1 *American Society of Heating Refrigeration and Air-Conditioning Engineers* (ASHRAE)

.1 Standard 90.1-2007, *Energy Standard for Buildings except Low-Rise Residential Buildings.*

.2 *Electrical Equipment Manufacturer Advisory Council* (EEMAC) / *Association des manufacturiers d'équipement électrique et électronique du Canada* (AMEEEC)

.3 Canadian Standards Association (CSA International)

.1 CSA-B214-F07, Installation Code for Hydronic Heating Systems.

.4 *National Electrical Manufacturers' Association* (NEMA)

.1 NEMA MG 1-2006, *Motors and Generators*.

1.3 DOCUMENTS / SAMPLES TO SUBMIT FOR APPROVAL / INFORMATION

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product data:

.1 Provide manufacturer's printed product literature and datasheets for pumps, circulators, and related equipments.

.2 The data sheets must include:

.1 Equipments and their components, including connections, piping, fittings and control devices, as well as factory mounted or site mounted details.

.2 Size and recommended installation instructions.

.3 Pumps performance curves with their point of operation.

.4 Motor characteristics including efficiency.

.3 Submit manufacturer's detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices or ancillaries, accessories and controllers.

.3 The maintenance datasheets must include the following items:

.1 Equipment description including the name of the manufacturer, the equipment type, the manufacturing date, the power or capacity and the serial number.

.2 Maintenance and operation details data sheets.

.3 The recommended spare parts list, the name and address of the manufacturer representatives.

.4 Product characteristics, performance criteria, dimensions, limitation and finish.

1.4 CLOSEOUT SUBMITTALS

.1 Provide at work completion, maintenance and operation data for incorporation into manual specified in Section 00 10 00 – General Instructions.

.2 The maintenance and operation datasheets must include the following items:

.1 Equipments description including the name of the manufacturer, the equipment type, the manufacturing date, the power or capacity and the serial number.

.2 Maintenance and operation details data sheets.

.3 The recommended spare parts list, the name and address of manufacturer representatives.

.4 Product characteristics, performance criteria, dimensions, limitation and finish.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials in original factory packaging, labeled with manufacturer's name and address.

.3 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

Part 2 Product

2.1 VERTICAL INLINE SPLIT COUPLED PUMPS

.1 Pumps shall be Armstrong or Bell & Gossett or approved equal. The pumps shall be single stage centrifugal in-line design. The seal shall be serviceable without disturbing the piping connections. The capacities and characteristics shall be as in schedules on drawings.

.2 Pump casing shall be constructed of ASTM A48 class 30 cast iron. The pump casing/volute shall be rated for 250 psi working pressure for all jobs. The pump flanges shall be matched to suit the working pressure of the piping components on the job, with either ANSI Class 125 flanges or ANSI class 250 flanges.

.3 The pump casing shall be drilled and tapped for gauge ports on both the suction and discharge connections and for a drain port at the bottom of the casing. The casing shall have an additional tapping on the discharge connection to allow for the installation of a seal flush line. The pump cover shall be drilled and tapped to accommodate a seal flush line which can be connected to the corresponding tapping on the discharge connection, or to an external source to facilitate cooling and flushing of the seal faces.

.4 All casings shall be flanged. Threaded casings not allowed unless extra unions and fittings are provided with that pump to allow servicing.

.5 The pump shall have a factory installed vent/flush line to insure removal of trapped air from the casing and mechanical seal cooling. The vent/flush line shall run from the seal chamber to the pump discharge.

.6 The impeller shall be ASTM B584-836/875 bronze and hydraulically balanced. The impeller shall be dynamically balanced to ANSI Grade G6.3 and shall be fitted to the shaft with a key. The impeller shall be cast by the hydraulically efficient lost foam technique to ensure repeatability of high quality.

.7 The pump shall be manufactured with AINSI 416 Stainless Steel shaft.

.8 The pump shall be fitted with a single mechanical seal, with EPT elastomers and Carbon/Ceramic faces, rated up to 125ºC. This seal must be capable of being flushed externally via a tapping in the pump cover adjacent to the seal cavity. The entire pump line shall use no more than three different sizes of seals.

.9 The pump shall be coupled via a high tensile aluminum split style coupling. The design must permit easy replacement of the mechanical shaft seal without removal of the motor. The motor mount must be designed to accept several different motor frame standards; CZ and HP.

.10 The manufacturer shall standardize on no more than three sizes of mechanical seals throughout the entire range of the family of pumps. The manufacturer shall not use multiple part numbers for the same part.

2.2 IN LINE VERTICAL CLOSE COUPLED CIRCULATORS

.1 Pumps shall be Armstrong, Bell & Gossett or approved equal. The pumps shall be single stage horizontal in-line design. The seal shall be serviceable without disturbing the piping connections. The capacities and characteristics shall be as called for in the plans/schedules.

.2 Pump shall be constructed of ASTM A48 class 30 cast iron. The pump casing shall be drilled and tapped for gauge ports on both the suction and discharge connections.

.3 All casings shall be flanged connections.

.4 The impeller shall be ASTM C87500 or C89833 bronze and hydraulically balanced. The impeller shall be dynamically balanced to ANSI Grade G6...

.5 The pump shall incorporate a dry shaft design to prevent the circulating fluid from contacting the shaft. The pump shaft shall be AISI 1045 carbon steel with field

replaceable copper nickel 90-10 shaft sleeve. The shaft sleeve must be slip on (press on not allowable) and must be easily replaced in the field.

.6 The pump shall be fitted with a single mechanical seal, with EPT elastomers and Carbon/Ceramic faces, rated up to 125ºC.

.7 The manufacturer shall standardize on one mechanical seal throughout the entire range of the family of pumps. The manufacturer shall not use multiple part numbers for the same part.

2.3 SUCTION MOUNTED RECTIFIERS

.1 The product must include a cylindrical diffuser-strainer orifice, straightening vane in the flow, startup screens, permanent magnet and adjustable support leg.

.2 The cylindrical diffuser-strainer orifice combination must be designed to withstand a pressure differential equal to the maximum head of the pumping system at zero flow. It must have a free area equal to five times the area of the cross section of the suction pump opening.

.3 The length of the flow straightening vanes should not be shorter than twice the diameter of the pump suction connection.

.4 The flow straightening vanes will be designed of a cast iron construction with a very strong connection to the system and a connection to the pump. The cylindrical diffuser-strainer orifice combination will be carbon steel with 4.76 mm perforations to protect the pumping system.

.5 The full length of the carbon steel straightening vane must provide a flow without turbulence near the pump suction.

.6 The startup screen must be made of bronze wire 16 mesh that will be removed after the system commissioning. An adjustable support bracket has to eliminate tensions in the device and at the pump connection. All interior components shall be replaceable.

2.4 CHARACTERISTICS

.1 See pump schedule on drawing (M-09).

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install hydronic pumps in accordance to CSA-B214.

.2 In line circulator directly mounted on pipe:

.1 Support at inlet and outlet flanges or unions

.2 Install with bearing lubrication points accessible.

.3 Base mounted type: supply templates for anchor bolt placement

.1 Include anchor bolts with sleeves. Place level, shim unit and grout.

.2 Align coupling in accordance with manufacturer's recommended tolerance.

.3 Check oil level and lubricate. After run-in, tighten glands.

.4 Ensure that pump body does not support piping or equipment.

.1 Provide stanchions or hangers for this purpose.

.2 Refer to manufacturer's installation instructions for details.

.5 Connect a drain pipe connection to a floor drain.

.6 Install volute venting pet cock in accessible location.

.7 Check rotation prior to start-up.

.8 Install pressure gauge test cocks.

3.3 START-UP

.1 General:

.1 In accordance with Section 00 10 00 – General Instructions, supplemented as specified herein.

.2 In accordance with manufacturer's recommendations.

.2 Procedures:

.1 Before starting pump, check that cooling water system over-temperature and other protective devices are installed and operative.

.2 After starting pump, check for proper and safe operation.

.3 Check installation, operation of mechanical seals, packing gland type seals. Adjust as necessary.

.4 Check base for free-floating and no obstructions under base.

.5 Run-in pumps for 12 continuous hours minimum.

.6 Verify operation of over-temperature and other protective devices under low- and no-flow conditions.

.7 Eliminate air from scroll casing.

.8 Adjust water flow rate through water-cooled bearings.

.9 Adjust flow rate from pump shaft stuffing boxes to manufacturer's recommendation.

.10 Adjust alignment of piping and conduit to ensure true flexibility.

.11 Eliminate cavitations, flashing and air entrainment conditions.

.12 Adjust pump shaft seals, stuffing boxes and glands.

.13 Measure pressure drop across strainer when clean and with flow rates as finally set.

.14 Replace seals if pump used to degrease system or if pump used for temporary heat.

.15 Replace seals if pump is used to degrease system or if pump is used for temporary heat.

.16 No pump test is allowed to the air.

3.4 PERFORMANCE VERIFICATION (PV)

.1 General

.1 Verify performance in accordance with Section 000 10 00 – General Instructions.

.2 Verify that manufacturer's performance curves are accurate;

.3 Ensure valves on pump suction and discharge provide tight shut-off.

.4 Net Positive Suction Head (NPSH)

.1 Application: measure NPSH for pumps which operate on open systems and with water at elevated temperatures.

.2 Measure using procedures prescribed in Section 00 10 00 – General Instructions.

.3 Where procedures do not exist, discontinue PV, report to NRC Representative and await instructions.

.5 Multiple Pump Installations - Series and Parallel

.1 Repeat PV procedures specified above for pump performance and pump BHP for combinations of pump operations.

.6 Mark points of design and actual performance at design conditions as finally set upon completion of TAB.

.7 Commissioning Reports: in accordance with Section00 10 00 – General Instructions reports supplemented as specified herein. Reports to include:

.1 Record of point(s) of actual performance at maximum and minimum conditions and for single and parallel operation as finally set at completion of commissioning on pump curves.

.2 Use Report Forms specified in Section 00 10 00 – General Instructions: Report Forms and Schematics.

.3 Reports should indicate the characteristics of pumps curves (families of curves).

3.5 CLEANING

.1 Operational requirements in accordance with Section 00 10 00 – General Instructions.

.1 Remove site materials/equipment surplus, waste management, tools and equipment.

.2 Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Contents

.1 Metal Ducts low-pressure, materials, attachments, accessories and installation methods related.

1.2 RELATED SECTIONS

.1 The requirements of sections 21 05 01 - Common Work Results for Mechanical and 23 05 00 - Common Work Results for HVAC are an integral part of this section.

.2 Section 00 10 00 – General Instructions

.3 Section 00 15 45 – General Safety Section & Fire Instructions

.4 Section 23 05 29 - Hangers and Supports for piping and HVAC equipment.

.5 Section 23 05 94 – Pressure testing of Ducted Air systems

1.3 REFERENCES

.1 *American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.* (ASHRAE).

.2 *American Society for Testing and Materials International*, (ASTM).

.1 ASTM A480/A480M-03c Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

.2 ASTM A635/A635M-02, *Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot Rolled.*

.3 ASTM A653/A653M-03, *Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.*

.4 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

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

.1 Material Safety Data Sheets (MSDS).

.4 *National Fire Protection Agency Association* (NFPA).

.1 NFPA 90A-02, *Standard for the Installation of Air-Conditioning and Ventilating Systems*.

.2 NFPA 90B-02, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*.

.3 NFPA 96-01, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.*

.5 *Sheet Metal and Air Conditioning NRC representatives' National Association* (SMACNA).

.1 *SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2nd Edition 1995 and Addendum No. 1, 1997.*

.2 *SMACNA HVAC Air Duct Leakage Test Manual, 1985, 1st Edition*.

.3 *SMACNA IAQ Guideline for Occupied Buildings Under Construction 1995, 1st Edition.*

.6 Transports Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.4 DOCUMENTS TO BE SUBMITTED

.1 Submit all technical specification sheets and shop drawings in accordance with Section 00 10 00 – General Instructions.

.2 Technical specifications: Submit material safety data sheets required under the Work hazardous material information system (WMIS) which must be compliant with the WHMIS system according to Section 00 15 45 – General Safety Section & Fire Instructions.

1.5 SCOPE OF WORK

.1 Design, manufacture, supply and install all conduits, ducts, equipment and accessories required and / or shown on the drawings

.2 Design, manufacture, supply and install duct systems according to the design criteria set forth in this section, and whose performance will also obtain the results listed in this section

.3 Supply and install all necessary products to seal the duct systems comply with the requirements, sealing and testing of new pipes until satisfactory results

1.6 GENERAL

.1 Neither design criteria mentioned in this section shall be considered restricted in comparison to the other. Use the design criteria the most restrictive.

.2 The Sealing classes are defined in order to establish a minimum criteria of duct sealing, the Contractor shall supply and install all the systems of sealing required to meet the other requirements, including requirements of the sealing classes, so that leakage levels comply with the sealing classes indicated.

1.7 COORDINATION

.1 The plans indicate an approximate location for the passage of new and existing equipment and ducts. Their exact location to be determined by the Contractor according to the projects architectural design, structure and power and according to the plans of the existing building and site surveys performed by the Contractor during the work. The Contractor shall verify on site space before submitting shop drawings.

.2 Coordinate installation of duct systems with all the architectural, structural, mechanical and electrical extension and / or the existing building and renovation project. Coordinate especially the following:

.1 Localization of ducts in the ceiling: allow the passage of the ducts under the beams, when required.

.2 Locate all required openings in the structural elements in time for incorporation in the structural work

.3 The contractor may not claim additional amounts for carrying out work to be done by him in order to coordinate their needs with those of other disciplines and / or existing locations. If the dimensions of ducts should be changed to allow such coordination, the net area of ducts should be kept.

.4 The contractor shall perform, at its expense, all required openings and fillings, the dismantling and replacement of equipment and systems installed to coordinate its work with other disciplines.

1.8 QUALITY ASSURANCE

.1 Data reliability techniques

.1 Data from catalogues and manufacturers' literature should be reliable, confirmed by tests to have been made by the manufacturers themselves or on their behalf by independent laboratories and certifying the compliance of the requirements of codes and standards.

1.9 HEALTH AND SAFETY

.1 Take the necessary measures for health and safety in construction in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.10 DELIVERY, STORAGE AND HANDLING

.1 Protect on site stored or installed absorptive material from moisture damage.

.2 Waste Management and Disposal

.1 Separate waste materials for reuse and/or recycling in accordance with Section 00 10 00 – General Instructions.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal and packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for reuse and/or recycling and place in designated waste containers in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.7 Fold up metal and plastic banding, flatten and place in designated area for recycling.

1.11 MANAGEMENT PLAN FOR THE INDOOR AIR QUALITY (IAQ)

.1 Apply during the construction phase, the SMACNA guidelines for the air quality in occupied buildings and set out in the document entitled "Indoor Air Quality Guideline for Occupied Buildings Under Construction".

Part 2 Products

2.1 Classification of ducts

.1 The category of static pressure (Pa) for the construction of air ducts for the system is as follows:

SYSTEM N°	OUTDOOR AIR (1)	SUPPLY (2)	RETURN OR EXHAUST (3)	EXHAUST (4)	CATEGORY OF SEAL
AHU system	-500	+1500 / +500	-500	+500	A

Note 1: Air duct from outside air to ventilation system.

Note 2: Air duct from the ventilation system to supply diffuser. When two categories are shown, the first applies to the portion of air duct between the ventilation system and the terminal unit and the second applies to the portion of air duct between the terminal unit and the grid or diffuser.

Note 3: Air duct from return or exhaust grilles or other discharge point, to fan or ventilation system. When two categories are shown, the first applies to the portion of the air duct between the diffuser and the terminal unit and the second applies to the portion of the air duct between the terminal unit and the fan.

Note 4: Air duct from the fan or the ventilation system to outside.

2.2 CATEGORY OF AIR DUCT TIGHTNESS

.1 The category of air tightness of the ducts shall be determined according to data from the table below.

Types of duct	Pressure classes 500 Pa and less (positive and negative)
Rectangular duct	24
Round and oval ducts	12
Welded pipes	No leaks allowed

2.3 CATEGORY OF SEALING

.1 The sealing categories are:

CLASSES	SEAL REQUIRED
A	All transverse joints, longitudinal joints, wall bushings, connections and duct penetrations sealed with a product and a sealing tape.
B	All transverse and longitudinal joints and connections sealed with a sealant, tape seal, or a thereof combination.
C	All transverse joints and connections sealed with gaskets, a product, a sealing tape or a combination thereof. Longitudinal joints unsealed.
D	Unsealed joints.

.2 Sealing classes listed above are the minimum required sealing of the contractor for all ducts. These minimums do not, however, release the contractor from its responsibility to manufacture, supply and install all ducts so as not to exceed the maximum leakage rates stipulated in section 2.1. The contractor shall provide and install all sealing equipment necessary to meet the requirements specified in section 2.1, without additional compensation.

.3 If the opinion of the contractor, the application of sealing classes defined in this section necessarily involves the use of welded joints at other locations, the contractor shall include the cost of welded joints amount of the original submission.

2.4 FITTINGS

.1 Fabrication: to SMACNA

.2 Radiused elbows.

.1 Rectangular: standard radius, short radius with single thickness turning vanes. Centreline radius: 1.5 times width of duct.

.2 Round: smooth radius five piece. Centreline radius: 1.5 times diameter.

.3 Mitred elbows, rectangular:

.1 To 400 mm: with single double thickness turning vanes.

.2 Over 400 mm: with double thickness turning vanes.

.3 Not allowed on return air or exhaust air network

.4 Branches:

.1 Main Rectangular branch: with radius on branch 1.5 times width of duct 45 degrees entry on branch.

.2 Main Round branch: enter main duct at 45 degrees with conical connection

.3 Provide volume control damper in branch duct near connection to main duct.

.4 Main duct branches: with splitter damper.

.5 Leads secondary entrance at 45 ° equipped with a damper mounted in the main branch or secondary entrance leads to 90 ° including the register and the directional damper mounted in the main branch

.5 Transitions:

.1 Diverging: 20 degrees maximum including angle.

.2 Converging: 30 degrees maximum including angle.

.6 Offsets:

.1 Full short radius elbows as indicated.

.7 Obstruction deflectors: maintain full cross-sectional area.

.1 Maximum included angles: as for transitions.

.2 The maximum opening angle must be the same as in the case of transition elements.

2.5 AIR DUCT

.1 General

.1 Thickness: according to SMACNA standards or as specified.

.2 Fabrication: according to SMACNA.

.2 Joints: according to SMACNA and manufactured made joints. The flanged joints shall be considered to have a class A manufactured seal.

.3 Round and oval ducts

.1 Construction:

.1 Ducts made of galvanized steel or aluminum: spiral ducts with factory-made fittings and accessories according to SMACNA.

.2 Transverse joints up to 915 mm with sleeve joints and sealing tape. Above 915 mm, Vanstone joints:

.1 90º elbow: made of 5 sections minimum.

.2 Fitting branches: conical T.

.3 Dimensions: the dimensions of ducts shown in the drawings were selected based on the parameters of air velocity and pressure loss. If certain duct dimensions are not available, select dimensions giving an equivalent diameter but never less. The contractor will be responsible for coordinating the obstructions in the ceiling, mounted, etc.

.4 The test procedures must be submitted by the contractor to the NRC representative for verification before running tests.

.4 Rectangular ducts

.1 Materials

.1 Galvanized steel with Z90 designation zinc coating lock forming quality, as per ASTM A653/A653M.

.2 Thickness: to SMACNA recommendations.

.2 Construction

.1 Ducts: factory fabricated, spiral wound, with matching fittings and specials to SMACNA.

.2 Transverse joints: welded proprietary duct joints SMACNA seal Class A and B.

.3 Use of inner reinforcing braces is prohibited. Duct design must incorporate required thickness for design pressures specified without the use of braces.

.3 Fittings

.1 Elbows: long radius, without baffles, bending radius corresponding to 1.5 x the width of the contractor.

.2 Fittings bypass: with branch cut at 45 degrees and 45 degrees bent branch.

.3 Sharp angle bends are not permitted.

.4 Application:

.1 All ducts, unless otherwise indicated.

2.6 FIRE STOPPING

.1 Retaining angles around duct, on both sides of fire separation in accordance with Section 07 84 00 – Fire stopping.

.1 Ducts should not be distorted by the fire-stop material or its installation

2.7 SEALANT PRODUCTS

.1 Sealant: Duct, polymer-based, fire retardant, oil resistant and can withstand temperatures ranging from 30 degrees Celsius to 93 degrees Celsius.

2.8 SEALANT TAPE

.1 Sealing Tape: Glass fibber membrane, loose weave, treated with polyvinyl, 50 mm wide.

2.9 HANGERS AND SUPPORTS

.1 Hangers and Supports: in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

.1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct.

.1 Maximum size duct supported by strap hanger: 500 mm.

.2 Hanger configuration: to ASHRAE and SMACNA.

.2 Hangers: black galvanized steel angle with black galvanized steel rods according to ASHRAE and SMACNA following table:

Duct size (mm) until 750	**Angle size (mm) 25 x 25 x 3**	**Rode size (mm) 6**
751 to 1050	40 x 40 x 3	6
1051 to 1500	40 x 40 x 3	10
1501 to2100	50 x 50 x 3	10
2101 to 2400	50 x 50 x 5	10
2401 and greater	50 x 50 x 6	10

.3 Round duct: hangers according to SMACNA and made of galvanized steel.

.4 Fastener suspension

.1 Attachment to the structure:

.1 Concrete structure: bolt expansion.

.2 Steel structure: manufactured attachments.

.5 Maximum spacing of supports: 3 m

.6 Provide and install all structural elements required to secure the brackets to the building structure. Cover all the structural elements of a layer of zinc rich paint, color chosen by the NRC representative.

.7 All materials exposed to bad weather shall be hot dip galvanized after welding. All hardware attachment and bracing required must be stainless steel.

Part 3 Execution

3.1 GENERAL

.1 Do work in accordance with NFPA 90A, NFPA 90B, ASHRAE, SMACNA as indicated.

.2 Do not break continuity of insulation vapour barrier with hangers or rods.

.1 Insulate strap hangers 100 mm beyond insulated duct. .Ensure diffuser is fully seated.

.3 Fasten vertical ducts in accordance with the requirements of relevant standards of ASHRAE and SMACNA standards relevant.

.4 Install breakaway joints in ductwork on each sides of fire-stop partitions

.5 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.

.6 Manufacture duct in lengths and diameter to accommodate installation of acoustic duct lining.

.7 Install the fire stop material in a way to avoid to twist air ducts

3.2 HANGERS

.1 Strap hangers: install in accordance with SMACNA.

.2 Angle hangers: complete with locking nuts and washers.

.3 Hanger spacing: in accordance with ASHRAE and SMACNA as follows:

Duct size (mm)	**Spacing (mm)**
Up to1500	3000
1501 and up	2500

3.3 WATERTIGHT DUCT

.1 Provide watertight duct for:

.1 Dishwasher exhaust.

.2 Fresh air intake.

.3 Minimum 3000 mm from duct mounted humidifier in all directions.

.4 As indicated.

.2 Shape the bottom of horizontal ducts without making any longitudinal joints.

.1 Weld end joints of the bottom plates and side.

.2 Seal all other joints using a product for sealing air ducts.

.3 Slope horizontal branch ductwork down towards fume hoods served.

.1 Slope header ducts down toward risers.

.4 Fit base of riser with 150 mm deep drain sump and 32 mm drain connected, with deep seal trap and valve trap primer and discharging to open funnel drain as indicated.

3.4 JOINT SEALING

.1 Apply sealant to outside of joint to manufacturer's recommendations.

.2 Bed tape in sealant and recoat with a minimum of one coat of sealant to manufacturers recommendations.

3.5 AIR DUCT LEAKAGE TESTS

.1 Refer to Section 23 05 94 - Pressure Testing of Ducted Air Systems.

.2 Perform leak tests in accordance with the requirements contained in the HVAC Contractor Leakage Test Manual of SMACNA.

.3 Do leakage pass tests in sections.

.4 Make preliminary test sealing (to detect air leakage) as directed, to check the quality of work.

.5 Do not install additional ductwork until trial test has been passed.

.6 Test section minimum of 30 m long with not less than three branch takeoffs and two 90 degree elbows.

.7 Complete test before performance insulation or concealment Work.

END OF SECTION

Part 1 General

1.1 SUMMURY

.1 Section includes:

.1 Materials / insulating and absorbant materials and performance criterias relating to the sound systems and mechanical systems.

1.2 RELATED SECTIONS:

.1 The requirements of sections 21 05 01 - Mechanical - General requirements for the results of work and 23 05 00 - HVAC - General requirements for the results of work are an integral part of this section.

1.3 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

.2 American Society for Testing and Materials International (ASTM):

.1 ASTM A653/A653M-05, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM C423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.3 ASTM E90-04, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.4 ASTM E477-99, Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers.

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

.1 Material Safety Data Sheets (MSDS).

.4 National Building Code (NBC)-[2015]

.5 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

1.4 DOCUMENTS TO BE SUBMITTED

.1 Technical specifications:

.1 Submit required technical data, specifications and manufacturers' documentation for products in conformance with Section 00 10 00 – General Instructions. Specify the products' characteristics, performance criteria and constraints.

.2 Submit two (2) copies of safety data sheets required under the Workplace Hazardous Material Information System (WHMIS), which must comply with this system, in accordance with Section 00 10 00 – General Instructions.

.2 Shop Drawings: Submit shop drawings in accordance with Section 00 10 00 – General Instructions.

.1 Provide shop drawings for each of the separate attenuators along with the required technical data.

.3 Quality Assurance: Submit the following documents in accordance with Section 00 10 00 – General Instructions.

.1 Certificates: submit the documents signed by the manufacturer certifying that the products, materials and equipment meet the requirements as to the physical characteristics and performance criteria.

.2 Instructions: Submit installation instructions provided by the manufacturer.

.1 NRC Representative will provide staff with one (1) copy of the installation instructions prepared by the system provider.

1.5 PERFORMANCE REQUIREMENTS

.1 Rating Data:

.1 Provide performance rating data, certified by professional engineer or accredited test laboratory and supported by calculations and verified by test results in accordance with referenced standards as follows:

.1 Silencer: insertion loss, pressure drop at design conditions, generated noise level.

.2 Acoustic plenums: transmission loss and acoustical absorption.

.3 Acoustical performance measurements in accordance with ASTM E477, ASTM E90 and ASTM C423, except where specified otherwise.

1.6 HEALTH AND SAFETY REQUIREMENTS

.1 Apply necessary measures during construction in occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.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 and recycling in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 ABSORPTION AND INSULATING MEDIA

.1 Acoustic quality, fiber glass, bacteria and fungus resistant; free of corrosion causing or accelerating agents; packed to density to meet performance requirements and meets NBC 2015 fire requirements or requirements of authority having jurisdiction for duct lining.

2.2 SILENCERS

.1 Factory manufactured of prime coated or galvanized steel, compatible with ductwork specified elsewhere and to ASHRAE and SMACNA standards.

.2 Outer casing and galvanized steel, inner casing with clean cut circular perforations to enclose acoustic media. Inner casing to contain half-splitters and pods running full length of silencer where any cross sectional dimension exceeds 450mm. Protect media from erosion with fibre glass cloth of Tedlar between media and perforated metal.

.1 See Table on plan for performance and size of the silencer.

.3 Performance: as indicated.

2.3 ACOUSTIC PLENUMS

.1 Panels: tongue and groove connection type, designed for specified and indicated individual panel removal and for equipment access without major dismantling of plenum.

.1 Outer sheet: 1.3 mm thick galvanized steel to ASTM A653/A653M, with coating designation Z90.

.2 Inner sheet: 0.085 mm thick galvanized steel to ASTM A653/A653M, with coating designation Z90 with 2 mm diameter clean cut perforations on 5 mm staggered centres.

.3 Peripheral frame: galvanized steel U-profiles of 1.3 mm thick.

.4 Horizontal stiffeners: 0.85 mm minimum galvanized steel on 800 mm centres to control media settlement.

.5 Access panels: sized for equipment removal; two handles per panel; screw at 100 mm maximum centres; perimeter neoprene sponge gasket; materials same as standard panel.

.6 Deflection: not to exceed 1/240 of unsupported panel span at design pressure differential of 750 Pa.

.2 Doors: access doors with minimum 510 mm x1375 mm opening

.1 Construction same as standard panel except interiors solid.

.2 Two butt-type nylon bushed hinges, two cam-type latches with inside and outside handles.

.3 Neoprene gasket seal.

.4 Zinc plated hardware.

.5 Open against air pressure.

.3 Inspection windows, 305 mm x 305 mm, double glazed with 6 mm wire reinforced glass mounted in neoprene "U" channels.

.4 Assembly: base sections and flashings 1.3 mm minimum galvanized steel.

.1 Panel and flashing joints externally sealed with 5 mm diameter bead of non sag, non hardening sealant. Floor channel to floor connection sealed with 3 x 13 mm monolastomeric tape.

.2 Factory cut and frame openings where greatest dimension exceeds 300 mm. Smaller panel openings, site located and cut 50 mm larger in diameter, sleeved with 0.75 mm minimum galvanized steel.

.3 Fill space between pipe and/or conduit and sleeve with acoustic media, covered and mastic sealed in accordance with manufacturer's instructions.

.4 No sensory leakage at design pressure differential of 750 Pa.

.5 Assembly RSI not less than 1.2 (m^2.degrees C)/W at 10 degrees C.

.6 Certified acoustical performance:

.1 Transmission loss to ASTM E90.

.2 Acoustical absorption to ASTM C423.

Octave bands (Hz)	125	250	500	1000	2000	4000
Transmission loss, dB	21	28	39	50	53	56
Absorption coefficient	0.7	0.9	.99	.99	0.9	0.9

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations and/or specifications, including products’ technical bulletins, handling, storage, installation instructions and datasheets.

3.2 INSTALLATION

.1 Noise flanking: where indicated, install in wall sleeve with uniform clearance around to ensure no contact of silencer with wall sleeve. Pack with flexible, non hardening caulking on both sides of sleeves.

.2 Instrument test ports: install at inlet and outlet to permit measurement of insertion loss and pressure loss.

.3 Suspension: to manufacturer's instructions.

3.3 FIELD QUALITY CONTROL

.1 Testing :

.1 Experienced and competent Acoustical engineer to perform sound and vibration testing to take sound measurements after start up and testing, adjusting and balancing of systems to Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.2 Sound measurements to extend over frequency range of 63 to 800 and taken:

.1 Upstream and downstream of each silencer and plenum.

.2 In areas adjacent to mechanical equipment rooms, duct and pipe shafts.

.3 At 1800 mm above floor adjacent to first air terminal.

.4 At following critical locations: to be determined.

.3 Provide the NRC Representative with 24h notice prior to commencement of tests.

.4 Establish adequacy of equipment isolation, acceptability of noise levels in occupied areas, other conditions affecting acoustics and, where appropriate, recommendation for remedial measures and costs.

.5 Submit complete report of test results including sound curves.

.2 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.

.2 Manufacturer's Field Services: consisting of product use recommendations and periodic site visits to review scheduled installation as follows:

.1 After delivery and storage of products.

.2 After preparatory work is complete but before installation commences.

.3 Twice during the installation, at 25% and 60% completion stages.

.4 Upon completion of installation.

.3 Submit manufacturer's reports to the NRC Representative within 3 days of manufacturer's representative's review.

.3 All costs are borne by the contractor.

3.4 ADJUSTING

.1 Make adjustments and corrections in accordance with written report.

.2 Provide the NRC Representative with 24h notice prior to visit.

3.5 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, evacuate the site materials / equipment surplus, waste, tools and equipment.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for duct accessories including flexible connections, access doors, vanes and collars.

1.2 RELATED SECTIONS:

.1 The requirements of Section 21 05 01 - Mechanical - Common Work Results For Mechanical and the requirements of Section 23 05 00 - Common Work Results For HVAC are an integral part of this section.

.2 Section 00 10 00 – General Instructions.

.3 Section 00 15 45 – General Safety Section & Fire Instructions.

1.3 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

.2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).

.1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible, 95.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:

.1 Flexible connections.

.2 Duct access doors.

.3 Turning vanes.

.4 Instrument test ports.

.2 Submit WHMIS MSDS in accordance with Section 00 15 45 – General Safety Section & Fire Instructions. Indicate VOC's for adhesives and solvents during application and curing.

.3 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.1 Certification of ratings: catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Instructions: submit manufacturer's installation instructions.

.6 Manufacturer's Field Reports: manufacturer's field reports specified.

1.5 CLOSEOUT SUBMITTALS

.1 Submit maintenance and engineering data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.6 HEALTH AND SAFETY:

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 GENERAL

.1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

2.2 FLEXIBLE CONNECTIONS

.1 Frame: galvanized sheet metal frame of 0.66 mm thick with fabric clenched by means of double locked seams.

.2 Material :

.1 Fire resistant, self extinguishing, neoprene coated glass fabric, temperature rated at minus 40 degrees C to plus 90 degrees C, density of 1.3 kg/m^2.

2.3 ACCESS DOORS IN DUCTS

.1 Non-Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame.

.2 Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame and 25 mm thick rigid glass fibre insulation.

.3 Gaskets: neoprene or foam rubber.

.4 Hardware:

.1 Up to 300 mm: two sash locks complete with safety chain.

.2 301 to 450 mm: four sash locks complete with safety chain.

.3 451 to 1000 mm: piano hinge and minimum two sash locks.

.4 Doors over 1000 mm: piano hinge and two handles operable from both sides.

.5 Hold open devices.

.6 300 x 300 mm glass viewing panels.

2.4 TURNING VANES

.1 Factory or shop fabricated double thickness with aerodynamic shape, to recommendations of SMACNA and as indicated.

2.5 INSTRUMENT TEST

.1 1.6 mm thick steel zinc plated after manufacture.

.2 Cam lock handles with neoprene expansion plug and handle chain.

.3 28 mm minimum inside diameter. Length to suit insulation thickness.

.4 Neoprene mounting gasket.

2.6 SPIN-IN COLLARS

.1 Conical galvanized sheet metal spin-in collars with lockable butterfly damper.

.2 Sheet metal thickness to corresponding round duct standards.

Part 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 data sheet.

3.2 INSTALLATION

.1 Flexible Connections:

.1 Install in following locations:

.1 Inlets and outlets to supply air units and fans.

.2 Inlets and outlets of exhaust and return air fans.

.3 As indicated.

.2 Length of connection: 100 mm.

.3 Minimum distance between metal parts when system in operation: 75 mm.

.4 Install in accordance with recommendations of SMACNA.

.5 When fan is running:

.1 Ducting on sides of flexible connection to be in alignment.

.2 Ensure slack material in flexible connection.

.2 Access Doors and Viewing Panels:

.1 Size:

.1 300 x 300 mm for inspection/servicing entry or as indicated on drawings.

.2 The hand holes will be refused.

.3 250 x 250 mm for viewing.

.4 As indicated.

.2 Locations:

.1 Fire and smoke dampers.

.2 Control dampers.

.3 Devices requiring maintenance.

.4 Required by code.

.5 Reheat coils.

.6 Elsewhere as indicated.

.3 Instrument Test Ports:

.1 General:

.1 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.

.2 Locate to permit easy manipulation of instruments.

.3 Install insulation port extensions as required.

.4 Locations:

.1 For traverse readings:

.1 Ducted inlets to roof and wall exhausters.

.2 Inlets and outlets of other fan systems.

.3 Main and sub-main ducts.

.4 As indicated.

.2 For temperature readings:

.1 At outside air intakes.

.2 In mixed air applications in locations as approved by NRC Representative.

.3 At inlet and outlet of coils.

.4 Downstream of junctions of two converging air streams of different temperatures.

.5 As indicated.

.4 Turning vanes:

.1 Install in accordance with recommendations of SMACNA and as indicated.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Require manufacturer of products, supplied under this Section, to review work involved in the handling, installation/application, protection and cleaning, of its product[s] and submit written reports, in acceptable format, to verify compliance of Work with Contract.

.2 Manufacturer's Field Services: 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, at stages listed:

.1 After delivery and storage of products and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

.3 Upon completion of the Work, after cleaning is carried out.

.4 Obtain reports, within 3 days of review and submit, immediately to NRC Representative.

3.4 CLEANING

.1 Perform cleaning operations as specified in Section 00 10 00 – General Instructions in accordance with manufacturer's recommendations.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 Balancing dampers for mechanical ventilation and air conditioning.

1.2 RELATED SECTIONS:

.1 The requirements of sections 21 05 01 - Mechanical - General requirements for the results of work and 23 05 00 - HVAC - General requirements for the results of work are an integral part of this section.

.2 Section 00 10 00 – General Instructions.

.3 Section 00 15 45 – General Safety Section & Fire Instructions.

1.3 REFERENCES

.1 Sheet Metal and Air Conditioning National Association (SMACNA)

.1 *SMACNA, HVAC Duct Construction Standards, Metal and Flexible-1985*.

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

.1 Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

.1 Product Data

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.1 Submit two (2) copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section & Fire Instructions..

.2 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.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

1.5 QUALITY ASSURANCE

1.6 HEALTH AND SAFETY REQUIREMENTS:

.1 Take the necessary measures for health and safety in construction, in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 GENERAL

.1 The dampers must be manufactured in accordance with relevant standards of SMACNA.

2.2 SPLITTER DAMPERS

.1 Registers blades are made of the same material as the air duct but their normalized thickness is immediately superior to the air duct thickness, with appropriate reinforcing device.

.2 Double thickness construction.

.3 Control rod with locking device and position indicator.

.4 Rod shape designed to prevent from entering it completely into the air duct

.5 Pivot mechanism consists of a piano hinge.

.6 Folded leading edge.

2.3 SINGLE BLADE DAMPERS

.1 Made of the same material as the air duct but the normalized thickness is immediately superior to air ducts thickness, V-groove ensuring greater rigidity.

.2 Form and dimensions comply with the recommendations of the SMACNA, except for what is the maximum height, which must be 100 mm consistent with indications.

.3 Lock extension to suit the thickness of the insulation of the air duct

.4 Inside and outside end levels are made of bronze.

.5 Frame profile is the same material as the air duct in which the register is mounted and fitted with stops angles.

2.4 MULTI-BLADED DAMPERS

.1 Factory manufactured of material compatible with duct.

.2 Opposed blade: configuration, metal thickness and construction are in accordance with SMACNA.

.3 Maximum blade height: 100 mm or as indicated.

.4 Bearings: pin in bronze bushings.

.5 Linkage: shaft extension with locking quadrant.

.6 Channel frame of same material as adjacent duct, complete with angle stop.

.7 Maximum leakage 0.6% of the nominal flow against a pressure of 2.5 kPa.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including products technical bulletins, handling, storage and installation instructions and datasheet.

3.2 INSTALLATION

.1 Install where indicated.

.2 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.

.3 Locate balancing dampers in each branch duct for supply, return and exhaust systems.

.4 Run-outs to registers and diffusers: install single blade damper located as close as possible to main ducts.

.5 Dampers: vibration free.

.6 Install control devices in areas where they are visible and accessible.

.7 The corrections and adjustments will be made by the NRC representative.

3.3 FIELD QUALITY CONTROL

.1 Tests:

.1 The tests shall cover a period of at least 15 days and must provide evidence that the system works as directed.

3.4 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Operating dampers for mechanical forced air ventilation and air conditioning systems.

1.2 RELATED SECTIONS

.1 The requirements of sections 21 05 01 - Mechanical - General requirements for the results of work and 23 05 00 - HVAC - General requirements for the results of work are an integral part of this section.

.2 Section 00 10 00 – General Instructions.

.3 Section 00 15 45 – General Safety Section & Fire Instructions.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM A653/A653M-[04a], *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process*.

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

.1 Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.1 Submit two (2) copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section & Fire Instructions.

.2 Indicate the following:

.1 Performance data.

.2 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.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.

.3 Closeout Submittals

.1 Provide maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 HEALTH AND SAFETY REQUIREMENTS:

.1 Take the necessary measures for health and safety in construction in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.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: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 MULTI-LEAF DAMPERS

.1 Opposed blade type or as indicated.

.2 Extruded aluminum, interlocking blades, complete with extruded vinyl seals, spring stainless steel side seals and extruded aluminum frame.

.3 Pressure fit self-lubricated bronze bearings.

.4 Linkage: plated steel tie rods, brass pivots and plated steel brackets, complete with plated steel control rod.

.5 Performance:

.1 Leakage: in closed position less than 2% of rated air flow at 250 Pa differential across damper.

.2 Pressure drop: at full open position less than 4 Pa differentials across damper at 5.08 m/s.

.6 Insulated aluminum dampers:

.1 Frames: insulated with extruded polystyrene foam with RSI 0.88.

.2 Blades: constructed from aluminum extrusions with internal hollows insulated with polyurethane or polystyrene foam, RSI 0.88.

2.2 DISC TYPE DAMPERS

.1 Frame: insulated brake formed, welded, 1.6 mm thick, galvanized steel to ASTM A653/A653M.

.2 Disc: insulated spin formed, 1.6 mm thick, galvanized steel to ASTM A653/A653M.

.3 Gasket: extruded neoprene, field replaceable with ten year warranty.

.4 Bearings: roller self lubricated and sealed.

.5 Operator: compatible with damper, linear stroke operator, spring loaded actuator, zinc-aluminum foundry alloy casting cam follower.

.6 Performance:

.1 Leakage: in closed position less than 0.001 % of rated air flow at 250 kPa pressure differential across damper.

.2 Pressure drop: at full open position less than 50 Pa differential across damper at 1.50 m/s.

2.3 BACK DRAFT DAMPERS

.1 Automatic gravity operated, multi leaf, aluminum construction with nylon bearings, counterweighted, as indicated.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage, installation instructions and datasheets.

3.2 INSTALLATION

.1 Install where indicated.

.2 Install in accordance with recommendations of SMACNA and manufacturer's instructions.

.3 Seal multiple damper modules with silicon sealant.

.4 Install access door adjacent to each damper. See Section 23 33 00 - Air Duct Accessories.

.5 Ensure dampers are observable and accessible.

3.3 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 Fire-and smoke dampers

1.2 RELATED SECTIONS

.1 The requirements of sections 21 05 01 - Mechanical - General requirements for the results of work and 23 05 00 - HVAC - General requirements for the results of work are an integral part of this section.

.2 Section 00 10 00 – General Instructions.

.3 Section 00 15 45 – General Safety Section & Fire Instructions.

1.3 REFERENCES

.1 *American National Standards Institute/National Fire Protection Association* (ANSI/NFPA)

.1 ANSI/NFPA 90A-2015 2002, *Standard for the Installation of Air Conditioning and Ventilating Systems*.

.2 NFPA 80-2016 *Standards for fire doors and other opening protective.*

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

.1 Material Safety Data Sheets (MSDS).

.3 Underwriters Laboratories of Canada (ULC)

.1 CAN4-S112-M9019, Standard Method of Fire Test of Fire Damper Assemblies.

.2 CAN4-S112.2-M84, Standard method Method of testing fire performance Fire Test of Celling Firestop Flap Assembly dampers located in the ceilings.

.3 ULC-S505-1974, Fusible Links for Fire Protection Service.

.4 Submit materials safety data sheets, including proof of compliance, for each product.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturers' required technical data, specifications and documentation in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.1 Submit two (2) copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section & Fire Instructions.

.2 Indicate the following:

.1 Fire-dampers.

.2 Smoke dampers.

.3 Operators.

.4 Fusible links.

.5 Design details of break-away joints.

.2 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.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.

.3 Closeout Submittals:

.1 Provide maintenance records required and join them to the manual mentioned in Section 00 10 00 – General Instructions to submit once work is completed.

1.5 HEALTH AND SAFETY REQUIREMENTS

.1 Apply necessary measures during construction in occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.6 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 00 10 00 – General Instructions.

.2 Provide following:

.1 Three (3) fusible links of each type.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.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: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 FIRE DAMPERS

.1 Fire dampers: arrangement Type A B C, listed and bear label of ULC and meet requirements of CFFM and ANSI/NFPA 90A and authorities having jurisdiction. Fire damper assembly fire tested in accordance with CAN4-S112.

.2 Mild steel, factory fabricated for fire rating requirement to maintain integrity of fire wall and/or fire separation.

.1 Fire dampers: 1-1/2 hour fire rated unless otherwise indicated.

.2 Fire dampers: automatic operating type and have dynamic rating suitable for maximum air velocity and pressure differential to which it will be subjected.

.3 Fusible link actuated, weighted to close and lock in closed position when released or having negator-spring-closing operator for multi-leaf type or roll door type in horizontal position with vertical air flow.

.4 Built mounting angles 40 mm x 40 mm x 3 mm, all around records of each side of partitions or walls Fire crossed

.5 Equip fire dampers with steel sleeve or frame installed disruption ductwork or impair damper operation.

.6 Equip sleeves or frames with perimeter mounting angles attached on both sides of wall or floor opening. Construct ductwork in fire-rated floor-ceiling or roof-ceiling assembly systems with air ducts that pierce ceiling to conform with ULC.

.7 Design and construct dampers to not reduce duct or air transfer opening cross-sectional area.

.8 Dampers shall be installed so that the centerline of the damper depth or thickness is located in the centerline of the wall, partition of floor slab depth or thickness.

.9 Unless otherwise indicated, the installation details given in SMACNA Install Fire Damp HVAC and in manufacturer's instructions for fire dampers shall be followed.

2.2 SMOKE DAMPERS

.1 Smoke Dampers: to be ULC or UL listed and labelled.

.2 Normally closed reverse action smoke vent (S/D-RASV): folding blade type, opening by gravity upon detection of smoke, and/or from remote alarm signaling device actuated by an electro thermal link as indicated. Two flexible stainless steel blades edge seals to provide required constant sealing pressure.

.3 Normally open smoke/seal (S/D-SSSD): folding blade type, closing when actuated by means of electro thermal link and/or from remote alarm signaling device. Blade edge

seals of flexible stainless steel to provide required constant sealing pressure. Provide stainless steel negator springs with locking devices to ensure positive closure for units mounted horizontally in vertical ducts.

.4 Motorized (S/D-M): folding blade type, normally open with power on. When power is interrupted damper shall close automatically. Both damper and damper operator shall be ULC listed and labeled.

.5 Electro thermal link (S/D-ETL): dual responsive fusible link which melts when subjected to local heat of 74 degrees C and from external electrical impulse of low power and short duration; ULC or UL listed and labeled.

Part 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 datasheets.

3.2 INSTALLATION

.1 Install in accordance with ANSI/NFPA 90A NFPA 80 and in accordance with conditions of ULC listing.

.2 Maintain integrity of fire separation.

.3 After completion and prior to concealment, obtain approvals of complete installation from authority having jurisdiction.

.4 Install access door adjacent to each damper. See Section 23 33 00 - Air Duct Accessories.

.5 Coordinate with fire damper installer

.6 Ensure access doors/panels, fusible links, damper operators are easily observed and accessible.

.7 Install break-away joints of approved design on each side of fire separation.

3.3 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, evacuate the site materials / equipment surplus, waste, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section includes:

.1 Materials and installation of flexible ductwork, joints and accessories.

1.2 RELATED SECTIONS:

.1 The requirements of sections 21 05 01 - Mechanical - General requirements for the results of work and 23 05 00 - HVAC - General requirements for the results of work are an integral part of this section.

.2 Section 00 10 00 – General Instructions.

.3 Section 00 15 45 – General Safety Section & Fire Instructions.

1.3 REFERENCES

.1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).

.2 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.2 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

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

.1 Material Safety Data Sheets (MSDS).

.4 National Fire Protection Association (NFPA).

.1 NFPA 90A-02, *Standard for the Installation of Air-Conditioning and Ventilating Systems.*

.2 NFPA 90B-02, *Standard for Installation of Warm Air Heating and Air-Conditioning Systems.*

.5 *Sheet Metal and Air-Conditioning Contractors' National Association* (SMACNA).

.1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, 95 (Addendum No.1, November 1997).

.2 SMACNA IAQ Guideline for Occupied Buildings under Construction, 1st Edition 1995.

.6 Underwriters' Laboratories Inc. (UL).

.1 UL 181-96, Standard for Factory-Made Air Ducts and Air Connectors.

.7 Underwriters' Laboratories of Canada (ULC).

.1 CAN/ULC-S110-1986(R2001), Fire Tests for Air Ducts.

1.4 SUBMITTALS

.1 Complete submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data: submit WHMIS MSDS in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section & Fire Instructions for the following:

.1 Thermal properties.

.2 Friction loss.

.3 Acoustical loss.

.4 Leakage.

.5 Fire rating.

.3 Samples: submit samples with product data of different types of flexible duct being used in accordance with Section 00 10 00 – General Instructions.

1.5 QUALITY ASSURANCE

.1 Certification of Ratings:

.1 Catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

1.6 HEALTH AND SAFETY:

.1 Complete construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Protect on site stored or installed absorptive material from moisture damage.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Place materials defined as hazardous or toxic in designated containers.

.4 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.5 Ensure emptied containers are sealed and stored safely.

1.8 INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN

.1 During construction meet or exceed the requirements of SMACNA IAQ Guideline for Occupied Buildings under Construction.

Part 2 Products

2.1 GENERAL

.1 Factory fabricated to CAN/ULC-S110.

.2 Pressure drop coefficients listed below are based on relative sheet metal duct pressure drop coefficient of 1.00.

.3 Flame spread rating not to exceed 25. Smoke developed rating not to exceed 50.

2.2 METALLIC – NON INSULATED

.1 Type 1: spiral wound flexible aluminum, as indicated.

.2 Performance:

.1 Factory tested to 2.5 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

2.3 METALLIC - INSULATED

.1 Type 2: spiral wound flexible aluminum with factory applied, 25 mm thick flexible glass fibre thermal insulation with vapour barrier and polyethylene jacket, as indicated.

.2 Performance:

.1 Factory tested to 2.5 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

2.4 NON METALLIC – NON INSULATED

.1 Type 3: non-collapsible, coated aluminum foil Mylar type, mechanically bonded to and helically supported by, external steel wire, as indicated.

.2 Performance:

.1 Factory tested to 2.5 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

2.5 NON METALLIC - INSULATED

.1 Type 4: non-collapsible, coated aluminum foil/Mylar type mechanically bonded to and helically supported by, external steel wire with factory applied, 25 mm thick flexible mineral fibre thermal insulation with vapour barrier and reinforced Mylar/neoprene laminate jacket, as indicated.

.2 Performance:

.1 Factory tested to 2.5 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Thermal loss/gain: 1.3 W/m^2. degrees C mean.

2.6 METALLIC ACOUSTIC INSULATED – MEDIUM PRESSURE

.1 Type 5: Spiral wound, flexible perforated aluminum with factory applied 25 mm thick flexible mineral fibre thermal insulation and sleeved by aluminum foil/Mylar laminate Type M vapour barrier, as indicated.

.2 Performance:

.1 Factory tested to 2.5 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Acoustical performance: Minimum attenuation (dB/m) to following table:

Frequency (Hz)					
Duct Diam.	**125**	**250**	**500**	**1000**	**2000**
100	0.6	3	12	27	0
150	1.2	3	12	22	27
200	2.0	5	12	19	20
300	2.4	5	12	16	15

2.7 METALLIC ACOUSTIC INSULATED – HIGH PRESSURE

.1 Type 6: Spiral wound, flexible perforated aluminum with factory applied 25 mm thick flexible mineral fibre thermal insulation and encased in spiral wound flexible aluminum jacket, as indicated.

.2 Performance

.1 Factory tested to 2.5 kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Acoustical performance: Minimum attenuation (dB/m) to following table:

Frequency (Hz)					
Duct Diam.	**125**	**250**	**500**	**1000**	**2000**
100	0.6	3	12	27	0
150	1.2	3	12	22	27
200	2.0	5	12	19	20
300	2.4	5	12	16	15

2.8 NON-METALLIC – ACOUSTIC INSULATED

.1 Type 7: non--collapsible, coated mineral base perforated fabric type helically supported by and mechanically bonded to steel wire with factory applied flexible mineral fibre acoustic insulation and encased in aluminum foil/Mylar laminate Type M vapour barrier, as indicated.

.2 Performance

.1 Factory tested to 2.5kPa without leakage.

.2 Maximum relative pressure drop coefficient: 3.

.3 Acoustical performance: Minimum attenuation (dB/m) to following table:

Frequency (Hz)					
Duct Diam.	**125**	**250**	**500**	**1000**	**2000**
100	0.6	3	12	27	0
150	1.2	3	12	22	27
200	2.0	5	12	19	20
300	2.4	5	12	16	15

Part 3 Execution

3.1 DUCT INSTALLATION

.1 Install in accordance with: CAN/ULC-S110, UL-181, NFPA 90A, NFPA 90B and SMACNA.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Contents

.1 Flexible air ducts, fastening materials, accessories and related installation methods.

.2 Related Sections

.1 The requirements of Section 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are an integral part of this section.

.2 Section 00 10 00 – General Instructions.

.3 Section 00 15 45 – General Safety Section & Fire Instructions.

.3 Execute work in accordance with standards:

.1 American Society for Testing and Materials International, (ASTM).

.2 ASTM C 423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

.3 ASTM C 916-85 (2001)e1, Standard Specification for Adhesives for Duct Thermal Insulation.

.4 ASTM C 1071-00, Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).

.5 ASTM C 1338-00, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

.6 ASTM G 21-96(2002), Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

.7 Department of Justice Canada (Jus).

.8 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

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

.10 Material Safety Data Sheets (MSDS).

.11 National Fire Protection Association (NFPA).

.12 NFPA 90A-02, Standard for the Installation of Air Conditioning and Ventilating Systems.

.13 NFPA 90B-02, Standard for the Installation of Warm Air Heating and Air Conditioning Systems.

.14 North American Insulation Manufacturers Association (NAIMA).

.15 NAIMA AH116-5th Edition, Fibrous Glass Duct Construction Standards.

.16 Sheet Metal and Air Conditioning Contractor's National Association (SMACNA).

.17 SMACNA, HVAC DCS, HVAC, Duct Construction Standards, Metal and Flexible-95 (Addendum No.1, Nov. 97).

.18 SMACNA IAQ Guideline for Occupied Buildings 95.

.19 Transport Canada (TC).

.20 Transportation of Dangerous Goods Act (TDGA), 1992, ch. 34.

.21 Underwriter's Laboratories of Canada (ULC).

.22 CAN/ULC-S102, Methods of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.2 SUBMITTALS

.1 Submit product data in accordance with Section 00 10 00 – General Instructions.

.2 Submit WHMIS MSDS – Material Safety Data Sheets in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section & Fire Instructions and must cover the following:

.1 Thermal properties.

.2 Friction loss.

.3 Sound attenuation.

.4 Leak-tightness.

.5 Fire resistance.

.6 Samples: Submit samples of different types of proposed flexible ducts, including related product data, in accordance with Section 00 10 00 – General Instructions.

1.3 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.4 SCOPE OF WORK

.1 The following ducts must be lined with acoustic insulation.

.1 All air transfer ducts.

.2 As indicated on drawings.

.3

1.5 DELIVERY, STORAGE AND HANDLING

.1 Protect on-site stored or installed absorptive material from moisture damage.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 00 10 00 – General Instructions.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, regional and municipal regulations.

.6 Ensure emptied containers are sealed and stored safely.

.7 Fold up metal banding, flatten and place in designated area for recycling.

1.7 GENERAL

.1 Duct dimensions indicated on drawings are clear inside duct lining. When duct insulation is installed, duct dimensions must be increased to maintain clear inside as indicated on drawings.

.2 Liner must permit ease in cleaning and prevent accumulation of dust and bacteria.

Part 2 Products

2.1 DUCT LINER

.1 General:

.1 Mineral fibre duct liner: density 22 kg/m^3, coated with black neoprene.

.2 Flame spread rating shall not exceed 25 and smoke development rating shall not exceed 50 when tested in accordance with CAN/ULC-S102 and NFPA 90A and NFPA 90B.

.2 Rigid:

.1 25 mm thick, to ASTM C 1071, Type 2, fibrous glass rigid board duct liner.

.2 Density: 48 kg/m³ minimum.

.3 Thermal resistance to be minimum 0.76 (m². degrees C)/W for 25 mm thickness, 1.15 (m².degrees C)/W for 38 mm thickness, 1.53 (m².degrees C)/W for 50 mm thickness when tested in accordance with ASTM C 177, at 24ºC mean temperature.

.4 Maximum velocity on faced air side: 20.3 m/sec.

.5 Minimum NRC of 0.70 at 25 mm thickness based on Type A mounting to ASTM C 423.

.6 Recycled content: EcoLogo certified products containing at least 45% recycled materials by weight.

.7 Use on flat surfaces where indicated.

.3 Flexible:

.1 25 mm thick, to ASTM C 1071 Type 1, fibrous glass blanket duct liner.

.2 Density: 24 kg/m³ minimum.

.3 Thermal resistance to be minimum 0.37 (m².degrees C)/W for 12 mm thickness, 0.74 (m².degrees C)/W for 25 mm thickness, 1.11 (m².degrees C)/W for 38 mm thickness, 1.41 (m².degrees C)/W for 50 mm thickness when tested in accordance with ASTM C 177, at 24ºC mean temperature.

.4 Maximum velocity on coated air side: 25.4 m/sec.

.5 Minimum NRC of 0.65 at 25 mm thickness based on Type A mounting to ASTM C 423.

.6 Use on round or oval surfaces.

2.2 ADHESIVE

.1 Flame spread rating shall not exceed 25 and smoke development rating shall not exceed 50. Temperature range -29°C to 93°C and as per NFPA 90A-1985.

.2 Water-based fire retardant type.

.3 Acceptable product: Duro Dyne 1A-22.

2.3 FASTENERS

.1 Weld pins 2 mm diameter, length to suit thickness of insulation, equipped with nylon or metal retaining clips, 32 mm square.

.2 Acceptable product: Duro Dyne, pins PN series, and retaining clips NC series.

2.4 JOINT TAPE

.1 Polyvinyl treated open weave fibreglass membrane 50 mm wide.

.2 Acceptable product: Duro Dyne FT2.

2.5 SEALER

.1 Meet requirements of NFPA 90A and NFPA 90B.

.2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50. Temperature range -68°C to 93°C.

.3 Acceptable product: Duro Dyne S-2.

Part 3 Execution

3.1 GENERAL

.1 Line inside of ducts where indicated.

.2 Duct dimensions, as indicated, are clear inside duct lining.

.3 Fabricate ducts of lengths suiting duct liner installation.

3.2 DUCT LINER

.1 Install in accordance with manufacturer's and SMACNA recommendations, and as follows:

.1 Fasten to interior sheet metal surface with 100% coverage of adhesive to ASTM C 916.

.2 In addition to adhesive, install weld pins not less than two (2) rows per surface and not more than 425 mm on centres. Impact driven mechanical fasteners to compress duct liner sufficiently to hold it firmly in place.

.1 Spacing of mechanical fasteners in accordance with HVAC – DCS of SMACNA NAIMA AH116.

3.3 JOINTS

.1 Seal butt joints, exposed edges, weld pin and clip penetrations and damaged areas of liner with joint tape and sealer. Install joint tape in accordance with manufacturer's written recommendations, and as follows:

.1 Bed tape in sealer.

.2 Apply two (2) coats of sealer over tape.

.2 Replace damaged areas of liner at discretion of the NRC Representative.

.3 Protect leading and trailing edges of duct sections with sheet metal nosing having 15 mm overlap and fastened to duct.

3.4 OPERATION

.1 Sustainable requirements with regard to verification must be in accordance with Section 00 10 00 – General Instructions and must cover the following:

.1 Cleaning products and frequency.

.2 Repair and maintenance materials and equipment and related instructions.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes

.1 Fans, motors, accessories and hardware for commercial use.

.2 Related Sections

.1 The requirements of Section 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are an integral part of this section.

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section & Fire Instructions.

1.2 REFERENCES

.1 Air Conditioning and Mechanical Contractors (AMCA)

.1 AMCA Publication 99-2003, Standards Handbook.

.2 AMCA 300-1996, Reverberant Room Method for Sound Testing of Fans.

.3 AMCA 301-1990, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

.2 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)

.1 ANSI/AMCA 210-1999, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

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

.1 Material Safety Data Sheets (MSDS).

1.3 SYSTEM DESCRIPTION

.1 Performance Requirements

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards in force.

.2 Capacity: flow rate, total static pressure, bhp W, efficiency, revolutions per minute, power, model, size, sound power data, and as indicated on schedule.

.3 Fans: statically and dynamically balanced, constructed in conformity with AMCA 99.

.4 Sound ratings: comply with AMCA 301, tested to AMCA 300. Supply unit with AMCA certified sound rating seal.

.5 Performance ratings: based on tests performed in accordance with ANSI/AMCA 210 and ASHRAE 51-99. Supply unit with AMCA certified rating seal, except for propeller fans smaller than 300 mm diameter.

1.4 SUBMITTALS

.1 Product Data

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.1 Submit two (2) copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section & Fire Instructions.

.2 Shop Drawings

.1 Submit shop drawings and product data in accordance with Section 00 10 00 – General Instructions.

.3 Provide:

.1 Fan performance curves showing point of operation, bhp kW and efficiency.

.2 Sound rating data at point of operation.

.4 Indicate:

.1 Motors, sheaves, bearings, shaft details;

.2 Minimum performance achievable with variable speed controllers.

.5 Quality Assurance Submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.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 NRC Representative to make available one (1) copy of installation instructions prepared by the system supplier to intended personnel.

.6 Closeout Submittals:

.1 Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.6 MAINTENANCE

.1 Extra Materials

.1 Provide maintenance materials in accordance with Section 00 10 00 – General Instructions.

.1 Spare parts to include:

.1 Matched set of belts.

.2 Furnish:

.1 List of individual manufacturer's recommended spare parts for equipment, including bearings and seals.

.2 Address of suppliers.

.3 List of specialized tools necessary for adjusting, repairing or replacing.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handing and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.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 and recycling in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 FANS – GENERAL

.1 Motors

.1 In accordance with Section 21 05 01 – Common Work Results For Mechanical and supplemented as specified herein.

.2 Motors selected based on variable speed drive applications, 50-hp motors and up must be in accordance with NEMA MG1, part 30.

.3 Motors to be high efficiency and surpasses CAN/CSA-C390.

.4 Factory installed motors.

.5 Rating as indicated.

.2 Accessories and hardware: matched set of V-belt drives, adjustable slide rail motor bases, belt guards, coupling guards, fan inlet and/or outlet safety screens as indicated and as specified in Section 23 05 13 – Common Motor Requirements for HVAC Equipment, inlet or outlet dampers and vanes and as indicated.

.3 Bearings: air handling quality, heavy duty, split pillow-block, flange mounted grease lubricated ball or roller self-aligning type with oil retaining, dust excluding seals and a certified minimum rated life of 200 000 h to AFBMA L-50 (AntiFriction Bearing Manufacturers Association). Characteristics and specifications of bearings are to be based on fan maximum speed and capacity as illustrated in catalogue data. Bearing supports are to be single or two-row cylindrical roller bearings. Supports must be secured to fan base.

.4 Factory primed before assembly in colour standard to manufacturer.

.5 Scroll casing drains: as indicated.

.6 Bearing lubrication systems plus extension lubrication tubes where bearings are not easily accessible.

.7 Vibration isolation: to Section 23 05 48 – Vibration and Seismic Control for HVAC Piping and Equipment.

.8 Flexible connections: to Section 23 33 00 – Air Duct Accessories.

2.2 CENTRIFUGAL FANS (DWDI, SWSI)

.1 Fan wheels:

.1 Welded steel or aluminum construction, as indicated.

.2 Maximum operating speed not more than 40% of first critical speed.

.3 Wheels equipped with blades as indicated.

.2 Housings

.1 Volute with inlet cones, fabricated steel for wheels 300 mm or greater; aluminum for smaller wheels, braced, and with welded supports.

.2 For horizontally and vertically split housings provide flanges on each section for bolting together, with gaskets of non-oxidizing non-flammable material.

.3 Provide bolted latched airtight access doors with handles.

.3 Variable volume control devices

.1 Mounted by fan manufacturer.

.2 Adjustable inlet vanes: operated from a centre mechanism linked to each damper vane. Support each vane at ends in bronze bearings. On DWDI fans interconnect vanes to operate in unison. Provide locking devices for manual operation.

.3 Variable speed drives: refer to section.

2.3 MIXED FLOW IN-LINE CENTRIFUGAL FANS

.1 Welded steel cylindrical housing with pre-pierced reinforcing flanges.

.2 Housing to be equipped with a bolted removable panel for inspection of fan's interior.

.3 As required, fans will be equipped with large bolted, reinforced access doors to provide maximum access to internal parts, fan wheel and drive components. Removable, bolted plates on the drive compartment will allow for access to bearings and other drive components. All removable panels will be equipped with gaskets.

.4 Units are to be equipped with reinforced feet welded to housing for structural building support in accordance with drawings.

.5 Fans are equipped with wide radius aluminum inlet cones and airflow straightening vanes.

.6 Fans must be equipped with AF or BI type steel wheel, as indicated, V-belt driven by motor installed outside of fan housing. Belt protected by belt housing. Motor must be mounted on adjustable bases.

2.4 CENTRIFUGAL ROOF EXHAUST VENTILATORS

.1 Airfoil blade centrifugal ventilation unit. V-belt-driven assembly with spun aluminum construction, motor and fan mounted on vibration isolation support, adjustable motor pulley, 2 mm dia. bird screen, disconnect switch mounted in fan cabinet, continuous roof curb gaskets, cadmium-plated steel mounting bolts and nuts.

.2 Aluminum wheel with motor isolated from airstream, TEFC type.

2.5 IN-LINE CENTRIFUGAL FANS

.1 Reinforced phosphate zinc-plated steel and galvanized steel structural spacing panels.

.2 Housing to be made of removable panels to permit access to internal parts.

.3 Fan wheel:

.1 Aluminium construction.

.2 Maximum speed designed to operate at no more than 40% of first critical speed.

.3 Backward inclined blades.

.4 Venturi type inlet.

.5 Motors and their belt drives will be located out of airstream to facilitate access and maintenance.

.6 As required, provide fan drive with sealed bearings with a minimum certified life of 200 000 h in accordance with AFBMA L-50.

.7 Factory mounted motors.

2.6 FIBERGLASS REINFORCED PLASTIC (FRP) CENTRIFUGAL FANS

.1 Fan housing:

.1 Outlet side guide vanes for increased efficiency.

.2 Dynamically balanced to reduce vibrations to 0.5 mil, crest to crest, to frequency of blades during operation to frequency of fan. Required vibration isolators will be limited to neoprene waffle plates.

.3 Assembly designed for direct mounting on conventional roof curb without need for guide wires.

.4 Non-ferrous metal discharge bell section to prevent sparking in case of motor winding breakdown.

.5 Fans are to be modular units for possible on-site assembly.

.6 PTFE connections to be provided for all twin flanges.

.7 Fastening bolts are to be made of SS316.

.8 A bolted access door for inspection of wheel is to be provided for each fan.

.9 Fan and accessories to be equipped with a drain at low point to eliminate condensation.

.10 TEFC Premium Efficiency electric motor with 1.15 service factor L-50 bearing type with 200 000-hour service life. Motors to have sealed bearing housings up to NEMA 256T. High-efficiency type with 5-year extended warranty. See description in Section 00 10 00 – General Instructions.

.11 NEMA 3R fuseless disconnect switch to be provided, installed on fan and connected to motor.

.12 Weather-proof motor hood (FRP) providing complete access.

.13 Corrosion resistant coating: all steel and aluminum parts to be treated by sanding or acid to be treated with corrosion resistant coating. Coating to be epoxy (4-5 mils) to provide protection against weather conditions, chemical fumes and chemical splashes.

.14 Anti-static graphite interior lining.

.15 Flexible connection on fan inlet: chlorobutyl elastomer for continuous service at 82ºC able to withstand ±34 kPa (±5 lb./in^2 man.) without leaks or distortion.

.1 Required quality: Technequip Maxi-Spour, model 1095 series 3000.

.16 SS316 lifting lugs and hardware.

.17 Spring-action insulated rail.

.18 Grounding lug.

Part 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 FAN INSTALLATION

.1 Install fans as indicated, complete with resilient mountings specified in Section 23 05 48 – Vibration and Seismic Control for HVAC and Piping Equipment, flexible electrical leads and flexible connections in accordance with Section 23 33 00 – Air Duct Accessories.

.2 Install flexible connections on fan inlet and discharge ductwork. Ensure metal bands of connectors are parallel with minimum flex between ductwork and fan while running. Flexible connections must not be under tension when fan is operating.

.3 Provide sheaves and belts required for final air balance.

.4 Bearings and extension tubes to be easily accessible.

.5 Access doors and access panels to be easily accessible.

3.3 ANCHOR BOLTS AND MOUNTING TEMPLATES

.1 Properly sized anchor bolts are to be used to seismically restrain (speed and acceleration) the units as specified in the section.

3.4 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes

.1 Variable air volume units, constant air volume bypass units, mixing units with fan, and electronic mixing units.

.2 Related Sections

.1 The requirements of Section 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are an integral part of this section.

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section & Fire Instructions.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI/AMCA 210-1999, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

.2 ANSI/NFPA 90A-2002, Standard for the Installation of Air Conditioning and Ventilating Systems.

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

.1 Material Safety Data Sheets (MSDS).

.3 International Organization of Standardization (ISO)

.1 ISO 3741-2001, Acoustics – Determination of Sound Power Levels of Noise Sources Using Sound Pressure – Precision Methods for Reverberation Rooms.

.4 Underwriters' Laboratories (UL)

.1 UL 181-2003, Factory-Made Air Ducts and Air Connectors.

1.3 RESPONSIBILITIES

.1 The Ventilation Contractor is the person ultimately in charge of providing, coordinating and installing air terminal units.

.2 The Division 25 Contractor is the only person in charge of coordination for the design of signals between PLCs and air terminal units. The Division 25 Contractor must also coordinate his work with that of the Division 25 Ventilation Contractor for installation of these units.

1.4 SYSTEM DESCRIPTION

.1 Performance Requirements

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency recognized by the ADC (Air Diffusion Council), signifying adherence to codes and standards in force.

1.5 SUBMITTALS

.1 Product Data

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.1 Submit two (2) copies of Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS) in accordance with Section 00 10 00 – General Instructions.

.2 Test Data: to ANSI/AMCA 210.

.1 Submit published test data on DIN (Direct Internal Noise), in accordance with ISO 3741 made by independent testing agency for 0, 2.5 and 6 m/s branch velocity or inlet velocity.

.2 Sound power level with minimum inlet pressure of 1 kPa in accordance with ISO 3741 for 2nd through 7th octave band, also made by independent testing agency.

.3 Pressure loss through silencer shall not exceed 60% of inlet velocity pressure maximum.

.2 Shop Drawings

.1 Submit shop drawings and product data in accordance with Section 00 10 00 – General Instructions.

.2 Indicate the following:

.1 capacity;

.2 pressure drop;

.3 noise rating;

.4 leakage.

.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 NRC Representative to make available one (1) copy of installation instructions prepared by the system supplier to intended personnel.

.4 Closeout Submittals:

.1 Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.6 UNIT FABRICATION

.1 The manufacturer of the unit must have been involved in the design and fabrication of air terminal units for more than ten (10) years. Strict adherence to dimensions and capacities to be respected, and deviation from specifications to be approved by NRC Representative ten (10) days prior to project bid, with no modifications to be taken into consideration following that date.

1.7 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handing and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.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 and recycling in accordance with Section 00 10 00 – General Instructions.

1.9 MAINTENANCE

.1 Extra Materials

.1 Provide maintenance materials in accordance with Section 00 10 00 – General Instructions.

.2 Furnish:

.1 List of individual manufacturer's recommended spare parts for equipment, including bearings and seals.

.2 Address of suppliers.

.3 List of specialized tools necessary for adjusting, repairing or replacing.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Air terminal units of the same type and product of one manufacturer.

2.2 GENERAL

.1 A terminal unit to include the following:

.1 Single Duct Terminal Units

.1 An airflow unit (variable or constant, as required), electronic digital controller, dampers and flow sensor for single duct terminal units, terminal reheat coil (if required) and sound attenuator. Assemblies must be pressure independent type.

.2 The Contractor responsible for work described in this section must seal all joints and penetration points on the coil and attenuator.

.3 Each terminal unit, coil and sound attenuator must be furnished with flanges minimum 14 gauge, pre-pierced, with neoprene gasket seal for connection to duct system.

.4 Provide an access door in compliance with the description of Section 23 05 00 – Common Work Results for HVAC, upstream of coil.

.5 Attenuators:

.1 Provide and install, as indicated, a factory-mounted sound attenuator made of galvanized steel, 0.853 mm (22 gauge) thick, suitable for air ducts specified in other sections and in accordance with requirements of ASHRAE and SMACNA.

.2 Acoustic quality, glass fibre, free of shot and odour; bacteria and fungus resistant; free of corrosion causing or accelerating agents; packed to minimum density of 10 to meet performance requirements; and meet NBC requirements concerning air duct liners.

.3 Outer casing and galvanized steel inner casing with clean-cut circular perforations to enclose acoustic media.

.4 Protect media from erosion (disintegration or friction wear) and humidity with Tedlar placed between the perforated metal casing and attenuating material.

.6 Fabricated assembly to be delivered to the site with the following characteristics:

.1 Pressure loss through terminal units must not exceed 125 Pa water column from one flange to another.

.2 Terminal unit length must be such that it may be installed at any location on the duct network without affecting air terminal unit performance. Any distance

required upstream or downstream of the VAV unit must be included for precision purposes.

.3 Provide all necessary supports.

.4 Models and capacities as indicated on schedule.

2.3 ELECTRONICALLY-CONTROLLED VARIABLE AIR VOLUME UNITS

.1 General:

.1 Casing to be constructed of 0.853 mm galvanized steel (22 gauge).

.2 Panels will be sealed using clear silicone to form airtight casing. Rate of loss through the unit casing must not exceed 1% of nominal flow when subjected to a pressure of 3 in.H_2O at inlet, and 0 in. H_2O at outlet.

.3 Units must be configured (NC or NO) as indicated on drawings and/or in specifications.

.4 Unit control range must be at least 6 to 1 (minimum set point versus maximum set point).

.5 Only the unit's minimum and maximum nominal flows may be factory calibrated. The project's specific minimum and maximum values must be calibrated on site by the contractor of Section 23 05 94 – Testing, Adjusting and Balancing for HVAC.

.6 All moving parts shall use a ring type assembly.

.7 Unit performance must be in compliance with the standards of ARI-ADC Industry 880-98, ANSI/ASHRAE Standard 130-1996 and as per tests performed in an ADC-certified laboratory.

.8 Each VAV unit must be equipped with a nameplate installed on the outside of the casing, with the following information listed: minimum and maximum capacity, and parts identification for unit and system.

.9 Each VAV unit to be insulated with fibrous glass 24 kg/m^3 density and 13 mm thick, with 0.853 mm (22 gauge) internally-lined galvanized steel. Internal insulation flame spread rating up to 25 and smoke development rating of 50. All perimeters of penetrations must be sealed. Fibrous glass insulation to respect the following standards: NFPA 90A, UL181 (Air Erosion), UL181 (Mold Growth & Humidity), UL723 (25/50) (Flame & Smoke), ASTM E84 (25/50) (Flame & Smoke), ASTM C 665 (Fungi Resistance), ASTM C 1071 (Physical Properties).

.10 Dimensions and capacity: as indicated.

2.4 CONTROLS

.1 Direct Digital Control – DDC (pressure independent):

.1 Air terminal units will be delivered to the site with pressure independent digital controls provided by the Control Contractor and factory-installed by the manufacturer. The Control Contractor must, in addition to providing controls to the Air Terminal Unit Manufacturer, provide technical data on all components including dimensions, mounting accessories and electrical diagrams for each terminal unit that appears on the schedule and mechanical drawings.

.2 Each specialized air terminal unit is controlled by an air terminal control assembly by the Division 25 Contractor.

.3 The unit actuator must be the same make as the air terminal unit (refer to Division 25 for specifications on actuators).

2.5 FLOW CHARACTERISTICS

.1 Maximum flow of each terminal unit not to exceed 80% of maximum specified by manufacturer.

2.6 ACOUSTICS

.1 Integrated sound attenuating sections described in this section must be in strict compliance with the requirements of Section 23 32 48 – Acoustical Air Plenums.

.2 Sound attenuators to eliminate noise generated by terminal units to produce the following results:

	RC (N)
2.1 Offices	40

Part 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 terminal units in accordance with manufacturer's instructions.

.2 Coordinate VAV unit installation with Balancing Subcontractor.

.3 Provide complete instructions with regard to calibration to the contractor of Section 23 05 94 – Testing, Adjusting and Balancing for HVAC in order that he may perform work described in his section. Provide supervision for follow-up of methods explained.

.4 All air terminal units must be delivered to the site with their ends covered to avoid accumulation of dust within the units. Any unit found not to comply with this requirement will be returned to the Subcontractor at his cost, or must be cleaned on site.

.5 Support independently of ductwork.

.6 Install flexible ducting directly upstream of each air terminal unit at least 1,000 mm long and a straight inlet duct minimum of four (4) duct diameters, same size as inlet.

.7 Locate terminal units so that controls, dampers and access panels are easily accessible.

.8 Duct liners must be intact, without tears or rips during installation of VAV units. Perform all necessary repairs or replace damaged liners.

3.3 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes

.1 Air supply, intake and exhaust grilles and registers, linear diffusers and grilles, domestic and commercial types.

.2 Related Sections

.1 The requirements of Section 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are integral parts of this section.

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section & Fire Instructions.

1.2 SYSTEM DESCRIPTION

.1 Performance Requirements

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards in force.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.1 Submit two (2) copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section & Fire Instructions.

.2 Product data must specify:

.1 capacity;

.2 throw and terminal velocity;

.3 noise criteria;

.4 pressure drop;

.5 neck velocity.

.2 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.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 NRC Representative to make available one (1) copy of installation instructions prepared by the system supplier to intended personnel.

1.4 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading

.1 Deliver, store and handle materials in accordance with Section 00 10 00 – General Instructions.

.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 and recycling in accordance with Section 00 10 00 – General Instructions.

1.6 RELIABILITY OF TECHNICAL DATA

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards in force.

1.7 MAINTENANCE

.1 Extra materials:

.1 Provide maintenance materials in accordance with Section 00 10 00 – General Instructions.

.2 Provide the following:

.1 keys for volume control adjustment;

.2 keys for air flow pattern adjustment.

Part 2 Products

2.1 GENERAL

.1 To meet capacity, pressure drop, terminal velocity, throw, noise level, and neck velocity as indicated.

.2 Grilles, registers and diffusers passing through fire-rated partitions to be equipped with steel sleeves secured to frame in accordance with NFPA 90A.

2.2 GRILLES AND DIFFUSERS

.1 Frames

.1 Standard steel frame with welded visible seams and flared joints.

.2 Aluminium or galv-alum frame with mechanical fasteners and mitered joints.

.3 Full perimeter gaskets.

.4 Plaster frames where set into plaster or gypsum board partition or wall.

.5 Mounting frame: coating as specified for frames.

.6 Concealed fasteners.

.7 Concealed manual volume control damper operators.

.8 Specific dimensions, volumes and characteristics: as indicated on tables within drawings.

.2 Colour as per architect’s instructions.

.3 Acceptable products: E.H. Price Ltd; Titus; Nailor.

2.3 MANUFACTURED UNITS

.1 Grilles, registers and diffusers of same generic type to be product of one manufacturer.

Part 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 grilles, registers and diffusers in accordance with manufacturer’s instructions.

.2 Provide and install all angle irons and steel fasteners necessary so that the weight of type ‘C’ and ‘L’ grilles and diffusers is not supported by the ceiling.

.3 Install with flat-head screws in countersunk holes where fastenings are visible.

.4 Plan for all additional connections, transitional elements and suspended T ceilings necessary for installation and connection of grilles and diffusers. Connections to be both robust and sealtight.

.5 Coordinate the installation of grilles and diffusers with the work of other subtrades, in particular those involved in architectural finishes and sealing details.

3.3 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Filters and filter gauges for various types of mechanical air handling equipment.

.2 Related Sections:

.1 The requirements of sections 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are an integral part of this section.

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section & Fire Instructions.

1.2 REFERENCES

.1 American National Standards Institute/National Fire Prevention Association (ANSI/NFPA).

.1 ANSI/NFPA 96-04, Ventilation Control and Fire Protection of Commercial Cooking Operations.

.2 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE).

.1 ASHRAE 52.1-1992, Gravimetric and Dust Spot for Testing Air-Cleaning Devices Used in Ventilation for Removing Particulate Matter (ANSI Approved).

.3 Canadian General Standards Board (CGSB):

.1 CAN/CGSB-115.10, Disposable Air Filters for the Removal of Particulate Matter from Ventilating Systems.

.2 CAN/CGSB-115.11, Filters, Air, High Efficiency, Disposable, Bag Type.

.3 CAN/CGSB-115.12, Filters, Air, Medium Efficiency, Disposable, Bag Type.

.4 CAN/CGSB-115.13, Filter Media, Automatic Roll.

.5 CAN/CGSB-115.14, High Efficiency Cartridge Type Supported Air Filters for the Removal of Particulate Matter from Ventilating Systems.

.6 CAN/CGSB-115.15, High Efficiency Rigid Type Air Filters for Removal of Particulate Matter from Ventilating Systems.

.7 CAN/CGSB-115.16, Activated Carbon for Odor Removal from Ventilating Systems.

.8 CAN/CGSB-115.18, Filter, Air, Extended Area Panel Type, Medium Efficiency.

.9 CAN/CGSB-115.20, Polarized Media Air Filter.

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

.1 Material Safety Data Sheets (MSDS).

.5 Underwriters' Laboratories of Canada (ULC)

.1 ULC-S111, Standard Method of Fire Tests for Air Filter Units.

.2 ULC-S649, Exhaust Hoods and Related Controls for Commercial and Institutional Kitchens.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.1 Submit two (2) copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section & Fire Instructions.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 00 10 00 – General Instructions.

.3 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.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 NRC Representative to make available one (1) copy of installation instructions prepared by the system supplier to intended personnel.

.4 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.4 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions..

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.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 and recycling in accordance with Section 00 10 00 – General Instructions.

1.6 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 00 10 00 – General Instructions.

.2 Furnish list of individual manufacturer’s recommended spare parts for equipment such as frames and filters, addresses of suppliers, list of specialized tools necessary for adjusting, repairing or replacing for inclusion in operating manual.

.3 Spare filters: in addition to filters installed immediately prior to acceptance by NRC Representative, supply one (1) complete set of filters for each filter unit or filter bank in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 GENERAL

.1 Media: suitable for air at 100% RH and air temperatures between -40 and 50ºC.

.2 Number of units, size as recommended by manufacturer and thickness of panels, overall dimensions of filter bank, configuration and capacity: as indicated.

.3 Pressure drop when clean and dirty, sizes and thickness: as indicated on schedule.

2.2 HOLDING FRAME

.1 Frames: Filter housing shall be constructed of minimum 16-gauge SS304, rigid "T" section, with sealing gaskets between frames and internal walls and fastener attachments to keep filters in place.

.2 Frames must be secured to filter pack and adequately reinforced to additional galvanized steel components as necessary. Filter fastener attachments must be made of stainless steel.

.3 Oversized copper differential pressure orifice plate.

.4 Seals: to ensure leakproof operation.

2.3 ACCESSORIES

.1 Blank-off plates: as required, to fit all openings and of same material as holding frames.

.2 Factory-installed gauge, Dwyer Magnehelic series 2000, accuracy within ±2%, capacity two times maximum filter pressure drop.

.3 Access and servicing: through doors/panels on each side and/or from upstream face of filter bank.

2.4 CARTRIDGE TYPE FILTERS, 30–35% EFFICIENCY

.1 Media: pre-moulded fibrous glass, disposable, synthetic material cartridge.

.2 Holding frame: galvanized steel with bracing.

.3 Media support: welded wire grid.

.4 Performance

.1 Average atmospheric dust spot efficiency to ASHRAE 52.1.

.2 Average dust holding capacity to ASHRAE 52.1.

.5 Fire rated: to ULC-S111.

2.5 POCKET FILTERS, RIGID TYPE, 30–35% EFFICIENCY

.1 Filter bank installation.

.2 Extended surface double pocket disposable filters, composed of self-supporting synthetic fibre treated with flame retardant with 9 gauge internal wire grid. Filters to be equipped with mechanically incorporated antimicrobial agent to prevent growth of mould, algae, moisture and bacteria. Filters using spray-on antimicrobial agent after manufacturing are not acceptable. Cells to be formed using hot melt process.

.3 Filters to be UL listed, Class III and in accordance with ASHRAE 52.2-1999, MERV-8.

.4 Dimensions: in accordance with filter schedule.

2.6 CARTRIDGE TYPE FILTERS, 80–85% EFFICIENCY

.1 Media: deep pleated, disposable, high efficiency, to CAN/CGSB-115.14.

.2 Holding frame: galvanized steel with bracing.

.3 Media support: welded wire grid.

.4 Performance: average atmospheric dust spot efficiency to ASHRAE 52.1.

.5 Fire rated: to ULC -S111.

2.7 POCKET FILTERS, 80–85% EFFICIENCY

.1 Media: ultrafine fibrous glass particles, expandable, disposable pocket type.

.1 High efficiency, as per CAN/CGSB-115.11.

.2 Medium efficiency, as per CAN/CGSB-115.12.

.2 Holding frame: galvanized steel.

.3 Media support: welded galvanized steel.

2.8 CARTRIDGE TYPE FILTERS, 90–95% EFFICIENCY

.1 Filter bank installation.

.1 Ultrafine media disposable type air filter, V-bank design with 1-in. mini-pleated fiberglass structure. Bi-directional filter design allows airflow in either direction. Filter frame assembly to include borders, bed, channels and enclosing frame made of moulded plastic (ABS). High-efficiency media packs shall be bonded to the inside periphery of enclosing frame at extrusions and plastic channels. 95% efficiency minimum, based on test ASHRAE 52.2-1999, MERV-14. Combustion rating: class 2 UL listed.

.2 Dimensions: 24 in. x 24 in. (610 x 610 mm) and 12 in. x 24 in. (305 x 610 mm). Depth not to exceed 11.50 in. (292 mm).

2.9 CARTRIDGE TYPE FILTERS, 95% EFFICIENCY

.1 Media: disposable, high efficiency, to CAN/CGSB-115.15.

.2 Holding frame: galvanized steel with bracing.

.3 Media support: welded wire grid.

.4 Performance: average atmospheric dust spot efficiency to ASHRAE 52.1.

.5 Fire rated: to ULC -S111.

Part 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 - GENERAL

.1 Install in accordance with manufacturer's recommendations and with adequate space for access, maintenance and replacement.

3.3 REPLACEMENT MEDIA

.1 Replace all media with new upon acceptance.

.2 Filter media to be new and clean, as indicated by pressure gauge, at time of acceptance.

3.4 FILTER GAUGES

.1 Install filter gauge type as indicated across each filter bank (pre-filter and final filter) in approved and easily readable location.

.2 Mark each filter gauge with value of pressure drop for clean condition and manufacturer's recommended replacement (dirty) value.

3.5 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 The requirements of sections 21 05 01 – Common Work Results for Mechanical and 23 05 00 – Common Work Results for HVAC are an integral part of this section.

.2 Section 00 10 00 – General Instructions.

.3 Section 00 15 45 – General Safety Section & Fire Instructions.

1.2 REFERENCES

.1 Definitions:

.1 Catalogued or published ratings: ratings obtained from tests carried out by manufacturer or manufacturer's designated independent testing agency which signify adherence to codes and standards in force.

.2 Reference Standards:

.1 American National Standards Institute/National Fire Prevention Association (ANSI/NFPA)

.1 ANSI/NFPA-90A-2009, Standard for the Installation of Air Conditioning and Ventilating Systems.

.2 ANSI/AMCA Standard 210-07, Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating.

.2 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

.1 ANSI/ASHRAE 90.1-2007, (I-P) Energy Standard for Buildings Except Low-Rise Residential Buildings.

.2 ANSI/ASHRAE 52.2-2007, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

.3 ANSI/ASHRAE 52, Gravimetric and Dust Spot Procedures for Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter.

.4 ASHRAE / ANSI Standard 111: Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems.

.3 Air Conditioning and Refrigeration Institute (AHRI)

.1 AHRI Standard 410: Forced-Circulation Air-Cooling and Air-Heating Coil.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.5 Master Painters Institute (MPI)

.1 MPI-INT 5.3-2007, Galvanized Metal.

.6 Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA)

.7 IEEE 112-B: Standard Test Procedures for Polyphase Induction Motors and Generators.

.8 NEMA MG-1: National Electrical Manufacturers Association Motor Standards.

.9 ASTM A-525: Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

1.3 SCOPE OF WORK

.1 Design, fabricate, factory assemble, transport and supervise installation of the required air handling units according to the specific requirements of this section.

.2 Field fabrication of units and their components will not be accepted. Only final assembly of AHU modules shall be done on site.

.3 Dimensions of AHUs must not exceed the dimensions available along the route for their final installation in the building.

.4 Air handling unit shall be fully tested for air leakage before shipping by the manufacturer of the unit. Field tests to be performed on site once the unit is assembled and connected to ductwork.

.5 Once shop-inspected, unit modules shall be crated, when required, in a number of sections to suit transportation regulations and special existing site conditions for handling and assembling.

.6 Manufacturer is responsible for any their equipment purchased until delivery on site.

.7 Subcontractor is responsible for receiving, hoisting, handling, installing, assembling and connecting ductwork on site.

.8 A representative of each manufacturer to assist and supervise the Ventilation Subcontractor when unloading and handling each module of the air handling units that he has supplied up to their final location installation and assembly of the units.

.9 Subcontractor to fully field test air handling units for leakage. Excessive leakage to be corrected.

.10 All components required for assembly and sealing of modules must be provided with assembly drawings.

.11 Further to assembly, Contractor to start up air handling unit with the assistance of the Manufacturer.

.12 Each manufacturer to re-align on site each fan driving assembly (pulleys and belt drives) before any start-up of air handling units. Manufacturer to also perform vibration signature testing for each fan and motor once each AHU is ready for start-up.

.13 Subcontractor to repaint scratches and repair all damages on the air handling unit and their components after their complete installation in the field.

.14 Provide training for operating and maintenance personnel identified by NRC Representative (plan for a 4-hour training session for each type of air handling unit).

.15 Standard of acceptance: Ingenia or approved equivalent.

1.4 SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for following and include product characteristics, performance criteria, physical size, finish and limitations:

.1 Overall construction.

.2 Dimensions.

.3 Component configuration.

.4 Coil data – size, EAT, LAT, EWT, LWT, airflow, water flow, air velocity, water velocity, air friction, water pressure drop.

.5 Filters and pre-filters (dimensions, velocities, initial and final pressure drops).

.6 Filter support data.

.7 Access doors.

.8 Motorized dampers.

.9 Materials of construction.

.10 Insulation.

.11 Paint.

.12 Cross-section details of typical wall, floor and roof construction.

.13 Component equipment data as detailed in component specification section.

.14 Details of coil supports and coil banks.

.15 Piping connection sizes and approximate locations.

.16 Doors and windows.

.17 Drain pan details.

.18 Operating and maintenance data.

.19 Indications of all split points in shop drawings.

.3 Shop Drawings:

.1 Indicate following:

.1 Actual cooling and heating air and fluid entering and leaving operating conditions for stated air side requirements.

.2 Fan data.

.3 Unit and component performance data.

.4 Wiring diagrams.

.5 Sound data.

.1 Sound analysis consisting of inlet, outlet and radiated sound power levels per unit.

.6 Important construction details and dimensions.

1.5 QUALITY ASSURANCE

.1 Certification of Ratings:

.1 Catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

1.6 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

.2 Furnish list of individual manufacturer recommended spare parts for equipment such as bearings and seals, and addresses of suppliers, together with list of specialized tools necessary for adjusting, repairing or replacing, for incorporation into operating manual.

1.7 HEALTH AND SAFETY

.1 Complete construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section & Fire Instructions.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials in accordance with Section 00 10 00 – General Instructions.

1.9 WARRANTY

.1 The Manufacturer shall furnish the following in writing:

.1 An unconditional warranty of all equipment, materials, and workmanship for a period of one (1) year from the date of acceptance by the NRC Representative.

.2 During the warranty period, the Manufacturer shall provide all labour and materials necessary to repair or replace, at his own expense and without any additional cost, any defective material, equipment or workmanship.

.3 For the warranty period, the Manufacturer may enter into an agreement with the Contractor to provide the labour to Manufacturer as needed.

Part 2 Products - Air handling Unit (AHU-04)

2.1 GENERAL

.1 Field or factory-assembled components to form units supplying air at design conditions as indicated. Air handling unit must be provided as "knock-down" corresponding to the physical limitations on site. All sections shall be able to fit though a standard 2100 x 810 door.

2.2 PERFORMANCE

.1 Provide factory fabricated air handling units having overall dimensions as shown on the construction plans. Physical dimensions and unit arrangement are critical for equipment layout and must be as shown on the drawings.

.2 Refer to the air handler schedules to determine the performance of all internal components: Fans, coils, filters, humidifiers, acoustical performance, etc.

.3 The indicated total static pressure for each fan must be equal to the sum of the external static and the internal static, including all internal system effects.

.4 The fan performance characteristics must be based on the actual elevation and operating temperature.

.5 All deviations from the specification must be clearly indicated on the submittal drawings. The contractor shall be held responsible for all additional expenses associated with the substitution of the specified product.

2.3 RATINGS

.1 Catalogued or published ratings shall be those obtained from tests carried out by Manufacturer or those ordered by him from an independent testing agency signifying adherence to codes and standards in force.

2.4 FANS

.1 In accordance with Section 23 34 00 – HVAC Fans.

2.5 CASING

.1 General

.1 Factory-manufactured galvanized steel casing thickness as indicated, reinforced and braced for rigidity and flanged for bolted sub-assemblies, to withstand a pressure differential as indicated.

.2 Unit internal insulation must have a flame spread rating not over 25 and smoke developed rating no higher than 50 complying with NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."

.3 Provide walk-in access doors to allow access to internal parts.

.1 Walk-in access doors: insulated sandwich panel construction of same material and thickness as casing, of sizes as indicated and complete with three (3) hinges, two-way latches, neoprene gaskets and 300 x 300 mm Georgian wire glass ports as indicated. Hinge doors to open against air pressure complete with hold-open devices**;** a two-stage door-opening prevention device is considered to be an acceptable alternative.

.4 Paint over steel, where steel is not galvanized, or where galvanized steel sheet is cut, with corrosion-resistant paint to MPI-INT 5.3A CAN/CGSB 1.181.

.1 Finish inside and out, over prime coat, with enamel paint to Section 09 91 23 – Interior Painting.

.2 Primer: maximum VOC limit 250 g/L to Standard GS-11 and SCAQMD Rule 1113.

.3 Enamel finish: maximum VOC limit 250 g/L to Standard GS-11 and SCAQMD Rule 1113.

.2 Unit Base / Floor / Frame Work:

.1 AHU unit must be equipped with a structural perimeter made of G90 galvanized steel HSS members. Cross members are to be anticipated at regular intervals to provide rigidity to floor and support weight of heavy equipment within the unit. The perimeter must be minimum 6.0'' (152 mm) high and maximum permissible deflection less than 1/200.

.2 The floor must be filled with 3" (76 mm) thick insulation with a hydrophobic polyurethane base having a nominal thermal resistance of R-6.5 per inch thickness.

.3 The unit base assembly is coated with a second epoxy primer coat and painted with polyurethane paint. The completed unit base coating must be able to sustain salt spray testing of 1,000 hours, per ASTM 117B.

.4 The "double bottom" base features a 75 mm thick insulated walk-on floor as specified below. Each unit must be equipped with removable lifting plates having a maximum of 10 ft (3,000 mm) centre-to-centre spacing.

.5 The floor's visible internal surface must be "checkered plate" type and made of 11-ga aluminium or 304 stainless steel. Floor seam shall be sealed to create leak-free joints. The perimeter of the unit consists of a 38-mm upturned perimeter lip to create a drainable floor. The under-floor liner shall be 22-Ga, G-90 galvanized steel and recessed nominal 12.7 mm to allow for air circulation under the unit floor. The entire unit base must be polyurethane foamed in place with a minimum thickness of 75 mm and a minimum R value of 20. Insulation made of rock wool or fibreglass may be accepted as an equivalent if the thicknesses are adjusted to provide equivalent thermal resistance and designed to provide equivalent rigidity.

.3 Wall and ceiling panels:

.1 All panels must have a nominal thickness of 3" (76 mm). Panel interior must be filled with insulation with a hydrophobic polyurethane base having a nominal thermal resistance of R-6.5 per inch thickness.

.2 Insulation made of rock wool or fibreglass may be accepted as an equivalent if the thicknesses are adjusted to provide equivalent thermal resistance and designed to provide equivalent rigidity.

.3 Panel exterior must be made of G90 galvanized steel, 16 Ga.

.4 The units' exterior finish will be pre-painted Bone White (QC-16069) with granular finish. Each panel must be individually powder coated using electrostatic spray process and oven baked. Coating must be able to sustain salt spray testing of 1,000 hours, per ASTM B117.

.5 Panel interior must be solid and made of 22-Ga stainless steel. Internal surfaces must be completely washed with isopropyl alcohol before packaging.

.6 As an alternative, the inner wall may be made of pre-painted galvanized steel with a smooth white coating incorporating an antibacterial agent. For this alternative, each panel must be individually powder coated with electrostatic spray process and oven baked. Coating must be able to sustain salt spray testing of 1,000 hours, per ASTM B117.

.7 All individual panels to be easily removable and concealed hardware must not prevent panels from being removed.

.8 All joints must be sealed using FDA-approved caulking bead to create an easily cleanable and smooth interior finish and prevent dust build-up.

.9 Casing shall incorporate insulating thermal breaks as required so that, when fully assembled, there is no path of continuous unbroken metal to metal conduction from inner to outer surfaces.

.10 Units shall entirely be made of double wall construction. Single wall construction with coated insulation is not acceptable. Exposed insulation edges in the air stream are not acceptable.

.11 Provide duplex receptacles and vapour-tight marine lights complete with gaskets and cast aluminum guards in each section in accordance with Division 26.

.12 Cut and frame openings or panel penetrations greater than 150 mm (diameter or length and width) at factory. Openings or penetrations less than 150 mm (pipe, conduit and instrument holes) may be field cut. Manufacturer to provide filler sheets between equipment and casing.

2.6 COILS

.1 General:

.1 Coil frame must be made of 16-gauge stainless steel.

.2 Maximum tube length: 3.6 m unless specified otherwise.

.3 Factory tested with air under water.

.4 Coils shall be AHRI certified.

.2 Capacities: as indicated.

.3 Ratings: Submit with shop drawings actual cooling and heating fluid entering and leaving conditions for stated air side requirements.

.4 Do not use removable headers at working gauge pressures above 0.7 MPa.

.1 Unless otherwise indicated, dehumidifying coils rated for 2.0 ~~5~~ m/s face velocity.

.2 Unless otherwise indicated, preheat coils rated for less than 3.0 ~~5~~ m/s.

.3 Water velocity: at least 1.2 m/s. For velocity between 0.6 m/s and 1.2 m/s, turbulators may be used if manufacturer’s standard practice.

.5 "WC" cooling and heating coils

.1 Primary Tube Surface

.1 Round seamless 15.9 mm O.D. copper tubes with 0.889 mm wall thickness mechanically expanded into fin collars of the secondary surface. Tubes shall be mechanically expanded to provide a permanent metal-to-metal bond for efficient heat transfer. Manufacturer may only use staggered tubes in direction of airflow and only return bends; reduced tube wall hairpin bends are not acceptable.

.2 Fins

.1 Die-formed 0.241 mm thick aluminum fins with full drawing fin collars to provide maximum tube contact. Maximum 120 fins per 254 mm.

.3 Headers

.1 Seamless copper with die-formed holes to provide a parallel surface to the coil tube for strong brazing joints. Header is supplied with 3.175 mm dia. brass female pipe thread (FPT) vents and drains. All circuiting is designed to gravity-drain.

.4 Casing

.1 Minimum 16-ga. G-90 galvanized steel (stainless steel for coils in cooling mode) with 38-mm die-formed flanges to permit easy stacking and mounting. Intermediate tube supports are supplied on coils over 1,118 mm fin length with additional supports every 1,067 mm multiple thereafter.

.5 Testing and Performance

.1 Each coil must undergo hydrostatic testing at 1,725 kPa (250 psig) and be able to withstand continuous pressure at 1,375 kPa (200 psig) and a service temperature of 220°F (105°C).

.2 The heating and/or cooling coils-must be certified under AHRI Standard 410 and bear the AHRI label. Coils exceeding the scope of the manufacturer's certification and/or the range of AHRI's standard rating conditions will be considered provided the coil selections are generated using the manufacturer's software; software must be AHRI certified.

2.7 DRAIN PANS

.1 Construction: 304 stainless steel.

.2 Drain connection: in bottom at low point.

.3 All drain pan corners shall be welded.

.4 Installation: slope at least 2% in two (2) directions to ensure no standing water.

.5 Dimensions: minimum 75 mm from upstream face of coil to 150 mm beyond downstream face of coil or eliminator and to include all return bends and headers.

.6 Comes with removable panel on the side of the air handling unit for coil removal. Side of the panel and removable coil to be determined by the subcontractor (see drawings).

2.8 DIRECT DRIVE MULTIPLE FAN ARRAY (FAN WALL TYPE)

.1 All fans within the fan matrix must have an AF wheel in compliance with the fan schedule.

.2 The array shall consist of multiple, direct driven, arrangement 4 plenum fans spaced in the air way tunnel cross section to provide a uniform air flow and velocity profile across the entire air way tunnel cross section and components contained therein. The array shall be constructed per AMCA requirements for the duty specified, (Class I, II, or III). All fans shall be selected to deliver design air flow at the specified operating TSP at the specified motor speed array shall be selected to operate at a system Total Static Pressure that does not exceed 90% of the specified fan's peak static pressure producing capability at the specified fan speed.

.3 Fan array shall consist of multiple fan and motor "cubes", spaced in the airway tunnel cross-section to provide a uniform airflow and velocity profile across the entire airway tunnel cross-section and components contained therein. Each fan/motor assembly shall be removable through section's access door opening.

.4 Wire sizing shall be determined and installed in accordance with applicable NEC Standards and UL508A and also to the local specific code. Each fan cube shall be wired individually to the control panel.

.5 The array shall be provided with a Coplanar Silencer for sound absorption. The Coplanar Silencers will reduce the fan discharge sound power levels. Unless otherwise specified, the acoustical silencers shall reduce the bare fan discharge sound power levels by a minimum of 15 db, re 10-12 watts with center frequencies of 125, 250, 500, 1,000, 2,000, 4,000, and 8,000 HZ when compared to the same unit design without the silencers.

.6 All motors shall be IEEE inverter duty, premium efficiency TEFC T-frame motors selected at the specified operating voltage, RPM, and efficiency as specified or scheduled elsewhere. All motors shall include isolated bearings or shaft grounding. All motors shall be provided with an AEGIS bearing protection ring to prevent Electrical Discharge Machining (EDM) damage to the motor bearings.

.7 Each fan/motor "cell" will be provided with an individual vertical back-draft damper with a very low air pressure drop.

2.9 ELECTRICITY AND CONTROLS

.1 To avoid having to make holes in panels on site, the Manufacturer must make electrical connections for motors and flow sensors in factory. Wires from each motor and flow sensor will be via rigid galvanized steel conduits with EMT type ends up to the external panel where a terminal is anticipated for each motor. Anticipate sleeved openings for each of the control devices (sensors, actuators, etc.) to be connected to the units in coordination with Division 25; see AHU control drawings for specific points.

.2 All components and wiring shall be identified using printed self-adhesive labels, consistent with the numbering used in the wiring diagrams.

.3 As required by system design, provide a single variable frequency drive to start and run all motors in the array (when applicable). The variable frequency drive shall be sized accordingly to start and hold all motors in the array. Provide short circuit protection of motor circuits through means of using fuses with fuse blocks or circuit breakers.

.4 The variable frequency drive VFD shall be mounted in a dedicated enclosure for connection to single point power. Variable frequency drive enclosure shall be provided with a main disconnecting means. Provide appropriate cooling of enclosure. VFD s must

meet the specifications of Section 25 30 02 including BACnet MSTP communication protocol.

.5 Motor circuit protectors (MCP) shall be used for each motor in the array.

.6 Motor circuit protectors shall be housed and mounted in the VFD enclosure as required. Motor circuit protectors may be mounted in a remote enclosure that is separate from VFD enclosure if design requires. Variable frequency drive enclosure and remote motor circuit protector enclosure must be mounted at a minimal distance from fan array motors and each other.

.7 At the inverter's outlet, each motor will be individually protected via its own thermal-magnetic circuit breaker (motor circuit protector) for automatic protection against overload, in addition to a manual switch, as needed.

.8 Each thermal-magnetic circuit breaker (MCP) will have a green pilot light in proximity indicating the corresponding fan's operation.

.9 Provide a green pilot light to indicate that inverter is in operation.

.10 Provide a red pilot light to indicate an external fault forcing the inverter to stop.

.11 Provide a red pilot light to indicate an inverter internal fault.

.12 The cabinet will have a hinged access door with locking device on which the inverter touchpad and display will be installed. Buttons, switches and pilot lights will also be installed on this door.

.13 As required by system design, each fan assembly shall be supplied with a complete flow measuring system which indicates airflow in cubic feet per minute. The flow measuring station shall not obstruct the inlet of the fan and shall have no effect on fan performance (flow or static) or sound power levels. A surface-mounted indicator, located on the unit exterior, shall provide a digital CFM readout and a 4-20 ma or 0-10 volt output control signal for use in the BAS as specified elsewhere.

.1 Flow sensor Ebtron GTC108-F/A6 for Fanwall with 6 sensors (1 sensor per fan) for each unit UTA-1 and UTA-2 unit. And flow sensor Ebtron GTC108-E/A8 for Fanwall with 8 probes (2 probes per fan) for the VE-1 unit.

.2 "Flare Mount" mounting type upstream of backdraft damper.

.14 As required by electrical design, when using variable frequency drives provide input line reactors with 3% impedance, mounted separately if not already integrated into the VFD. The EFV must meet the specifications of section 25 30 02 including BACnet MSTP communication protocol.

.15 As required by electrical design, when using variable frequency drives provide output line reactors as required where filtering capacity or distance are problematic. Size the output filters accordingly to manufactures recommendations.

.16 Filter Gauge – Each filter bank shall be furnished with: Magnehelic filter gauge with a 4¾" OD white static pressure dial with black figures and zero pointer adjustment like Dwyer Series 2000 air filter gauge.

2.10 FILTER BOX

.1 Material to match casing complete with flat V cartridge type filter arrangement as indicated. Provide access to filter through hinged door.

.2 Filters: to Section 23 41 00 – HVAC Air Filtration.

.3 Provide blank-off plates to ensure zero bypass around filters.

2.11 VIBRATION ISOLATION

.1 Flexible connections to Section 23 33 00 – Air Duct Accessories.

.2 Vibration isolators on each fan section to Section 23 05 48 – Vibration and Seismic Controls for HVAC Piping and Equipment.

2.12 INSTRUMENT TEST PORTS

.1 16 gauge steel, zinc plated after manufacture.

.2 Cam lock handles with neoprene expansion plug and handle chain.

.3 28.56 mm minimum I.D. Length to suit insulation thickness.

.4 Neoprene mounting gaskets.

.5 Location: in each access door.

.6 Standard of acceptance: Duro Dyne IP1 or IP2.

2.13 ACCESS DOORS

.1 Access doors are constructed with a double wall construction and an extruded aluminum frame. The door frame features a built-in no-through-metal high density resin barrier and a perimeter gasket. Door frames with no thermal break are not acceptable. The door gasket is seamed together at each corner to prevent leakage through the door. Each door must be equipped with at least two stainless steel hinges and two handles (cane type), operable from both the outside and inside. Doors shall open against higher pressure side.

.2 Inspection access panels and doors shall be sized and located to allow periodic maintenance and inspections. Provide access panels and doors in the following locations as shown on drawings.

.3 Dual-paned tempered glass with vacuum seal windows with thermally broken frames shall be supplied as shown on unit drawings. Singled-paned windows with desiccant bag are not acceptable.

2.14 ACCEPTABLE PRODUCTS

.1 Reference product: Venmar.

.2 Others acceptable products: Ingénia, Rosemex.

.3 The design was based on the reference product in performance and footprint; it is the product shown on drawings. If the Contractor is bidding with another acceptable product, this can required to changes (size and location) of equipment's concrete base, conduits and other elements, and additional costs required for these changes do not have to be included in this bid. For an acceptable product requiring adjustment of the arrangement, a change order will be provided to the Contractor by the NRC Representative after he has confirmed his choice of equipment. The Contractor shall confirm his choice as soon as possible, only after contract has been awarded, within 30 days after contract has been awarded in order not to delay the implementation schedule.

PART 2B PRODUCTS - FRESH AIR RECOVERY UNIT (UTAF-1)

2.15 UNIT CONSTRUCTION

.1 Fabricate unit with extruded aluminum channel posts and galvanized panels secured with mechanical fasteners. All access doors shall be sealed with permanently applied bulb-type gasket.

.1 Panels and access doors shall be constructed as 50 mm nominal thickness with injected polyurethane foam insulation. R-value shall be 6.5 per 25 mm of wall thickness. The outer panels shall be constructed of G90 galvanized steel. The inner liner shall be constructed of G90 galvanized steel. Module-to-module assembly shall be accomplished with self-adhering foam gaskets. Manufacturer shall supply test data demonstrating less than 5 mm deflection for an unsupported 1200 x 1200 panel under 750 mm W.C. pressure.

.2 Access doors shall be flush mounted to cabinetry, with minimum of two hinges, locking latch and full size handle assembly.

2.16 SUPPLY / RETURN FANS

.1 Provide direct-drive airfoil plenum fans. Fan assemblies including motors ~~and sheaves~~ shall be dynamically balanced by the manufacturer on all three planes and at all bearing supports. Manufacturer must ensure maximum fan RPM is below the first critical speed.

.2 Bearings shall be self-aligning, grease lubricated, ball or roller bearings with extended copper lubrication lines to access side of unit. Grease fittings shall be attached to the fan base assembly near access door. If not supplied at the factory, contractor shall mount copper lube lines in the field.

.3 Fan and motor shall be mounted internally on a steel base. Provide access to motor, drives and bearings through hinged access door. Fan and motor assembly shall be mounted on rubber-in-shear vibration type isolators inside cabinetry and on 50 mm deflection spring vibration type isolators inside cabinetry.

2.17 BEARINGS AND DRIVES

.1 Bearings: Basic load rating computed in accordance with AFBMA - ANSI Standards, L-50 life at 600,000 hours – all inline fans, heavy duty pillow block type, self-aligning, grease-lubricated ball bearings.

.2 Shafts shall be solid, hot rolled steel, ground and polished, keyed to shaft, and protectively coated with lubricating oil.

2.18 ELECTRICAL

.1 The air handling units shall bear an ETL listing label for the entire assembly. Units with only components bearing third party safety listing are unacceptable.

.2 Wiring Termination: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. All wires shall be number tagged and cross-referenced to the wiring diagram for ease of troubleshooting.

.3 Fan motors shall be 1800 rpm, open drip-proof (ODP) type. Motors shall be premium efficiency.

.4 Supplier shall provide and mount variable speed drive (VFD). It must meet the specifications of Section 25 30 02 including BACnet MSTP communication protocol.

.5 AHU manufacturer shall provide and mount a damper hand-off-auto (HOA) switch.

2.19 COOLING AND HEATING COIL SECTIONS

.1 Provide access to coils from connection side of unit for service and cleaning. Enclose coil headers and return bends fully within unit casing. Unit shall be provided with coil connections that extend a minimum of 5" beyond unit casing for ease of installation. Drain and vent connections shall be provided on exterior of unit casing. Coil connections must be factory sealed with grommets on interior and exterior and gasket sleeve between outer wall and liner where each pipe extends through the unit casing to minimize air leakage and condensation inside panel assembly. If not factory packaged, Contractor must supply all coil connection grommets and sleeves. Coils shall be removable through side top panels of unit without the need to remove and disassemble the entire section from the unit.

.1 Identify fin, tube and casing material type and thickness.

.2 Show coil weights (shipping and operating).

.3 State air and fluid flow amounts with their associated pressure drops. For cooling coils, indicate steam pressure and condensate load.

.4 Indicate entering and leaving air and water temperatures. For cooling coils, indicate temperature at saturated suction.

.5 Certification – Acceptable heating and/or cooling water coils are to be certified in accordance with AHRI Standard 410 and bear the AHRI label. Coils exceeding the scope of the manufacturer's certification and/or the range of AHRI's standard rating conditions will be considered provided the coil selections are generated using the manufacturer's software; software must be AHRI certified.

.6 Headers shall consist of seamless copper tubing to assure compatibility with primary surface. Headers to have intruded tube holes to provide maximum brazing surface for tube to header joint, strength, and inherent flexibility. Header diameter should vary with fluid flow requirements.

.7 Fins shall have a minimum thickness of 0.20 mm aluminium plate construction. Fins shall have full drawn collars to provide a continuous surface cover over the

entire tube for maximum heat transfer. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.

.8 Coil tubes shall be 16mm OD seamless copper, 0.9 mm nominal tube wall thickness, expanded into fins, brazed at joints. Soldered U-bends shall be provided to minimize the effects of erosion and premature failure having a minimum tube wall thickness of 0.9 mm .

2.20 PARTICULATE FILTERS

.1 Filter section with filter racks and guides with hinged and latching access doors on connection side for side loading and removal of filters.

.2 Filter media shall be UL 900 listed.

.3 See Filter Schedule on drawing.

2.21 HUMIDIFIER

.1 The unit must have one section and the required connections to receive the steam distributor from the humidifier, with all required accesses. Openings will be made by the Manufacturer using sleeves to ensure sealtight quality for steam supply and drainage.

2.22 ENERGY RECOVERY

.1 **Dual core energy recovery cassette banks**

.1 Units shall be equipped with dual core energy recovery cassette banks. They shall be 90% efficient (+-5%) in winter and up to 80% in summer. They shall also provide up to 70% latent recovery. Energy recovery devices shall not require frost protection in applications down to -40 degrees. Cores shall be Generation 3, comprised of precisely corrugated high grade aluminum.

.2 Each damper section shall be composed of four (4) multi-section dampers limiting air leakage and operated by electric motors with DC breaking action (use of pneumatic actuators is an acceptable equivalent if the air compressor and the conduits and electric/pneumatic connections are an integral part of the unit at a shared connection point with the other elements at compressor voltage).

.3 Each damper shall control one of the four (4) airways, upper-horizontal, lower-horizontal, forward-vertical and rear-vertical. Damper switching times of 1.0 second. Dampers shall be capable of orienting to close off outside air to the building without needing external shut-off dampers. Dampers shall also be capable of orienting to allow 100% recirculation of air without using heat recovery device for off peak or unoccupied heating modes. Damper blades, shafts and axles must be made of galvanized steel for greater longevity.

2.23 DRAIN PANS

.1 Construction: stainless steel 304.

.2 Drain connection: in bottom at low point.

.3 All drain pan corners shall be welded.

.4 Installation: slope without sag minimum 2% in both directions to ensure no standing water.

2.24 CONTROL FUNCTIONS

.1 Damper actuator test

.1 The damper actuators can be tested using S1 switch at the control panel.

.2 The Normal position of S1 switch is 0 when the dampers follow the Building Management System (BMS) signal.

.3 When S1 is at position 1, M7 damper actuator is always activated and at position 2, M6 damper actuator is always activated.

.2 Sequence under central Building Management System control (BMS)

.1 When S2 is at position A (automatic), dampers are controlled by the Building Management System (BMS)

.1 Contact 1 (see wiring diagram) defines the dampers activation (closed contact = activated, open contact = not activated).

.2 Contact 2 (see wiring diagram) defines the mode of operation of the dampers (closed contact = heat recovery, open contact = “free cooling”).

.2 When Contact 1 closes and contact 2 opens = dampers change operation at every 3 hours (“free cooling”).

.3 When Contact 1 closes and contact 2 closes = dampers change operation every 60 seconds (adjustable) “heat recovery”.

.4 When Contact 1 opens and contact 2 opens = dampers are closed.

.3 Sequence under local control (not by BMS)

.1 Place switch S2 at position M (manual).

.2 The dampers are controlled by the two (2) internal thermostats GT1 on the supply side and GT2 on the exhaust side. GT1 is set at 59^{o}F (15^{o}C) and GT2 is set at 68^{o}F (20^{o}C).

.3 The sequence will then be:

.1 If exhaust air is < 68^{o}F (20^{o}C) = heat recovery (cycle every 60 seconds).

.2 If exhaust air is > 68^{o}F (20^{o}C) and supply air is > 59^{o}F (15^{o}C) = “free cooling” (cycle every 3 hours).

.3 If exhaust air is > 68°F (20°C) and supply air is < 59°F (15°C) = "heat recovery mode" until supply air is > 59°F (15°C) then the system returns to "free cooling mode".

.4 When S2 switch is at position 0 = stop = all dampers are closed.

.4 Heating, ventilation and cooling

.1 The start-up of the supply and return fans will be done by others (BMS).

.2 Additional cooling or heating will be done by others (BMS).

Note: In every situation to prevent damage to the internal dampers, always open dampers first before starting the unit. At shut down, stop all fans before closing the dampers.

.5 Manufacturers

.1 Reference product: Tempeff Dual Core$_{TM}$ North America, RG 30 000 Model.

.2 Other acceptable product: BKM Regent Eco, model EB-18000-ZV-I-AH-C-LT.

.3 The design was based on the reference product in performance and footprint; it is the product shown on drawings. If the Contractor is bidding with another acceptable product, this can required to changes (size and location) of equipment's concrete base, conduits and other elements, and additional costs required for these changes do not have to be included in this bid. For an acceptable product requiring adjustment of the arrangement, a change order will be provided to the Contractor by the NRC Representative after he has confirmed his choice of equipment. The Contractor shall confirm his choice as soon as possible, only after contract has been awarded, within 30 days after contract has been awarded in order not to delay the implementation schedule.

Part 3 EXECUTION

3.1 INSTALLATION

.1 Provide appropriate protection apparatus.

.2 Fabricate to provide smooth air flow through components.

.1 Limit air leakage to 1% of rated air flow at 2.5 kPa suction pressure.

.3 Apply sealer into all seams prior to assembly.

.1 Secure toe angles on 300-mm centres for full length of casing continuous along entire length of assembly.

.4 Provide, coordinate and install a concrete slab underneath each air handling unit.

3.2 FANS

.1 Suspension for hung units: install four-part hanger type, ceiling flange, top hanger, bottom hanger and vibration isolator with take-up for levelling.

.2 Install flexible connections at fan inlets and outlets as required.

.1 Ensure metal bands of connectors are parallel and not touching.

.2 Ensure that each fan's outlet and connected duct are aligned when fan is running.

3.3 DRIP PANS

.1 Install deep seal P trap and trap seal primer on drain lines.

.1 Depth of water seal to be at least 1.5 times static pressure at this point.

Part 4 Testing

4.1 GENERAL

.1 Complete assembled air handling units shall be factory tested by Manufacturer at factory and field tested by the Contractor and his Ventilation Subcontractor as an assembly to ensure compliance with these specifications.

.2 The Manufacturer shall notify the NRC Representative one (1) week prior to scheduled factory tests. The NRC Representative will inform the Manufacturer if a representative is to witness the tests.

4.2 AIR LEAK TESTS

.1 The Ventilation Contractor shall hire a certified AABC test agency to test and verify tightness of each air handling unit manufactured and installed as per these specifications. The certified agency shall conduct all tests in accordance with the Associated Air Balance Council and the National Standards for Field Measurement and Instrumentation.

.2 The allowable air leak of an air handling unit, measured in L/s, shall not exceed 1% of the highest designed L/s at the fan design internal static pressure and shall not be less than 1000 Pa w.g. (positive and negative).

.3 With an appropriate test apparatus connected to the air handling unit, air leakage test apparatus shall hold negative and positive pressures for 15 minutes before reading any L/s leakage.

.4 The NRC Representative shall be present at the pressure test.

.5 Excessive leakage to be corrected in factory and air leakage tests repeated. All testing and corrections are to be performed in the presence of various representatives and witnesses to ensure acceptable test results before shipping and final start-up of units or modules.

4.3 VIBRATION TESTS

.1 The unit fans shall be operated at the design rpm and a complete vibration spectrum shall be conducted. Such tests must be performed on all completely assembled units including all components. Unit manufacturer shall demonstrate compliance with all of the fan manufacturer's recommended vibration tolerances, but never less than requirements from ISO 2631 and 3945 standards.

.2 Vibration signatures shall be taken for all fans and motor bearings.

.3 For all systems, vibration signature of all fans and all fans' motor bearings are to be taken after the system has been installed and set to its normal operating conditions.

.4 Maximum vibration acceptance criteria for displacement measurements on the fan in the vertical, axial and horizontal directions is the "Smooth line" on the fan manufacturer's Rathbone Balancing Chart (ref.: Peak-to-Peak vibration amplitude of 0.7 mils at 1,800 rpm). Perform all required balancing work required to respect acceptance criteria.

.5 The results are to be submitted in a hard copy report.

Part 5 Start-up

.1 Unit start-up and field performance testing shall be provided by the Subcontractor. The intent of this testing is to provide field verification of factory performance testing and to ensure that the air handling equipment and associated components are operating within the design parameters. The unit manufacturer shall be responsible for any corrective work necessary to meet the specified performance criteria.

.2 Air handling unit shall be rigged and set in place on the job by the Contractor as detailed by the air handling unit manufacturer.

.3 Air handling unit manufacturer shall provide field supervision by qualified factory personnel during start-up of the units.

.4 After complete installation, the following verifications shall be done by the Contractor, supervised by the Manufacturer:

.1 Install all parts shipped loose.

.2 Check isolation inertia base and spring isolators.

.3 Check flexible connections at fan outlet.

.4 Check and re-align all access doors and dampers to ensure smooth operation through the entire operating position range.

.5 Upon start-up, each fan motor is to be checked for fan rotation and amp drawn for each phase. Amp readings are to be marked on the fan scroll.

.6 All belt drives are to be re-adjusted for tension alignment and air flows.

.7 Verify adjustable flow dampers for proper operation between maximum and minimum positions.

.5 The following readings/tests shall be done by the Contractor:

.1 Functional testing of all unit components.

.2 Motor voltage and amperage.

.3 Vibration levels for motors/fans.

.4 Airborne noise level.

.5 Radiated noise level.

.6 Verification of design cfm.

.7 Unit static pressure profile at design cfm.

.8 The fans shall be statically and dynamically balanced after their field installation.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for steam injection mechanical, atomizing, plenum mounted drum, plenum or duct mounted pad, packaged electrode steam generating, packaged, gas fired, steam generator type humidifiers and accessories.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section & Fire Instructions.

.3 Section 23 31 13.01 - Metal Ducts - Low Pressure to 500 Pa.

1.2 REFERENCES

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

.1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

.1 Submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet for heating, ventilation and air conditioning distribution piping and ductwork.

.3 Shop Drawings:

.1 Submit shop drawings to indicate project layout, dimensions and extent of humidification system.

.4 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Instructions: submit manufacturer's installation instructions.

.7 Manufacturer's field reports specified.

.8 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.4 HEALTH AND SAFETY

.1 Proceed with necessary measures in terms of health and safety in construction site as specified in section Section 00 15 45 – General Safety Section & Fire Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials in accordance with Section 00 10 00 – General Instructions.

1.6 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 00 10 00 – General Instructions.

.2 Furnish list of individual manufacturer's recommended spare parts for equipment, addresses of suppliers, list of specialized tools necessary for adjusting, repairing or replacing, for inclusion into operating manual.

.3 Provide following: one complete set of renewable evaporator media.

Part 2 Products

2.1 PACKAGED ELECTRODE STEAM GENERATING TYPE

.1 CSA certified and ULC listed.

.2 Components housed in factory fabricated cabinet with factory enameled finish and electrically interlocked door.

.3 Factory sealed disposable steam cylinder complete with factory installed electrodes to suit water condition.

.4 Controls:

.1 Solid state panel.

.2 Touch screen controller with intuitive color user interface.

.3 BMS communication protocols BACnet MSTP with Web and USb Interface.

.4 Modulating steam output of 20%-100%.

.5 Internal Drain Water tempering to 140°F (60°C) or less.

.6 Header SAM-e with insulation and Inlet kit.

.7 Insulated Steam Tube, SAM-e, 304 SS with the mounting frame kit.

.8 Solenoid valve on water and drain lines.

.9 Duct humidistat.

.10 Airflow proving switch.

.11 Adjustable flush cycle timer.

.12 Amp meter.

.13 Cylinder replacement indicator light.

.5 Duct distribution header complete with condensate drain and supply hose.

.6 Capacity and characteristic on drawings.

Part 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 manufacturers instructions.

.2 Humidifier and evaporator media to be new and clean when project is accepted.

.3 Install humidistat as indicatedin accessible location.

.4 Water service overflow drain: to manufacturers' recommendation.

.5 Install access doors or panels in adjacent ducting.

.6 When installing in ducting, provide waterproof duct up and downstream in accordance with Section 23 31 13.01 - Metal Ducts - Low Pressure to 500 Pa.

.7 Install capped drain connection at low point in duct.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Have manufacturer of products, supplied under this Section, review Work involved in the handling, installation/application, protection and cleaning, of its product[s] and submit written reports, in acceptable format, to verify compliance of Work with Contract.

.2 Manufacturer's Field Services: 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, at stages listed:

.1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.

.2 Twice during progress of Work at 25%and 60%complete.

.3 Upon completion of the Work, after cleaning is carried out.

.4 Obtain reports, within 3days of review, and submit, immediately, to Ministry Representative

.2 Performance Verification (PV):

.1 General: in accordance with Section 00 10 00 – General Instructions.

.2 Timing:

.1 After TAB of ducted air systems.

.2 At same time as PV of related air handling units.

.3 PV procedures:

.1 Packaged Electrode Steam Generating type

.3 Start-up:

.1 General: in accordance with Section 00 10 00 – General Instructions.

.4 Commissioning Reports:

.1 General: in accordance with Section 00 10 00 – General Instructions. Include:

.1 PV results on approved PV Report Forms.

.2 Product Information Report Forms.

3.4 DEMONSTRATION

.1 Training: in accordance with Section 00 10 00 – General Instructions.

3.5 CLEANING

.1 Perform cleaning operations as specified in Section 00 10 00 – General Instructions.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-15, Canadian Electrical Code, Part 1 (23rd Edition), Safety Standard for Electrical Installations. and Ontario Amendments (Ontario Electrical Safety Code, OESC)

.2 Perform all work to meet or exceed the requirements of the Canadian Electrical Code, CSA Standard C22.1 - (latest edition).

.3 Consider CSA Electrical Bulletins in force at time of tender submission, while not identified and specified by number in this Division, to be forming part of related CSA Part II standard.

.4 Do overhead and underground systems in accordance with CSA C22.3 except where specified otherwise.

Where requirements of this specification exceed those of above mentioned standards, this specification shall govern.

1.2 PERMITS AND FEES

.1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay all fees required for the performance of the work.

1.3 INSPECTION AND FEES

.1 Furnish a Certificate of Acceptance from the Authorized Electrical Inspection Department on completion of work.

.2 Request and obtain Special Inspection approval from the Authorized Electrical Inspection Department for any non-CSA approved control panels or other equipment fabricated by the contractor as part of this contract.

.3 Pay all fees required for inspections.

1.4 DEFINITIONS

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.5 SCOPE OF WORK

.1 The following list describes the scope of work, without being limited to such. Perform detailed work to deliver a complete, operational and performing installation. Unless otherwise indicated, work includes the supply, installation and connection of equipment.

.2 For the construction and modifications required for workplace 2.0 retrofit:

.1 Provide, install and connect 120/208 electrical distribution, including but not limited to distribution panels, conduits, wiring, junction boxes and supports, as required for a complete distribution system.

.2 Provide, install and connect receptacles network for general and specialized services.

.3 Provide and install wiring raceways, conduits and wiring.

.4 Provide, install and connect complete sound masking system.

.5 Provide, install and connect indoor lighting and controls.

.6 Install and connect motors starters and/or VFDs for mechanical systems.

.7 Provide electrical supply and connection for mechanical services and heating.

.8 Provide, install and connect new fire alarm system components on existing main controller.

.9 Provide electrical supply and connection for equipment furnished and installed by other divisions, including furniture.

.10 Provide, install and connect emergency exit lighting.

.11 Provide, install and connect grounding and bonding for all components installed.

.12 Training on the systems and preparation of operating and maintenance manuals.

.13 Perform all testing on cables and equipment.

.14 Provide and install all temporary electrical services for construction work: lighting, distribution and others.

.15 Provide and install conduit network, outlet boxes and pull cords for the data/telephone network up to suspended ceiling. Provide and install cable tray system above suspended ceiling.

.16 Provide and install conduits, outlet boxes, junction boxes and pull cords for the electrical doors up to suspended ceiling.

.17 Provide all qualified labour, all equipment, all materials and all tools necessary to cut holes in roofs, walls and/or floors and other elements, as required for the installation of electrical equipment.

.18 Perform all necessary works for acoustic and air-sealing systems for all electrical conduit and wiring penetrations through walls, floors and any other partition.

.19 The fire stop sealing systems must be coordinated with the specialist contractor on the job.

.20 Dismantle apparent conduit for main lobby door control system and reinstall above ceiling.

.21 Perform all work described in drawings.

1.6 DESIGN REQUIREMENTS

.1 Operating voltages to CAN3-C235.

.2 Control/safety devices able to operate sufficiently at 60 Hz and within the limits established in the above-mentioned standard.

.1 Devices able to withstand operation under extreme conditions without damage as defined in this standard.

.3 Operating and display language: for all identification and display purposes, use English only.

1.7 SUBMITTALS

.1 Submittals: in accordance with Section 01 00 10.

.2 Product data: submit WHMIS MSDS.

.3 Shop drawings

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province within Canada.

.2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.

.3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.

.4 Indicate on drawings clearances for operation, maintenance, and replacement of equipment devices.

.5 If changes are required, notify the NRC Departmental Representative of these changes before they are made.

.4 Quality Control: in accordance with Section 01 45 00 – Quality Control.

.1 Provide CSA certified equipment.

.2 Where CSA certified equipment is not available, submit such equipment to inspection authorities for approval before delivery to site.

.3 Submit test results of installed electrical systems and instrumentation.

.4 Permits and fees: in accordance with General Conditions of contract.

.5 Submit, upon completion of work, load balance report as described in PART 3 – LOAD BALANCE.

1.8 SYSTEM START-UP

.1 Instruct the NRC Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.

1.9 OPERATING INSTRUCTIONS

.1 Provide operating instructions for each main system and item of equipment as specified in technical sections for use by operation and maintenance personnel.

.2 Operating instructions to include following:

.1 Wiring diagrams, control diagrams, and control sequence for each main system and item of equipment.

.2 Start-up, proper adjustment, operating, lubrication, and shutdown procedures.

.3 Safety precautions.

.4 Procedures to be followed in event of equipment failure.

.5 Other items of instruction as recommended by manufacturer of each system or item of equipment.

.3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.

.4 Post instructions where directed.

.5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.6 Ensure operating instructions will not fade when exposed to sunlight.

Part 2 Products

2.1 MATERIALS/EQUIPMENT

.1 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, submit such equipment to inspection authorities for approval before delivery to site and submit such approval as described in PART 1 – SUBMITTALS.

.2 Factory assemble control panels and component assemblies.

2.2 WIRING TERMINATIONS

.1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.3 EQUIPMENT IDENTIFICATION

.1 Identify with 3mm non-smearing label tape, or an alternate approved by the Departmental Representative, all electrical outlets shown on drawings and/or mentioned in the specifications. These are the lighting switches, recessed and surface mounted receptacles such as those in offices and service rooms and used to plug in office equipment, telecommunication equipment or small portable tools. Indicate only the source of power (Ex. for a receptacle fed from panel L32 circuit #1: "L32-1").

.2 Light fixtures are the only exceptions for electrical equipment identification (except as noted in 7.13 below). They are not to be identified.

.3 Identify with lamicoid nameplates all electrical equipment shown on the drawings and/or mentioned in the specification such as motor control centers, switchgear, splitters, fused switches, isolation switches, motor starting switches, starters, panelboards, transformers, high voltage cables, industrial type receptacles, junction boxes, control panels, etc., regardless of whether or not the electrical equipment was furnished under this section of the specification.

.4 Coordinate names of equipment and systems with other Divisions to ensure that names and numbers match.

.5 Wording on lamicoid nameplates to be approved by the Departmental Representative prior to fabrication.

.6 Provide two sets of lamicoid nameplates for each piece of equipment; one in English and one in French.

.7 Lamicoid nameplates shall identify the equipment, the voltage characteristics and the power source for the equipment. Example: A new 120/240 volt single phase circuit breaker panelboard, L16, is fed from panelboard LD1 circuit 10.

"PANEL L16
120/240 V
FED FROM LD1-10"

PANNEAU L16
120/240 V
ALIMENTE PAR LD1-
10

.8 Provide warning labels for equipment fed from two or more sources - "DANGER MULTIPLE POWER FEED" black letters on a yellow background. These labels are available from NRC's Facilities Maintenance group in building M-19.

.9 Lamicoid nameplates shall be rigid lamicoid, minimum 1.5 mm (1/16") thick with:

.1 Black letters engraved on a white background for normal power circuits.

.2 Black letters engraved on a yellow background for emergency power circuits.

.3 White letters engraved on a red background for fire alarm equipment.

.10 For all interior lamicoid nameplates, mount nameplates using two-sided tape.

.11 For all exterior lamicoid nameplates, mount nameplates using self-tapping 2.3 mm (3/32") dia. slot head screws - two per nameplate for nameplates under 75 mm (3") in height and a minimum of 4 for larger nameplates. Holes in lamicoid nameplates to be 3.7 mm (3/16") diameter to allow for expansion of lamicoid due to exterior conditions.

.1 No drilling is to be done on live equipment.

.2 Metal filings from drilling are to be vacuumed from the enclosure interiors.

.12 All lamicoid nameplates shall have a minimum border of 3 mm (1/8"). Characters shall be 9 mm (3/8") in size unless otherwise specified.

.13 Identify lighting fixtures which are connected to emergency power with a label "EMERGENCY LIGHTING/ÉCLAIRAGE D'URGENCE", black letters on a yellow background..

.14 Provide neatly typed updated circuit directories in a plastic holder on the inside door of new panelboards.

.15 Carefully update panelboard circuit directories whenever adding, deleting, or modifying existing circuitry.

.16 Identify electrical equipment with nameplates as follows:

.1 Nameplates: lamicoid 3 mm thick plastic engraving sheet, black face and white core, lettering accurately aligned and engraved into core, mechanically attached with self tapping screws.

.17 Wording on nameplates to be approved by the Departmental Representative prior to manufacture.

2.4 WIRING IDENTIFICATION

.1 Unless otherwise specified, identify wiring with permanent indelible identifying markings, using either numbered or coloured plastic tapes on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout network.

2.5 LABELLING SYSTEM

.1 Labelling

.1 All labels are to be machine fabricated and of professional quality; labels are to be either transparent heat-shrinkable film or stickers.

.2 Ink is to be indelible.

.3 No handwritten labels will be accepted.

2.6 CONDUIT AND CABLE IDENTIFICATION

.1 All new conduits to be factory painted, colour-coded EMT, type as follows:

.1 Fire alarm – red conduit
.2 Emergency power circuits – yellow conduit
.3 Voice/data – blue conduit
.4 Gas detection system – purple conduit
.5 Building Automation system – orange conduit
.6 Security system – green conduit
.7 Control system – black conduit

.2 Apply paint to the covers of junction boxes and conduits of existing conduits as follows:

.1 Fire alarm – red
.2 Emergency power circuits – yellow
.3 Voice/data – blue
.4 Gas detection system – purple
.5 Building Automation system – orange
.6 Security system – green
.7 Control system - black

.3 For system running with cable, half-lap wrap with dedicated coloured PVC tape to 100 mm width, tape every 5 m and both sides where cable penetrates a wall.

.4 All other systems need not be coloured.

.5 Maintain phase sequence and colour coding throughout.

.6 For identification inside junction boxes, paint entire edge of junction boxes as per colour code, but not the cover. Using a thick indelible marker, identify the source (panel) and circuit numbers on the cover for all wiring penetrating junction and pull boxes when located in an unfinished or ceiling space.

Part 3 Execution

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 All free-standing electrical equipment must be installed on housekeeping pads 100 mm high and dimensions as per equipment.

3.2 NAMEPLATES AND LABELS

.1 Ensure that manufacturer's registration plates are properly affixed to all apparatus showing the size, name of equipment, serial number, and all information usually provided, including voltage, cycle, phase and the name and address of the manufacturer.

.2 Do not paint over registration plates or approval labels. Leave openings through insulation for viewing the plates. Contractor's or sub-contractor's nameplate not acceptable.

3.3 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

.2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.

.3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.

3.4 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify with NRC Departmental Representative before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise.

.1 Wall receptacles

.1 General: 300 mm.

.2 Above continuous baseboard heater: 200 mm.

.3 Above counter: 1 150 mm from finished floor.

.4 In mechanical rooms: 1 400 mm.

3.5 FIELD QUALITY CONTROL

.1 Conduct following tests.

.1 Insulation resistance testing

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350–600 V circuits, feeders and equipment with a 1000 V instrument.

.3 Check resistance to ground before energizing.

.2 Carry out tests in presence of the NRC Departmental Representative.

.3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of work.

.4 Manufacturer's field services. Obtain written report from manufacturer verifying compliance of work, in handling, installing, applying, protecting and cleaning of product.

.1 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.

3.6 CLEANING

.1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

3.7 WORK ON LIVE EQUIPMENT & PANELS

.1 NRC requires that work be performed on non-energized equipment, installation, conductors and power panels. For purposes of quotation assume that all work is to be done after normal working hours and that equipment, installation, conductors and power panels are to be de-energized when worked upon.

END OF SECTION

Part 1 General

1.1 SECTION CONTENTS

.1 Materials and installation for wire and box connectors.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-C22.2No.18-[latest edition], Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.

.2 CSA C22.2No.65-[latest edition], Wire Connectors.

.2 National Electrical Manufacturers Association (NEMA).

1.3 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.2 Collect and separate for disposal packaging materials in appropriate on-site bins for recycling in accordance with waste management plan.

.3 Divert unused wiring materials from landfill to metal recycling facility as approved by the NRC Representative.

Part 2 Products

2.1 EQUIPMENT

.1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper or aluminum conductors as required.

.2 Clamps or connectors for armoured cables and flexible conduits as required to: CAN/CSA-C22.2 No.18.

Part 3 Execution

3.1 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

.1 Provide product data in accordance with Section 01 00 10.

1.2 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 BUILDING WIRING AND GENERAL REQUIREMENTS

.1 Conductor material for branch circuit wiring and grounding:

- .1 Stranded copper.
- .2 Neutral wire: continuous throughout its length without breaks.
- .3 Separate insulated green grounding conductors in all electrical conduits.
- .4 All wire and cable insulation shall meet the C.S.A. Standards for the types and services hereinafter specified. Colours as per section 4-036 of Electrical Code.
- .5 Where otherwise specified, use wire and cable types as follows:
  - .1 Type R90 XLPE cross-link polyethylene stranded for applications using wires sized No. 8 and larger.
  - .2 Type T90 stranded for applications using wires sized No. 10 and smaller.
  - .3 For fire alarm wiring refer to Section 283100.
  - .4 Approved heat resistant wire for wiring through and at lighting and heating fixtures. Where insulation types are shown on the drawings other types shall not be used unless the specification is more restrictive.
- .6 Use BX cable only under the following conditions:
  - .1 Wiring from a junction box to a recessed lighting fixture in suspended ceilings. Cable length not to exceed 1.5 m (5'), or
  - .2 Wiring or switches or 15 amp receptacles in partitions having removable wall panels, or
  - .3 When specifically called for on drawings.
- .7 Use stranded wire no smaller than No. 12 AWG for lighting and power and no smaller than No. 16 AWG for control wiring.
- .8 Conductors shall be soft copper properly refined and tinned having a minimum conductivity of 98%.

2.2 TECK90 CABLES

.1 Use only where specifically indicated on drawings.

.2 Cables: in accordance with Section 26 05 00 – Common Work Results for Electrical.

.3 Conductors

- .1 Grounding conductor: copper.
- .2 Circuit conductors: copper as indicated.

.4 Insulation

.1 Cross-linked polyethylene XLPE.

.2 Rating: 600 V.

.5 Fastenings

.1 One-hole steel straps to secure surface cables 50 mm and smaller. Two-hole steel straps for cables larger than 50 mm.

.2 Channel type supports for two or more cables at 1500 mm centers.

.3 Threaded rods: 6 mm diameter to support suspended channels.

.6 Connectors

.1 Watertight approved for TECK cables.

2.3 ARMOURED CABLES

.1 Maximum length, 1.5m. Use only for final connections at lighting fixtures.

.2 Conductors: insulated, copper, size as indicated.

.3 Type AC90 cables.

.4 Armour: aluminum strip.

.5 Cable type: ACWU90 PVC jacket over thermoplastic armour and compliant to applicable Building Code classification for this project in wet locations.

.6 Connectors: anti short connectors.

2.4 CONTROL CABLES

.1 Type: LVT: 2 soft annealed copper conductors, sized as indicated.

.1 Insulation: thermoplastic.

.2 Sheath: thermoplastic jacket.

.2 Low energy control cables: 300 V, soft annealed copper conductors, stranded and shielded in pairs with polypropylene jacket. Number of pairs and conductors sized as indicated on drawings.

.1 Grounding conductor: stranded for each pair and unique colour for each insulator.

.2 Overall covering: FT4 thermoplastic.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.

.2 Perform tests using method appropriate to site conditions and to approval of the NRC Representative and local authority having jurisdiction.

.3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

.1 Terminate cables in accordance with Section 26 05 20 – Wire and Box Connectors (0–1000 V).

.2 Cable Colour Coding: to Section 26 05 00 – Common Work Results for Electrical.

.3 Conductor length for parallel feeders to be identical.

.4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

.5 Concealed wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

.6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

.7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend.

.8 Install a green bonding conductor in each conduit, sized as required.

3.3 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

.1 In conduit systems in accordance with Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings;

.2 Make joints, taps and splices in approved boxes with solderless connectors. Joints and/or splices are not acceptable inside a panelboard.

.3 Ensure the lugs accommodate all the strands of the conductor.

.4 Replace any wire or cable showing evidence of mechanical injury.

.5 Use No. 10 AWG for branch circuit wiring extending more than 30 m (100 ft.) to farthest outlet from panel.

.6 Circuit numbers indicated on the drawing are intended as a guide for the proper connection of multi-wire circuits at the panel.

.7 Take care to keep the conductors free from twisting.

.8 Use an approved lubricant for pulling in conduit.

.9 Leave sufficient slack on all runs to permit proper splicing and connection of electrical devices.

.10 Branch circuit wiring of 120 volt applications to be multi-wire utilizing common neutrals. Under no condition shall any switch break a neutral conductor.

.11 Provide and install an approved fire- retardant wrap or coating for PVC jacketed cables installed in a grouped configuration of two or more.

.12

3.4 INSTALLATION OF TECK90 CABLES (0–1000 V)

.1 Group cables wherever possible on channels.

.2 Install cables securely supported by straps.

3.5 INSTALLATION OF ARMOURED CABLES

.1 Group cables wherever possible on channels.

.2 To be installed in ceilings for lighting fixtures only for final connections. Maximum length 1 500 mm.

3.6 INSTALLATION OF CONTROL CABLES

.1 Install control cables in conduits.

.2 Ground control cable shield.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

.1 ANSI/IEEE 837-[latest edition], Qualifying Permanent Connections Used in Substation Grounding.

.2 Canadian Standards Association (CSA International).

1.3 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.2 Divert unused metal materials from landfill to metal recycling facility as approved by the NRC Representative.

.3 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.

.2 Insulated grounding/bonding conductors: green, type RW90 for indoor use or RWU90 for exterior use.

.3 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors.

.4 Bonding jumpers, straps.

.5 Pressure wire connectors.

Part 3 Execution

3.1 INSTALLATION – GENERAL

.1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT or flexible conduits are used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from damage.

.4 Use mechanical connectors for grounding connections to equipment provided with lugs.

.5 Soldered joints not permitted.

.6 Ground secondary service pedestals.

3.2 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to the following list: service equipment, transformers, switchgear, duct systems, frames of motors, motor control centres, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting.

3.3 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of the NRC Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system.

.4 Disconnect ground fault indicator during tests.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-12, Canadian Electrical Code, Part 1, 20th Edition.

1.2 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 00 10.

.2 Product Data

.1 Provide manufacturer's printed product literature, specifications and datasheets and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings: in accordance with Section 01 00 10.

.1 Provide drawings stamped and signed by professional engineer registered in Ontario.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste management and disposal

.1 Separate waste materials for reuse and recycling.

Part 2 Products

2.1 SPLITTERS

.1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Terminations: connection blocks to match required size and number of incoming and outgoing conductors as indicated.

.3 Spare terminals: minimum three (3) spare terminals on each connection or lug block sized less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Construction: welded steel enclosure.

.2 Covers flush mounted: 25 mm minimum extension all around.

.3 Covers surface mounted: screw-on flat.

Part 3 Execution

3.1 SPLITTER INSTALLATION

.1 Mount plumb, true and square to building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOX AND CABINET INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.

.3 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

.4 Install access panels when boxes are inaccessible.

3.3 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00 – Common Work Results for Electrical.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 00 10.

Part 2 Products

2.1 FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Steel coupling for EMT.

.3 Fittings for liquid-tight flexible conduits shall be liquid-tight connectors.

.4 Provide expansion couplings for all conduits running in slabs through expansion joints. These shall be the type approved for use in concrete with a bonding conductor.

.5 Factory bends are not permitted to be modified. Ensure conduit bends other than factory bends are made with an approved bender. Making offsets and other bends by cutting and rejoining factory bends are not permitted.

2.2 OUTLET BOXES

.1 Size boxes in accordance with CSA-C22.

.2 Unless otherwise specified, provide galvanized steel outlet boxes at least 40mm (1-1/2") deep, single or ganged style, of proper size to accommodate devices used and shall be equipped with covers as necessary of the type designed for the specified fittings. Pull boxes shall be steel and shall be galvanized or painted to prevent rusting. For lighting fixture outlets, use 100mm (4") octagon boxes.

.3 Equip with plaster rings for flush mounting devices in finished walls.

.4 Blank cover plates for boxes without wiring devices.

.5 Equip with centre fixture studs for light fixtures.

.6 Use cast boxes where indicated and for surface mounted wiring. In areas above hung ceilings where appearance is not significant, pressed steel surface boxes may be used.

.7 Supply all outlet boxes and pull boxes sized according to code requirements unless specified otherwise on the drawings.

2.3 SUPPORT HARDWARE

.1 Use 10mm (3/8") threaded rod for suspended unistrut and conduit.

.2 Unless otherwise specified, use 41mm x 41mm (1-5/8" x 1-5/8") galvanized steel unistrut for conduit support systems.

Part 3 Execution

3.1 INSTALLATION

.1 Install outlet boxes as follows:

.1 Support boxes independently of connecting conduits.

.2 Make necessary mounting adjustments to the outlet to match interior finish.

.3 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of construction material.

.4 Where more than one conduit enters a switch or receptacle box on the same side, provide a 100mm (4") minimum square box with a suitable plaster ring.

.5 Location and appearance to be to the NRC Departmental Representative's approval.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 00 10.

Part 2 Products

2.1 RACEWAYS

.1 Conduit:

.1 Each length of conduit to be new and bear the CSA Stamp of Approval.

.2 Conduit, unless otherwise noted, to be EMT, no smaller than 21mm (3/4").

.3 Conduit to be coloured as required for systems described in section 260500.9.

.2 Bushings and Connectors:

.1 Insulated type, with the insulation an integral part of the fitting.

.3 Conduit Fastening:

.1 One hole malleable iron straps to secure surface conduits. Two hole straps for conduits larger than 50mm (2").

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits.

.4 Pull Cord:

.1 Polypropylene cord in empty conduit.

.5 Unless specifically called for on the drawings, do not use flexible conduits but it is recognized that there may be applications where this material will be useful, such as equipment connections, etc. In such cases, obtain permission for its use from the NRC Departmental Representative. For tender purposes, assume that flexible conduits will not be permitted unless specifically called for on the drawings or equipment specifications. All flexible conduits for vapour-tight applications shall be liquid-tight flexible conduits (seal-tight).

.6 Provide expansion couplings for all conduits running in slabs through expansion joints. These shall be the type approved for use in concrete with a bonding conductor.

2.2 CABLE TRAY SYSTEM

.1 Ladder type.

.2 Aluminium construction.

.3 Minimum 75mm depth, 200mm wide.

.4 Standard of acceptance: Thomas&Betts or approved equal.

2.3 SUPPORT HARDWARE

.1 Use 10mm (3/8") threaded rod for suspended unistrut and conduit.

.2 Unless otherwise specified, use 41mm x 41mm (1-5/8" x 1-5/8") galvanized steel unistrut for conduit support systems.

Part 3 Execution

3.1 RACEWAYS

.1 Install raceways as follows:

.1 Rigidly supported.
.2 Workmanlike manner.
.3 Maintain maximum headroom.
.4 Concealed in finished area.
.5 Surface-mounted in open area.
.6 Do not pass conduits through structural members except as indicated.
.7 Parallel to or at right angles to the building lines.
.8 Thoroughly ream all conduits at ends and terminate with appropriate locknuts and bushings.
.9 Cause minimum interference in spaces through which they pass.
.10 Plug or cap conduit during construction to protect from dust, dirt or water.
.11 Unless specifically indicated on drawings or with the permission of the NRC Departmental Representative, do not cast conduits in concrete.
.12 Dry conduits out before installing wire.
.13 Mechanically bend steel conduit larger than 22 mm (3/4") diameter. Bend conduit cold.
.14 Do not cut or modify prefabricated bends.
.15 PVC conduit as indicated.
.16 Function and appearance to be to the NRC Departmental Representative's approval.
.17 Seal conduit and cable openings in fire- rated walls and floors with an approved fire stop material.

.18 Seal conduit and cable openings in exterior walls with a weatherproof silicone sealant.

.19 Paint exposed conduits and boxes to match existing wall / ceiling except the colored EMT specified in 260500.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA C22.2 No. 18-[latest edition], Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.

.2 CSA C22.2 No. 45-[latest edition], Rigid Metal Conduit.

.3 CSA C22.2 No. 56-[latest edition], Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83-[latest edition], Electrical Metallic Tubing.

.5 CSA C22.2 No. 211.2-[latest edition], Rigid PVC (Unplasticized) Conduit.

.6 CAN/CSA C22.2 No. 227.3-[latest edition], Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 00 10 – Submittal Procedures.

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.

.1 Submit cable manufacturing data.

.3 Quality Assurance

.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.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

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

.3 Ensure emptied containers are sealed and stored safely for disposal.

Part 2 Products

2.1 CABLES AND REELS

.1 Provide cables on reels.

.1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.

.2 Each coil or reel of cable to contain only one continuous cable without splices.

.3 Identify cables for exclusively DC applications.

2.2 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel threaded.

.2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.

.3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.4 Rigid PVC conduit: to CSA C22.2 No. 211.2.

.5 Flexible metal conduit: to CSA C22.2 No. 56, liquid tight.

.6 Flexible PVC conduit: to CAN/CSA-C22.2 No. 227.3.

2.3 CONDUIT FASTENINGS

.1 One-hole steel straps to secure surface conduits 50 mm and smaller.

.1 Two-hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.5 m on centre.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, specially manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90-degree bends for 25 mm and larger conduits.

.3 Watertight connectors and couplings for EMT.

.1 Set-screws are not acceptable.

2.5 EXPANSION FITTINGS FOR RIGID CONDUITS

.1 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.

2.6 FISH CORD

.1 Polypropylene.

Part 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 datasheets.

3.2 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.

.3 Use electrical metallic tubing (EMT) except in cast concrete and when conduits are located more than 2.4 m above ground and not subject to mechanical damage.

.4 Use rigid PVC conduit underground.

.5 Use flexible metal conduit for connection to motors in dry areas, connection to recessed incandescent fixtures without prewired outlet box, connection to surface or recessed fluorescent fixtures and work in movable metal partitions.

.6 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.

.7 Use explosion-proof flexible connection for connection to explosion-proof motors.

.8 Install conduit sealing fittings in hazardous areas.

.1 Fill with compound.

.9 Minimum conduit size for all applications: 19 mm.

.10 Bend conduit cold.

.1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.11 Mechanically bend steel conduit over 19 mm diameter.

.12 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.13 Install fish cord in empty conduits.

.14 Run two (2) 50 mm spare conduits up to ceiling space and two (2) 50 mm spare conduits down to ceiling space from each flush panel.

.1 Terminate these conduits in junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in surface type box.

.15 Remove and replace blocked conduit sections.

.1 Do not use liquids to clean out conduits.

.16 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

.7 Surface mount conduits only in unfinished spaces.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Locate to suit reinforcing steel.

.1 Install in centre one third of slab.

.2 Protect conduits from damage where they stub out of concrete.

.3 Install sleeves where conduits pass through slab or wall.

.4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed.

.1 Use cold mastic between sleeve and conduit.

.5 Conduits in slabs: minimum slab thickness 4 times conduit diameter.

.6 Encase conduits completely in concrete with minimum 25 mm concrete cover.

.7 Organize conduits in slab to minimize crossovers.

3.6 UNDERGROUND CONDUITS

.1 Slope conduits to provide drainage.

.2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

3.7 CLEANING

.1 On completion and verification of performance of installation, remove surplus materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 00 10 00.

.2 Submit stamped engineered drawings for structures supporting transformers on walls or other structures other than the floor.

.3 Prior to any installation of circuit breakers in either a new or existing installation, Contractor must submit three (3) copies of a certificate of origin, from the manufacturer, duly signed by the factory and the local manufacturer's representative, certifying that all circuit breakers come from this manufacturer, they are new and they meet standards and regulations. These certificates must be submitted to the NRC Departmental Representative for approval.

.1 The above applies to all breakers rated above 240V.

.2 The above applied to all breakers rated up to 240V and 100A or more.

.4 A delay in the production of the certificate of origin won't justify any extension of the contract and additional compensation.

.5 Any work of manufacturing, assembly or installation should begin only after acceptance of the certificate of origin by NRC Departmental Representative. Unless complying with this requirement, NRC Departmental Representative reserves the right to mandate the manufacturer listed on circuit breakers to authenticate all new circuit breakers under the contract at the Contractor's expense.

.6 In general, the certificate of origin must contain:

.1 The name and address of the manufacturer and the person responsible for authentication. The responsible person must sign and date the certificate;

.2 The name and address of the licensed dealer and the person of the distributor responsible for the Contractor's account.

.3 The name and address of the Contractor and the person responsible for the project.

.4 The name and address of the local manufacturer's representative. The local representative must sign and date the certificate.

.5 The name and address of the building where circuit breakers will be installed:

.1 Project title.

.2 End user's reference number.

.3 The list of circuit breakers.

1.2 IDENTIFICATION

.1 Identification as per Section 26 05 00.

Part 2 Products

2.1 DISCONNECT SWITCHES, FUSED AND NON-FUSED

.1 Fusible and non-fusible disconnect switches in NEMA Enclosure as indicated.

.2 Provision for padlocking in "OFF" switch position.

.3 Mechanical voidable door interlock in "ON" position.

.4 Fuses: size and type as indicated.

.5 Fuseholders in each switch to be suitable without adaptors, for type and size of fuse indicated.

.6 Quick-make, quick-break action.

.7 "ON-OFF" switch position indication on switch enclosure cover.

.8 Standard of acceptance: Square D, Cutler-Hammer, Siemens, ABB.

2.2 GROUNDING

.1 Insulated grounding conductors in accordance with Section 26 05 00.

.2 Compression connectors for grounding to equipment provided with lugs.

2.3 DRY TYPE TRANSFORMER

.1 Type ANN, C802.2.

.2 Single or three phase, KVA rating, input and output voltage as indicated.

.3 Class 200, 130°C temperature rise insulation rating for 15kva and 30kva transformer. Class 220, 150°C temperature rise insulation system for other sizes.

.4 Copper windings.

.5 Four 2.5% taps, 2-FCAN and 2-FCBN.

.6 NEMA 1 enclosure with lifting lugs, removable metal front and side panels.

.7 Drip shield.

.8 Standard of acceptance: Hammond or approved equal.

2.4 PANELBOARDS

.1 600 volt panelboards: bus and breakers rated for 25,000 amp r.m.s. symmetrical interrupting capacity or as indicated.

.2 250 volt branch circuit panelboards to have minimum interrupting capacity of 10,000 amp r.m.s. symmetrical.

.3 Panelboards that have a main breaker indicated in plan shall be service entranced approved (i.e. barrier to separate main breaker from remainder of panels).

.4 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.5 Panelboards: mains, number of circuits, number and size of branch circuit breakers as indicated.

.6 Two keys for each panelboard and all panelboards to be keyed alike.

.7 Copper bus, neutral and ground bar with neutral of same ampere rating as mains.

.8 Suitable for: plug-in breaker on width over 20", bolt-on breakers on 20" width and less.

.9 Trim and door finish: baked grey enamel.

.10 Drip shield.

.11 Surface mount with hinge door, unless otherwise indicated on drawing.

.12 Complete circuit directory with typewritten legend showing description of each circuit.

.13 Manufacturer: Square D or approved equal.

2.5 MOULDED CASE CIRCUIT BREAKER

.1 Thermal-magnetic moulded case circuit breakers, quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.

.2 Common-trip breakers with single handle for multiple applications.

.3 All new 120V to 600V circuit breakers installed on this project are to include the handle accessory, "Handle Padlock Attachment", which locks breakers on or off.

.4 Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of current reaches 10 times their setting.

.5 Circuit breaker and panel to be of same manufacturer.

Circuit breakers minimum interrupt rating: 10KA for 120/240V and 25KA for 600/347V or greater if indicated.

.6 Electronic trip unit as indicated by drawing.

LI: long time and instantaneous

LSI: long time, short time and instantaneous

LSIG: long time, short time, instantaneous and grounding

A: with Ammeter

E: with energy meter

.7 Standard of acceptance: Square D or approved equal.

2.6 FUSES

.1 250V and 600V time delay, type as indicated.

.2 Standard of acceptance: Gould-Shawmut or approved equal.

Part 3 Execution

3.1 DISCONNECT SWITCHES

.1 Install disconnect switches complete with fuses as indicated.

3.2 GROUNDING

.1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including, conductors, compression connectors, accessories, as indicated, to conform to requirements of Engineer, and local authority having jurisdiction over installation. Where EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Soldered joints not permitted.

3.3 DRY TYPE TRANSFORMER

.1 Transformers above 75 kVA mount on floor.

.2 Provide adequate clearance around transformer for ventilation.

.3 Install transformers in level upright position.

.4 Remove shipping supports only after transformer is installed and just before putting into service.

.5 Loosen isolation pad bolts until no compression is visible.

.6 Make primary and secondary connections shown on wiring diagram.

.7 Energize transformers immediately after installation is completed, where practicable.

.8 Provide equipment identification in accordance with Section 26 05 00.

.9 Connect transformer through side of housing.

3.4 PANELBOARDS

.1 Locate panelboards as indicated and mount securely, plumb, and square, to adjoining surfaces.

.2 Mount panels to height specified in section 26 27 26 or as indicated.

.3 Connect loads to circuits as indicated.

.4 Connect neutral conductors to common neutral bus.

.5 Perform thermography ten (10) days following panel startup and 10 months further to provisional acceptance of work. Submit a separate report for each thermography.

3.5 MOULDED CASE CIRCUIT BREAKERS

.1 Install circuit breakers as indicated.

3.6 FUSES

.1 Install fuses in mounting devices immediately before energizing circuit.

.2 Install fuses correctly sized to assigned electrical circuits.

.3 Provide 3 spare fuses for each rating supplied.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Common Work Results - Electrical Section 26 05 00.

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 00 10.

1.4 IDENTIFICATION

.1 Identification as per Section 26 05 00.

Part 2 Products

2.1 WIRING DEVICES

.1 Switches:

- .1 Specification grade, shallow body, designed to withstand high inductive fluorescent loads CSA C22.2 No. 55.
- .2 Number of poles as indicated.
- .3 Captive mounting screws, quiet safe mechanical action with rust-proofed mounting strap and silver alloy contact points.
- .4 Toggle actuated, colour white unless otherwise indicated.
- .5 Brass screw terminals rated 20 AMP at 125 volt.
- .6 Standard of acceptance: Hubbell, Leviton.

.2 LED Dimming Switches:

- .1 0-10VDC, electronic, suitable for use with installed light fixture.
- .2 Rated for 1200W.
- .3 Suitable for use in “3-way” configuration where indicated.
- .4 Standard of acceptance:
  - .1 Philips SR1200ZTUNV or equivalent approved by NRC Departmental Representative.
  - .2 3-way style to be Philips SR3W or equivalent approved by NRC Departmental Representative.

.3 Wall Switch Occupancy Sensor:

.1 120V-277V line voltage.
.2 Dual relay (1200VA/800VA).
.3 Adjustable horizontal field of view (PIR).
.4 Color: white.
.5 Standard of acceptance:
.1 Philips LRS221500I or equivalent approved by NRC Departmental Representative.

.4 Ceiling Mount Occupancy Sensor:

.1 120V line voltage.
.2 360 degree coverage.
.3 Dual technology.
.4 Time delay and sensitivity adjustments.
.5 Color: white.
.6 Standard of acceptance:
.1 Legrand DT-355 or equivalent approved by NRC Departmental Representative.

.5 Receptacles:

.1 Duplex type, CSA type 5-15R, 125 volt, 15A, U ground, specification grade with the following features:
.1 Flush type with parallel blade slots.
.2 Double-wiping contacts.
.3 Double-grounding terminals.
.4 Break-off feature for separate feeds.
.5 One piece body, colour white unless otherwise indicated.
.2 Duplex type, CSA type 5-20R, 125 volt, Combination 15/20A, U ground, specification grade with the following features:
.1 Flush type with parallel blade slots.
.2 Double-wiping contacts.
.3 Double-grounding terminals.
.4 Break-off feature for separate feeds.
.5 One piece body, colour white unless otherwise indicated.
.3 USB Duplex type, CSA Type 15-R, 125 volt, 15A, U ground with 2 USB charging ports, minimum 3.1A rated, specification grade with the following features:
.1 Flush type with parallel blade slots.
.2 Double-wiping contacts.
.3 Double-grounding terminals.
.4 Break-off feature for separate feeds.
.5 One piece body, colour white unless otherwise indicated.
.4 Special receptacles with ampacity and voltage as indicated.

.5 Receptacles of one manufacturer throughout the project.

.6 Cover Plates:

.1 Cover plates for wiring devices.

.2 Smooth white plastic for wiring devices mounted in flush-mounted outlet box.

.3 Sheet metal cover plates for wiring devices mounted in surface-mounted outlet box.

.4 Weatherproof covers to be die case aluminum. Standard of acceptance: Hubbell WPFS26.

.5 Multi-outlet covers as indicated.

.7 Splitters, Junction Boxes & Cabinets:

.1 Sheet metal enclosure, welded corners and formed cover, provided as required.

Part 3 Execution

3.1 LOCATION OF OUTLETS

.1 The number and general location of outlets for lighting, power, telephones, etc., are to be as shown on the drawings. Install all outlets accurately and uniformly with respect to building details. When centering outlets, make allowance for overhead pipes, ducts, etc. and for variations in wall or ceiling finish, window trim, etc. Reinstall incorrectly installed outlets at no cost to the Owner. Make field power and control connections as indicated.

.2 The location of all outlets as shown on the plans are approximate and are subject to change, up to 3m (10') without extra cost or credit provided the information is given prior to the installation of the outlet.

.3 Unless otherwise specified, locate light switches on latch side of doors. Determine the direction of all door swings from the architectural drawings or on site, not from the electrical drawings.

3.2 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not indicated verify before proceeding with installation.

.3 Generally, locate outlets as follows: (except those otherwise shown on the drawings):

.1 Local switches 1.2m (3'-11") to centreline.

.2 Wall receptacles 300mm (1'-4") to centreline.

.3 Clock receptacles 2.4m (8'-0") to centreline.

.4 Lighting panels 1.8m (6'-0") to top.

.5 Telephone and data communications outlet 300mm (1'-4") to centreline.

.6 Fan coil speed control switch 1.2m (3'-11") to centreline.

3.3 WIRING DEVICES

.1 Install wiring devices as follows:

.1 Where more than one local device is shown at one location, they are to be set under one cover plate.

.2 Install single throw switches with handle in "up" position when switch closed.

.3 Devices in gang type outlet box when more than one device is required in one location.

.4 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.

.5 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

.6 Install metal barriers where required.

.7 Remove insulation carefully from ends of conductors and connect wiring as required.

.8 Bond and ground as required.

3.4 SPLITTERS AND DEVICES

.1 Installation of splitters, junction boxes, pull boxes & cabinets as follows:

.1 Mount plumb, true and square to the building lines.

.2 Install in inconspicuous but accessible locations.

.3 Install pull boxes so as not to exceed 30 m (100') of conduit run between boxes or as indicated.

END OF SECTION

Part 1 General

1.1 SECTION CONTENTS

.1 Materials and equipment for moulded case circuit breakers.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International).

.1 CSA-C22.2 No. 5-13, Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489 and the second edition of NMX-J-266-ANCE-2013).

1.3 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results for Electrical.

1.4 SUBMITTALS

.1 Submit product data in accordance with Section 01 00 10.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

.2 Separate for reuse and recycling and place in designated containers, steel, metal, plastic waste in accordance with waste management plan.

Part 2 Products

2.1 GENERAL REQUIREMENTS

.1 Moulded-case circuit breakers: to CSA C22.2 No. 5.

.2 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation.

.3 Common-trip breakers: with single handle for multi-pole applications.

.4 Circuit breakers to have interrupting capacity rating as indicated.

.5 Circuit breakers dedicated to fire alarm services are to be red in colour.

2.2 THERMAL MAGNETIC BREAKERS (DESIGN A)

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

Part 3 Execution

3.1 INSTALLATION

.1 Provide and install a breaker for each outlet shown on drawings.

.2 Install circuit breakers as indicated by the Manufacturer.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Equipment and installation for ground fault circuit interrupters (GFCI).

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-C22.2 No.144-M91(R2001), Ground Fault Circuit Interrupters.

.2 National Electrical Manufacturers Association (NEMA)

.1 NEMA PG 2.2-1999, Application Guide for Ground Fault Protection Devices for Equipment.

1.3 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results - Electrical.

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 00 10.

.2 Submit product data and shop drawings.

.3 Submit test report for field testing of ground fault equipment to NRC Representative and a certificate that system as installed meets criteria specified herein.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling.

.4 Divert unused metal and wiring materials from landfill to metal recycling facility approved by NRC Representative.

.5 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 MATERIALS

.1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA-C22.2 No.144.

.2 Components comprising ground fault protective system to be of same manufacturer.

2.2 BREAKER TYPE GROUND FAULT INTERRUPTER

.1 Single or two-pole ground fault circuit interrupter as indicated, 1 phase circuit c/w test and reset facilities.

Part 3 Execution

3.1 INSTALLATION

.1 Do not ground neutral on load side of ground fault relay.

.2 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.2 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.

.2 Demonstrate simulated ground fault tests.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 00 10.

.2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by NRC Departmental Representative.

Part 2 Products

2.1 FINISHES

.1 Baked enamel finish.

.1 Metal surfaces of luminaire housing and reflectors finished with high gloss powder coated baked enamel applied after fabrication to give smooth uniform appearance, free from pinholes or defects.

2.2 METAL SURFACES

.1 Metal surfaces to be minimum 20 gauge steel, unless otherwise indicated.

2.3 LIGHT CONTROL DEVICES

.1 All luminaire lenses to be injection moulded clear virgin acrylic unless otherwise noted.

2.4 LUMINAIRES

.1 LED

.1 Type A:

.1 120V (universal voltage 120-277V), 610mm x 1220mm (2’x4’), 40W-43W, suitable for recessed mounting in T-bar or drywall ceiling.

.2 Rigid die embossed steel housing, 76mm deep, powder coated housing.

.3 5-year warranty.

.4 Removable LED boards and driver for ease of service/replacement.

.5 0-10V DC dimming.

.6 Rated to deliver L70 performance for 50,000 hours.

.7 4000k colour temperature, minimum 4000 Lumen output.

.8 Standard of acceptance: Philips 2TG43L840-4-FS-02F-UNV-DIM or equivalent approved by the NRC Departmental Representative.

.2 Type B:

.1 120V (universal voltage 120-277V), 610mm x 610mm (2'x 2'), 31W, suitable for recessed mounting in T-bar ceiling.

.2 Rigid die embossed steel housing, 76mm deep, powder coated housing.

.3 5-year warranty.

.4 Removable LED boards and driver for ease of service/replacement.

.5 0-10V DC dimming.

.6 Rated to deliver L70 performance for 50,000 hours.

.7 4000k colour temperature, minimum 3800 Lumen output.

.8 Standard of acceptance: Philips 2TG38L840-2-FS-02F-UNV-DIM or equivalent approved by the NRC Departmental Representative.

.3 Type C:

.1 120V, 2440mm x 240mm, suitable for suspended or flush mounting.

.2 Precision formed 18 gauge cold-rolled steel housing.

.3 5-year warranty.

.4 Removable LED boards and driver for ease of service/replacement.

.5 0-10V DC dimming.

.6 Rated to deliver L80 performance for 60,000 hours.

.7 3500k colour temperature, minimum 4800 Lumen output (per 4ft).

.8 Standard of acceptance: Philips 7806LBCQN-0871ET or equivalent approved by the NRC Departmental Representative

.4 Type D:

.1 l20V, square housing, 145mm, LED type, downlight suitable for recessed mounting.

.2 5-year warranty.

.3 0-10V DC dimming.

.4 Removable LED boards and driver for ease of service/replacement.

.5 Rated to deliver L70 performance for 90,000 hours.

.6 3500k colour temperature, 80+ CRI, minimum 3000 lumen output.

.7 Standard of acceptance: Lumenpulse LASM-A-120-L30-35K-CR80-W-SQ-WH-PDA1-NC or equivalent approved by the NRC Departmental Representative

.5 Type E:

.1 l20V, 1220mm (4'), LED strip, suitable for surface mounting.

.2 5-year warranty.

.3 0-10V DC dimming.

.4 Removable LED boards and driver for ease of service/replacement.

.5 Rated to deliver L70 performance for 50,000 hours.

.6 3500k colour temperature, 4000 lumen output minimum.

.7 Standard of acceptance: Philips LF-4-FR-39-35-1-DZT or equivalent approved by the NRC Departmental Representative.

.6 Type F:

.1 l20V power supply, 1259mm, LED strip, clear lens, white finish.

.2 5-year warranty.

.3 0-10V DC dimming.

.4 Rated to deliver L70 performance for 80,000 hours.

.5 3500k colour temperature.

.6 Standard of acceptance: Lumenpulse LUCRO-24V-48-35K-CL-WH or equivalent approved by the NRC Departmental Representative.

.7 Type G:

.1 l20V (universal), 127mm (5in) round, LED, suitable for recessed mounting.

.2 5-year warranty.

.3 0-10V DC dimming.

.4 Removable LED boards and driver for ease of service/replacement.

.5 Rated to deliver L70 performance for 50,000 hours.

.6 3500k colour temperature, 80 CRI, minimum 1500 lumen output.

.7 Standard of acceptance: Philips L5R-15-A-Z10-U-VA / LSR-15-8-35-VA / L5R-D-W or equivalent approved by the NRC Departmental Representative.

.8 Type H:

.1 l20V (universal), 1220mm (4’), LED, suitable for recessed mounting in T-bar or drywall ceiling.

.2 5-year warranty.

.3 0-10V DC dimming.

.4 Removable LED boards and driver for ease of service/replacement.

.5 Rated to deliver L70 performance for 50,000 hours.

.6 3500k colour temperature, 80 CRI, minimum 4200 lumen output.

.7 Standard of acceptance: Philips 1-T-G-42L-835-4-FS-02F-UNV-DIM-FMA14 or equivalent approved by the NRC Departmental Representative

.9 Type I:

.1 l20V, 580mm (2’), LED strip, suitable for suspended mounting.

.2 5-year warranty.

.3 0-10V DC dimming.

.4 Removable LED boards and driver for ease of service/replacement.

.5 Rated to deliver L70 performance for 50,000 hours.

.6 3500k colour temperature, minimum 4000 lumen output.

.7 Standard of acceptance: Philips LF-2-FR-39-35-1-DZT or equivalent approved by the NRC Departmental Representative.

Part 3 Execution

3.1 INSTALLATION

.1 Supply and install all lighting fixtures complete with lamps, switches, supports, etc., to provide a complete working lighting system.

.2 Locate and install luminaires as indicated.

3.2 LUMINAIRE SUPPORTS

.1 For suspended ceiling installations support each luminaire, including exit lights and pot lights, independently of the ceiling support system with separate chains at each end. No. 80 steel sash chain minimum.

3.3 WIRING

.1 Connect luminaires to lighting circuits directly for exit fixtures and exterior floodlights.

3.4 LUMINAIRE ALIGNMENT

.1 Align luminaires mounted in continuous rows to form a straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to building grid lines as shown on drawing.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 00 10.

Part 2 Products

2.1 EXIT LIGHTS

.1 Housing: Metal construction using Canadian cold-rolled steel. Frame and back plate shall each be of a one-piece construction.

.2 Faceplate(s) shall be constructed of robust clear poly-carbonate panels with an opaque border colored factory-white.

.3 Universal pictogram sign. Two pictogram films per face, for direction selection.

.4 Long-life white LED light source. Consumes less than 2.5W in AC mode and 1W in DC mode.

.5 Meets or exceeds CSA 22.2 No.141-10 standard for pictogram exit signs.

.6 Two-wire universal AC input: 120 to 347V. Two-wire standard DC input: 6 to 24Vdc.

.7 Universal mounting: end, wall or ceiling.

.8 Color: white.

.9 Standard of acceptance: Thomas&Betts LS series. LS1WU for single face and LS2WU for double face.

Part 3 Execution

3.1 EXIT LUMINAIRES

.1 Connect fixtures to emergency power circuits as indicated.

.2 Ensure that the exit light circuit breaker is locked in the "ON" position.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 REFERENCES

.1 Telecommunications Industry Association (TIA)

.1 ANSI/TIA/EIA 569-D, Commercial Building Standard for Telecommunications Pathways and Spaces.

1.3 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Raceways: Minimum 21mm (3/4") EMT larger sizes as indicated on drawing. Factory painted blue as per section 26 05 00.

.2 Tele-Power poles/Jiffy poles: type as indicated on drawings.

.3 Floor mounted outlets: type as indicated on drawings.

Part 3 Execution

3.1 CONDUIT SYSTEM

.1 Conduit and cable pathways installation shall comply with ANSI/TIA/EIA 569-D.

.2 Run conduit from wall outlets to 150mm (6") above false ceiling or to a point indicated on drawings.

.3 Install a steel pull box after every two 90° bends, or equivalent; or where there is a (U-shaped) bend in the run.

.4 Install additional steel pull boxes where necessary so that throughout the entire system, wires may be pulled in or withdrawn with reasonable ease. No section of conduit shall be longer than 30m (100ft) between pull points.

.5 Pull boxes shall be placed in a straight section of conduit and shall not be used in lieu of a bend. The corresponding conduit ends shall be aligned with each other.

.6 Where a pull box is required with conduits equal or smaller than 27mm (1”), an outlet box may be used as a pull box. For conduits above 27mm (1”), the pull box shall be size as per ANSI/TIA/EIA 569-D or as noted on the drawings.

.7 Bending radius for conduits equal or less than 50mm (2”) shall be no less than 6 times the internal diameter of the conduit. Bending radius for conduits more than 50mm (2”) shall be no less 10 times the internal diameter.

.8 No conduit body (Condulet), LB type or other, shall be used unless otherwise indicated on the drawings or pre-approved by the departmental representative.

.9 Conduits shall be reamed to eliminate sharp edges and terminated with insulating nylon bushings.

.10 Install nylon pull-cords in all empty conduits.

.11 Clearly identify conduits at each end.

.12 Paint all elbows and pull box covers blue. (This identifies the conduit as conduit dedicated to voice/data wiring.)

.13 Do not run communications cables in the same raceway as power and lighting conductors.

.14 Grounding and bonding to the Canadian Electrical Code (CEC).

3.2 MOUNTING

.1 Recess mount wall outlets unless otherwise indicated. Mount wall outlets to height specified in section 26 27 26 or as indicated.

3.3 WORK BY OTHERS

.1 Cables and terminations.

END OF SECTION

Part 1. General

1.1 RELATED REQUIREMENTS

.1 Section 26 05 00 - Common Work Results – Electrical

1.2 REFERENCE STANDARDS

.1 ASTM International
.1 ASTM E1573-[09] – Standard Test Method for Evaluating Masking Sound in Open Office Using A Weighted and One-Third Octave Band Sound Pressure Levels

.2 CSA Group

.1 CSA CMP 75C FT6: Communications cable intended for use within buildings in ducts or plenums or other spaces used for environmental air...

.3 Industry Canada

.1 ICES-003 (Industry Canada): Interference-Causing Equipment Standard.

.2 IEC 60065: Standard for Audio, Video and Similar Electronic Apparatus – Safety Requirements
.3 RoHS: Restriction of Hazardous Substances Directive 2002/95/EC
.4 Underwriters Laboratory
.1 UL 1310: Standard for Class 2 Power Units.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for [sound masking system] and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Installation Drawings:
.1 Submit installation drawings and details.
.2 Include:
.1 Total number of loud speakers.
.2 Total number of masking zones.
.3 Minimum, maximum and average number of loud speakers per zone.

.4 Certificates: submit certificates signed by manufacturer certifying that sound masking system complies with specified performance characteristics and physical properties.

1.4 QUALITY ASSURANCE

.1 Qualifications:
.1 Manufacturer qualifications: company specializing in manufacturing the products specified in this Section with minimum [10] years experience.

.2 Installer qualifications: company specializing in performing Work of this Section with minimum 10 years' experience.
.3 System adjustment: to be performed by approved manufacturer representative

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 00 10 00 General Instructions and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect sound masking equipment from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

Part 2. PRODUCTS

2.1 SYSTEM DESIGN

.1 Design system in accordance with manufacturer's specifications.

2.2 SYSTEM PERFORMANCE REQUIREMENTS

.1 System Architecture
.1 System: networked-decentralized architecture with addressable masking devices distributed throughout installation area.

.2 Masking Sound Generation

.1 Provide independent sound masking generator for each masking control zone.

.2 Masking sound to be random and provide no noticeable repetitive pattern.

.1 Simulated random generation cycles to exceed 24 hours.

.3 System Control

.1 System must include PC control interface capable of making and displaying sound masking, paging and sound masking timer settings.
.2 System settings to be digital and adjusted by PC control interface or control panel.
.3 PC control interface to be capable of displaying and reporting on all system settings affecting masking/paging performance.
.4 Sound masking system:
.1 Arrange into zones of loudspeakers based on common installation conditions.
.2 Each zone:
1. not to exceed 2 loudspeakers in size as per attached layouts.
2. Each meeting room and office is to be zoned independent of any other area.
3. individually addressable and controllable for fine tuning of system.

.5 Use digital signal processing (DSP) technology for masking sound generation and adjustment of masking and paging signals.

.6 Each zone to be independently controllable through network device with capabilities as follows:

.1 Third-octave band equalizer with adjustment capabilities for minimum 21 third-octave bands for masking signal, capable of equalizing masking signal output to loudspeakers within corresponding zone.

.2 Equalizers to provide minimum adjustment range of 100 to 10,000 Hz.

.3 Masking volume to be adjustable within each zone in 0.5 dBA increments over range of 35 dBA to 85 dBA at a distance of 1m.

.4 All output adjustments to be implemented by control panel or PC control interface.

.4 Acoustical Performance Requirements

.1 Prior to commissioning system, with mechanical system operating at normal daytime levels and with furnishings in place, third-octave sound measurement samples to be taken throughout facility.

.1 Identify and measure building noises that prevent achieving the preferred spectrum identified below.

.2 Provide report of these measurements to NRC Departmental Representative.

.2 With exception of those areas identified above, other areas to conform to masking sound levels defined in paragraph 2.01.4.6 and sound spectrum defined in paragraph 2.01.4.7.

.3 Uniformity in third-octave bands between 100Hz and 5000Hz to vary no more than +/-2dB.

.4 Variations that exceed levels defined in paragraph 2.01.4.3 to be basis for additional zones provided at vendor's expense.

.5 Masking sound levels as indicated] [as defined by Acoustical Engineer;

.1 42 dBA in meeting rooms.

.2 43 dBA in private offices.

.3 47 dBA in open plan areas.

.6 After adjustment, system to provide spatial uniformity of +/-0.5dBA for overall sound level.

.1 Areas where excessive building noise prevents this target from being achieved to be noted and included in system report as per paragraph 2.01.4.1.2.

.7 Reference sound masking spectrum:

Table 1. NRC Canada Optimum Spectrum - 45.0dBA Overall

Band Center Frequency (Hz)	***Decibels (dB)***
100	46.9
125	45.9
160	44.7
200	43.9
250	42.7
315	41.4
400	40.4
500	38.9
630	37.4
800	35.4
1,000	33.7

1,250	31.4
1,600	29.4
2,000	27.4
2,500	24.9
3,150	22.4
4,000	19.4
5,000	16.4

.5 Timer Performance

.1 System:
- .1 Equipped with timer function allowing masking volume levels to be automatically adjusted according to programmed schedule.
- .2 Equipped with calendar-based programmable timer function.
- .3 Provided with automatic daylight saving time adjustments.
- .4 Provide acclimatization process that automatically increases masking volume over period of time according to programmed schedule.
  - .1 Allow for independent acclimatization schedules for each timer zone.
- .5 Allow independent timer schedules for each day of week.
- .6 Allow variable rates of volume adjustment.

.2 Each masking zone to be individually assignable to a timer zone.
- .1 Allow for up to 150 independent timer zones.

.6 Paging / Background Music Performance

.1 Provide system with overhead paging with, and without, interruption of masking sound.
.2 Paging/music volume adjustment: independent of masking volume adjustment.
.3 Each masking device:
- .1 With independent paging/music volume control.
- .2 With minimum one-octave, 8-band equalizer for paging/music.

.7 In-Room Occupant Control

.1 System: include wall-mounted, in-room control giving facility occupants manual control over loudspeaker volume in designated rooms.

.8 Diagnostic Performance

.1 System: capable of identifying non-functioning electronic components.

.9 Reporting Performance

.1 PC control interface: capable of reading and displaying current settings for masking, paging and timer zones.
.2 System: capable of generating detailed reports of system settings down to level of each zone.

.10 Security Performance

.1 Below-ceiling electronic components: contained in locked metal enclosure.

.2 Access to control functions: password protected.
.3 System: allow for settings to be backed up on electronic storage medium.

2.3 SOURCE QUALITY CONTROL

.1 Provide sound masking components, loudspeakers, controls and cables from single manufacturer for project.

Part 3. EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sound masking equipment installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of NRC Departmental Representative.
.2 Inform NRC Departmental Representative of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NRC Departmental Representative.

.2 Verify dimensions, tolerances, and ceiling types.

.3 Verify plenum height is suitable.

3.2 INSTALLATION

.1 Install sound masking system in accordance with manufacturer's instructions and installation drawings.

.2 Ensure supplementary materials used meet applicable codes and standards.

3.3 FIELD QUALITY CONTROL

.1 Suspend loudspeakers level and plumb with no obstructions.

.2 Securely support cabling in ceiling

3.4 COMMISSIONING AND REPORTING

1. .2 Commission the sound masking system with
   a. ceilings fully installed,
   b. all furnishings in place,
   c. mechanical systems operating at normal daytime levels,
   d. no occupant noise during measurements.
2. Select a commissioning location within each local control zone.
   a. Mark the commissioning location precisely on the as-built system design.
   b. Assign the commissioning location an alphanumeric ID.
3. Conduct third-octave sound level measurements:
   a. Use an ANSI Type 1 third-octave sound level analyzer.
   b. Set analyzer for A-weighted equivalent average level (Leq).
   c. Set analyzer for fast response.

d. Hold the analyzer microphone oriented upwards at a height between 1.2 to 1.4 meters (4 to 4.7 feet) from the floor.
e. Move the analyzer through a slow horizontal arc of at least 60 centimeters (2 feet) during the measurement period.
f. Keep the analyzer at least 1 meter (3.3 feet) away from vertical or horizontal surfaces.
g. Measure for at least 15 seconds.

4. Conduct a third-octave sound level measurement with the sound masking deactivated to document existing conditions at each commissioning location.
    a. Identify any third-octave band in existing conditions that exceeds the target band level for that location.
5. Adjust the sound masking at each commissioning location to conform to the sound masking curve and overall volume for that location as defined in Section 2.01.04
    a. The volume in each third-octave band from 100 Hz and 5000 Hz inclusive is within plus or minus two decibels (+/- 2 dB) of the target band level.
        i. Unless existing conditions exceed the maximum limit for the band.
    b. The overall volume is within plus or minus one half decibel (+/- 0.5 dBA) of the overall volume.
        i. Unless existing conditions cause overall volume to exceed tolerances.
6. If the sound masking curve and overall volume requirements are not met at a commissioning location, modify the system design, installation or commissioning, at the supplier's expense, until conformance is achieved.
    a. Unless deviation can be shown to be due to existing conditions.

A. Provide an electronic report of testing and commissioning data, including:
1. As-built system design(s) showing all commissioning locations with ID references and local control zones.
2. A table and graph of commissioned sound masking measurements for each commissioning location, including:
    i. Third-octave levels for bands within the sound masking curve.
    ii. Overall volume level.
    iii. The sound masking curve, overall volume and tolerances specified for that location.
3. Explanation of any sound masking measurements which exceed tolerances for the sound masking curve or overall volume with a table and graph of existing conditions measurements for each such commissioning location, including:
    i. Third-octave levels for bands within the sound masking curve.
    ii. Overall volume level.

3.5 CLEANING

.1 .1 Leave work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.6 CLOSEOUT ACTIVITIES

.1 Training: arrange for installer to demonstrate to NRC personnel in operation and maintenance of sound masking equipment in accordance with Section 00 10 00 – General Conditions.

3.7 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by sound masking installation.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results For Electrical.

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

1.3 SCOPE OF WORK

.1 Supply and install all required material, equipment and labour to provide the fire alarm changes and additions as shown on the drawings and indicated by this section of the specification.

1.4 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)
- .1 CAN/ULC-S524-2014, Standard for the Installation of Fire Alarm Systems.(ULC 524)
- .2 CAN/ULC-S525-2016, Audible Signal Device for Fire Alarm Systems. (ULC 525)
- .3 CAN/ULC-S526-2016, Visual Signal Devices for Fire Alarm Systems. (ULC 526)
- .4 CAN/ULC-S527-2011, Control Units. (ULC 527)
- .5 CAN/ULC-S528-2014, Manual Pull Stations for Fire Alarm Systems. (ULC 528)
- .6 CAN/ULC-S529-2016, Smoke Detectors for Fire Alarm Systems. (ULC 529)
- .7 CAN/ULC-S530-M91, Heat Actuated Fire Detectors for Fire Alarm Systems. (ULC 530)
- .8 CAN/ULC-S536-2004,Inspection and Testing of Fire Alarm Systems. (ULC 326)
- .9 CAN/ULC-S537-2004, Verification of Fire Alarm Systems. (ULC 537)

1.5 SUBMITTALS

.1 Product Data:
- .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with PART 1- SUBMITTALS.

.2 Shop Drawings:
- .1 Submit shop drawings in accordance with PART 1- SUBMITTALS. Include:
  - .1 Detail assembly and internal wiring diagrams for control units.

.2 Overall system riser wiring diagram identifying control equipment initiating zones, signaling circuits; identifying terminations, terminal numbers, conductors and raceways.
.3 Details for devices.
.4 Details and performance specifications for control, annunciation and peripherals with item by item cross reference to specification for compliance.
.5 Step-by-step operating sequence.
.6 Complete input/output correlation schedule.
.7 Battery and power calculation, showing compliance with this specification.
.8 Bill of material for equipment shipping.

.3 Quality assurance submittals: submit following in accordance with PART 1-SUBMITTALS.
.1 Certificates:
.1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.2 Submit certificate signed by manufacturer certifying that fire alarm technician is approved to provide installation and verification services on the existing equipment.
.3 Sub certificates signed by training provider (IBEW or CFAA) that installers are certified to install fire alarm systems.
.2 Instructions: submit manufacturer's installation instructions.
.3 Manufacturer's Field Reports: fire alarm verification reports.
.4 Closeout Submittals:
.1 Instructions for all added components of the fire alarm system to permit effective operation and maintenance.
.2 Technical data - illustrated parts lists with parts catalogue numbers.
.3 Copy of approved shop drawings with corrections completed and marks removed except review stamps.
.4 Approved fire alarm verification report.
.5 Warranties and Guarantees.
.6 Acceptance report by Authority having jurisdiction
.7 List of recommended spare parts for system.
.8 Proof of acceptance of training to owner's representative.
.9 As-built drawings showing device and conduit locations size, wiring counts wire size and device address.

1.6 QUALITY ASSURANCE

.1 Qualifications:
.1 Installer: company or person specializing in fire alarm system installations with 5 -years documented experience, approved by manufacturer. IBEW or CFAA certified to install fire alarm systems.

.2 Fire Alarm Technician:
.1 provide services of representative or technician from manufacturer of system, experienced in installation and operation of type of system, to supervise installation, adjustment, preliminary testing, and final testing of system and to provide instruction to

project personnel.

.3 System:

.1 Subject to Departmental Representative inspection for final acceptance.
.2 Subject to Commissioning Manager inspection.

.4 Extra Materials:
.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.5 Maintenance Service:
.1 Take over maintenance of existing system in the area of construction during construction period. Coordinate services with existing building service provider. Provide all inspection tests required to conform to ULC 536. Submit inspection report to Departmental Representative.

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:
.1 Construction/Demolition Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Equipment and devices: ULC listed and labelled and supplied by existing fire alarm system manufacturer.

.2 Audible signal devices: to ULC 525.

.3 Visual signal devices: to ULC 526.

.4 Control unit: to ULC 527.

.5 Power supply: to ULC 527.

.6 Manual pull stations: to ULC 528.

.7 Smoke detectors: to ULC 529.

.8 Thermal detectors: to ULC 530.

2.2 SYSTEM OPERATION

.1 Retain existing sequence of operations for all device types.

.2 Provide separate circuits from control panel to each new zone of initiating devices and indicating devices.

.3 Provide isolator modules for existing addressable device circuits extended into new zones.

2.3 CONTROL PANEL

.1 Control panel is existing. Provide modifications required to support system changes indicated or required to provide a complete system.

.2 System Capacity:

.1 Confirm loading of existing input and output circuits prior to modifying system.

.2 Where existing loading is more than 90% of system capacity, make such extensions or additions of existing equipment as indicated or required to provide a complete system.

.3 New circuits shall be designed to be loaded not more than 80% of its capacity.

.4 Initiation and control circuits and devices:

.1 Addressable.

.2 Class A wiring.

.3 Circuits to provide power and communications to individual devices over 2 wires.

.4 Devices to communicate individual status to control panel/transponder.

.5 Device address to be set in the field.

.6 Addressable field devices to be provided only in environments within their listed operating range where temperature or relative humidity is outside device operating range provide a conventional device and an addressable monitor module located elsewhere.

.5 Signalling circuits:

.1 Class B.

.2 All signal outputs to be synchronized.

2.4 POWER SUPPLY

.1 Power supply is existing. Provide modifications required to support system changes indicated or required to provide a complete system.

.2 System Capacity:

.1 Confirm loading of existing power supply capacity prior to modifying system.

.2 Where existing loading is more than 90% of system capacity, make such extensions or additions of existing equipment as indicated or required to provide a complete system.

.3 New circuits and batteries shall be designed to be loaded not more than 80% of its capacity.

2.5 MANUAL ALARM STATIONS

.1 Provide non-coded addressable single action single stage type with mechanical reset features.

.2 Stations: surface mounted and interior type as indicated.
- .1 For surface mounting provide station manufacturer's approved back box.
- .2 Back box finish to match station finish.

.3 Equip each station with terminal strip with contacts of proper number and type to perform functions required.

.4 Stations: type not subject to operation by jarring or vibration.
- .1 Break-glass-front stations are not permitted; pull-lever break-rod type is acceptable provided presence of rod is not required to reset station.

.5 Station colour: red.

.6 Provide station with visible indication of operation.

.7 Restoration to require use of key.
- .1 Keys: identical throughout system for stations and control panel(s).

2.6 AUTOMATIC ALARM INITIATING DEVICES

.1 Heat detectors: provide heat detectors designed for detection of fire by combination fixed temperature and rate-of-rise principle.

.2 Combination Fixed Temperature and Rate-Of-Rise Detectors (Spot Type): designed for surface outlet box mounting and supported independently of conduit, tubing or wiring connections.

- .1 Contacts: self-resetting after response to rate-of-rise actuation
- .2 Operation under fixed temperature actuation to result in external indication.
- .3 Fixed portion to activate at 57°C.
- .4 Rate of rise portion to activate at 9°C per minute.
- .5 Rated spacing 1525 mm minimum.

.5 Spot type smoke detectors:
- .1 Combined photoelectric ionization and heat sensors.
- .2 Environmental compensation: detector to adjust sensitivity automatically based on operating environment.
- .3 Advanced detection algorithm: detector to respond quickly to known fire signatures.
- .4 Detectors and associated modules: compatible with control panel and suitable for use in supervised circuit.
- .5 Equip each detector with visible indicator lamp that will flash when detector is in

normal standby mode and glow continuously when detector is activated.

.6 Provide remote indicator lamps for each detector that is located concealed from view.

.7 Each detector: plug-in type with tab-lock or twist-lock, quick disconnect head and separate base in which detector base contains screw terminals for making wiring connections.

.8 Detector head: removable from its base without disconnecting wires. Removal of detector head from its base to cause activation of system trouble signals.

2.7 REMOTE MONITOR MODULE

.1 Provide Class A input monitor circuits to monitor conventional field devices.

.2 Custom programmable to provide any input type to control panel.

2.8 LINE ISOLATOR MODULES

.1 Short circuit line isolation.

.2 Self restoring.

.3 LED to indicate when activated.

2.9 AUDIBLE SIGNAL DEVICES

.1 Audible device(s):

.1 Bells: surface mounted, steel, polarized, 24 V dc, 150 mm, 89 db.

.3 For surface mounting provide appliance manufacturer's approved back box with no knockouts. FS box acceptable alternative. Back box finish to match appliance finish.

.4 All audible sounds to be synchronized through area.

2.10 VISUAL ALARM SIGNAL DEVICES

.1 Surface-mounted assembly of stroboscopic type suitable for use in electrically supervised circuit and powered from notification appliance circuits.

.2 Strobe outputs as shown or to meet ULC 524 requirements.

.3 Protect lamps with thermoplastic lens labelled "FIRE/FEU" in letters at least 12 mm high. Pictograms are an acceptable alternative.

.4 All visual devices to be self-synchronizing and synchronized throughout area.

2.11 REMOTE RELAY MODULE

.1 Single FORM C relay operation.

.2 Contacts to be rated for 2A, 120 VAC inductive circuit control.

.3 LED to indicate device operation.

2.12 END-OF-LINE DEVICES

.1 End-of-line devices to control supervisory current in signalling circuits, sized to ensure correct supervisory current for each circuit. Open , short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel.

2.13 CONDUIT

.1 Rigid Steel Conduit:
- .1 Zinc-Coated.

.2 Electrical Metallic Tubing (EMT):

.3 Surface Metal Raceway and Fittings:
- .1 Two-piece painted steel.
- .2 Totally enclosed snap-cover type.

.4 Neatly mark each coupling, box cover and conduit at each side of walls with red paint stripe or tape.

2.14 WIRING

.1 Wire for 120 V circuits: No. 12 AWG minimum solid copper conductor.

.2 Twisted copper conductors: FAS rated.

.3 To initiating circuits: 18 AWG minimum, and in accordance with manufacturer's requirements.

.4 To signal circuits: minimum 16 AWG minimum, and in accordance with manufacturer's requirements.

.5 To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements. Multi-conductor cables are not permitted.

.6 Insulation 90 degrees C minimum with nylon jacket.

.7 For underground or wet locations cable: type UF.

.8 Colour code wiring.

2.15 EQUIPMENT IDENTIFICATION

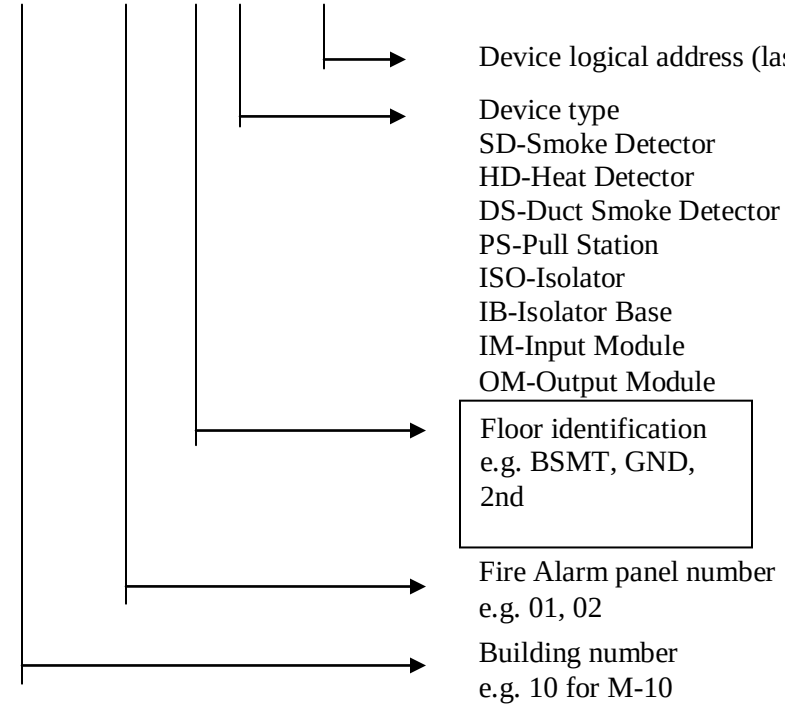
.1 Label each manual alarm station and each audible signal device with its unique identification number as per drawings. Use lamicoid nameplates as per Section 26 05 00.

.2 Label each initiating device use P-Touch type as per Section 26 05 00. Devices are to be numbered per the format shown below.

Example M-10 fire alarm #1 Heat detector 000001

10FAS-01-GND-HD-000001

XXFAS-XX—XX-XX-XXXXXX



.3 Apply red paint to the covers of junction boxes and condulets of fire alarm conduit.

.4 Label wires as per drawing and as per Section. 26 05 00.

.5 Update remote annunciator panels and fire alarm panel zone directories if new zones are added to the system.

2.16 AS-BUILT RISER DIAGRAM

.1 Fire alarm system riser diagram: [in glazed frame] [on black lamicoid sheet with bevelled edges, white lettering and designations,] minimum size 600 x 600 mm.

Part 3 EXECUTION

3.1 AUTOMATIC ALARM INITIATING DEVICES

.1 Locate detectors in accordance with their listing by ULC and the requirements of ULC 524, except provide at least 2detectors in rooms of 54 square meters or larger in area.

.2 Mount detectors at underside of ceiling or deck above unless otherwise indicated.

.1 For mounting heights greater than 3m above floor level, reduce actual detector linear spacing from listed spacing as required by ULC 524.

.2 For heights greater than 9m space detectors no farther apart than 34% of their listed spacing.

.3 Locate detectors minimum 300mm away from lighting fixtures and not closer than 600mm to air supply or return diffuser.

.4 Ensure detectors, located in areas subject to moisture or exterior atmospheric conditions or hazardous locations as defined by The Canadian Electrical Code, are approved for such locations.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.3 INSTALLATION

.1 Install systems in accordance with ULC 524.

.2 Modify central control unit and power supply. Provide programming, additional circuits, lamps, labels etc. Provide additional circuit control equipment where required.

.3 Extend circuits from existing field devices. Do not extend circuits from an existing junction box. If wiring extended from an existing junction box, a verification of all the devices on the entire existing circuit will be required.

.4 Locate and install field devices and connect to appropriate circuit following ULC 524 and specified placement rules.

.1 Mount manual alarm stations with operating lever not more than 1.2 m above finished floor.

.2 Locate manual alarm stations on latch side of door not more than 600 mm from door edge.

.3 Locate remote lamps not more than 1800 mm above floor and not more than 600 mm from door of mechanical rooms.

.1 Coordinate location with Engineer in finished areas.

.4 Coordinate exact location of isolator modules on site with Engineer.

.1 Install modules not more than 1800 mm above finished floor.

.5 Connect new circuits to main control panel.

.6 Install end-of-line devices at end of circuits where required.

.7 Install door releasing devices.

.8 Splices are not permitted.

.9 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and CCU, as required by equipment manufacturer.

.10 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.

.11 Identify circuit and other related wiring at central control unit, annunciators, and terminal boxes.

3.4 SCHEDULING OF SHUTDOWNS

.1 Make written shutdown request to the NRC Departmental Representative at least 48 hours in advance. Acceptance of shutdown request will be determined by the NRC Departmental Representative based on building user needs. Fire alarm systems are to be shut down by NRC staff only. **Contractor is not to shutdown system on their own.**

3.5 INTEGRATION INTO SYSTEM MONITORING AT BUILDING M-1

Presently all NRC buildings in Ottawa report back their fire alarm status to the M1 building central monitoring station. The monitoring station consists of a computer graphics terminal showing building layouts of each building, and is linked on an internal NRC network. The new fire alarm system under this contract must communicate all addressable input points to the existing computer graphics monitoring station, Fireworks by Chubb Edwards. All required modifications to the existing Fireworks station are to be included in this tender.

.1 Addressable devices:

.1 Integrate any new addressable devices installed as part of this project into the monitoring system at building M-1.

.2 Remove from the monitoring system at building M-1 any addressable devices removed as part of this project.

.3 Make appropriate changes to the monitoring system at building M-1 to reflect any relocated addressable devices.

.4 All work on the monitoring system at building M-1 is to be done by factory trained technician.

.2 Conventional (non-addressable) devices:

.1 Integrate any new zones installed as part of this project into the monitoring system at building M-1. This is to be done by factory trained technician.

.2 Remove from the monitoring system at building M-1 any zones removed as part of this project.

.3 Make appropriate changes to the monitoring system at building M-1 to reflect any zone location changes as appropriate.

.4 All work on the monitoring system at building M-1 is to be done by factory trained technician.

3.6 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results - for Electrical and ULC 537.

.2 Fire alarm system:

.1 Test such device and alarm circuit to ensure manual stations, thermal and smoke detectors transmit alarm to control panel and actuate general alarm.

.2 Check annunciator panels to ensure zones are shown correctly.

.3 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of system.

.4 Addressable circuits system style DCLA:

.1 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals on each side of single open-circuit fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.

.2 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals during ground-fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.

.3 Provide testing documentation with the ULC 537 verification report for each isolator sequence tested: documentation to include list of all isolators and devices failed (include device address) during each sequence.

3.7 TRAINING

.1 Provide on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

.2 Provide proof of acceptance of training by owner.

3.8 REMOVAL OF OLD EQUIPMENT

.1 Decommission, disconnect and remove redundant/un-used fire alarm equipment following acceptance of the new fire alarm system.

3.9 CLEANING

.1 Upon completion, verification of performance of installation, and old equipment removal, remove surplus materials, excess materials, rubbish, tools and equipment.

Hazardous Building Materials Assessment

Building M-58, 1200 Montreal Road, Ottawa, Ontario

Prepared for:

National Research Council Canada
1200 Montreal Road
Ottawa, ON K1A 0R6

Attention: Derek Foot
Construction Project Manager

September 28, 2016

Pinchin File: 113237

MEMBER OF
THE PINCHIN GROUP

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EXECUTIVE SUMMARY

National Research Council Canada (Client) retained Pinchin Ltd. (Pinchin) to conduct a hazardous building materials assessment in Building M-58, 1200 Montreal Road, Ottawa, Ontario. Pinchin performed the assessment on May 3, May 28, July 8, July 28, and August 16, 2016.

The objective of the assessment was to identify specified hazardous building materials in preparation for building renovation. The results of this assessment are intended for use with a properly developed scope of work and performance specification.

The assessed area consisted of the east and west wings of the ground floor as shown on the drawings in Appendix I.

SUMMARY OF FINDINGS

Asbestos: Asbestos-containing materials (ACM) were confirmed to be present as follows:

- Friable sprayed fireproofing;
- Friable remnant sprayed fireproofing;
- Friable parging cement pipe fittings;
- Friable “Aircell” pipe straight insulation;
- Friable “Sweatwrap” pipe straight insulation;
- Potentially friable plaster (due to contamination from fireproofing);
- Non-friable black tar on square ducts, round ducts, hangers, pipe insulation and plaster walls;
- Non-friable burgundy duct sealant;
- Non-friable perimeter sealants; and
- Non-friable grey caulking on exterior window flashings.

Lead: Lead was confirmed present in select paints/surface coatings and is present in emergency light batteries and pipe fittings.

Silica: Crystalline silica is present in concrete, mortar, brick, masonry, and ceramics in the assessed area.

Mercury: Mercury vapour is present in fluorescent lamps and liquid mercury is present in thermostat ampules.

Polychlorinated Biphenyls (PCBs): PCBs may be present in light ballasts.

Mould: Mould-impacted building materials were not identified.

SUMMARY OF RECOMMENDATIONS

The following is a summary of significant recommendations; refer to the body of the report for detailed recommendations:

1. Remove and properly dispose of asbestos-containing materials identified in planned renovation areas.
2. Remove and properly dispose of PCB ballasts and mercury-containing items in the planned renovation areas.
3. Follow appropriate safe work procedures when handling or disturbing lead and silica.

Please refer to Section 4.0 of this report for detailed recommendations regarding administrative, and renovation activities.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

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APPENDICES

1.0 INTRODUCTION AND SCOPE

National Research Council Canada (Client) retained Pinchin Ltd. (Pinchin) to conduct a hazardous building materials assessment in Building M-58, 1200 Montreal Road, Ottawa, Ontario.

Neil Box, Senior Project Manager performed the assessment on May 3, May 28, July 8, July 28 and August 16, 2016. The surveyor was accompanied by NRC or security personnel during the assessment. The building was occupied during assessment with the exception of the May 28 portion of the assessment.

The objective of the assessment was to identify specified hazardous building materials in preparation for building renovations. This assessment is intended to be used for pre-construction purposes only, and may not provide sufficient detail for long term management of hazardous materials as required by Health and Safety regulations. The results of this assessment are intended for use with a properly developed scope of work and performance specification.

1.1 Scope of Assessment

The assessment was performed to establish the location and type of specified hazardous building materials incorporated in the structure(s) and its finishes. The assessed area was limited to the parts of the building within the area to be renovated, including the central core, east and west wings of the ground floor. These areas were initial divided into phases: Phase 2 (west wing); Phase 3A (east wing), Phase 3B (north central washrooms) and Phase 4 (central core). The client requested additional assessment, including the induction units in the first floor vestibule (north), and the hot water supply and return lines servicing ground floor located in the basement level. The extent of the assessed areas were defined by the Client and are shown on the appended drawings. For the purpose of this report, phase 4 will be reported separately as per the Clients request.

For the purpose of the assessment and this report, hazardous building materials are defined as follows:

- Asbestos;
- Lead;
- Silica;
- Mercury;
- Polychlorinated Biphenyls (PCBs); and
- Mould.

The following Ontario Designated Substances are not typically found in building materials in a composition/state that is hazardous and were not included in this assessment:

- Arsenic;
- Acrylonitrile;
- Benzene;
- Coke oven emissions;
- Ethylene oxide;
- Isocyanates; and
- Vinyl chloride monomer.

2.0 BACKGROUND INFORMATION

Building Description Item	Details
Building Use	Office Space and printing space
Number of Floors/Levels	Four storeys plus one below grade
Structure	Structural steel, concrete
Exterior Cladding	Pre-cast concrete, brick
HVAC	Ground Floor HVAC, Boiler and hot water heating to radiators
Flooring	Vinyl tile, terrazzo, ceramic tiles
Interior Walls	Drywall, plaster, concrete block, concrete
Ceilings	Drywall, plaster, acoustic ceiling tile, metal pan ceiling

2.1 Inaccessible Areas

Due to the know presence of asbestos-containing fireproofing on the deck above metal pan ceilings, Type 2 procedures were used to access the ceiling space in phases 3A and 3B. Due to the limitations presented by Type 2 isolation isolations, visual access to all areas above metal pan ceiling tiles was not possible.

2.2 Existing Reports

Pinchin was provided, and instructed to rely upon, the following existing reports:

- Designated Substances Survey, Building M-58, March 2007, Oakhill Environmental Inc. (File No.PR-06-39); and
- Summary Report – Project-Specific Designated Substances Survey, Ground Floor, South Wing, Building M-58, National Research Council, September 2015, DST Consulting Engineers (File No. BE-OT-21545).

3.0 FINDINGS

3.1 Asbestos

3.1.1 Suspect Building Materials Not Found

The following types of building materials may historically contain asbestos but were not observed in the assessed area and are not discussed in the report findings:

- Texture finishes (acoustic/decorative);
- Vermiculite in concrete block wall cavities;
- Asbestos cement products; and
- Vinyl sheet flooring.

3.1.2 Spray-Applied Fireproofing and Thermal Insulation

Beige (fibrous) fireproofing, containing amosite asbestos, is present on structural steel beams within the assessed area contains amosite asbestos (samples S0012A – Phase 3A, photos 1 and 2). Overspray from asbestos-containing sprayed fireproofing is present on concrete block walls, pipes, ducts, conduit, cabling, hangers, junction boxes, etc. (samples S0021A-C – Phases 3A and 3B). Sprayed fireproofing is also present in riser shafts present in Phases 2, and 3B (photo 3). A total foot print of approximately 8,300 square feet is present in Phases 2, 3A and 3B, mostly above 12”x24” metal pan ceiling tiles with fibreglass back.

Asbestos-containing fireproofing may be present as debris or overspray in pipe risers and shafts within the assessed area where walls extend to the structure/fireproofing. Based on historic knowledge of the first floor, there is potential for debris to be present in the wall cavity behind the induction units in the 1st floor vestibule.

A newer style of grey (fibrous) fireproofing is present on the north and south ends of the east wing – Phase 3A printing area. This original beige amosite asbestos-containing sprayed fireproofing and metal

pan ceilings in this area was reportedly removed and replaced with the newer material (photo 4). The details such as the date of this remediation are unknown; however, remnant amosite asbestos was found in the current sprayed fireproofing in this area (sample S0013A-E). This result suggests potentially incomplete removal of the original asbestos-containing sprayed fireproofing. Visually similar grey fibrous sprayed fireproofing is also present in the west wing – Phase 2. This material was not sampled; however, sprayed fireproofing is present in a plaster wall sample collected above the lay-in ceiling tiles (sample S0006A, photo 5). It should be assumed that debris is present on horizontal surfaces (including the tops of walls, and within pipe chases). A total foot print of approximately 6,900 square feet is present in Phases 2 and 3A.

As a general rule, in areas where the building was originally sprayed with asbestos-containing sprayed fireproofing that has been removed and replaced, it is not possible to locate minor amounts of residual sprayed asbestos left in these areas after application of new, non-asbestos fireproofing. Such residual materials may be present within cavities, shafts, within walls, or fully or partially covered with new asbestos-free re-spray. To attempt to locate these residual pockets of ACM would require extensive demolition, visual investigation of literally every square meter and likely extensive removal and replacement of the new fireproofing.

Photo 1 – Friable asbestos-containing sprayed fireproofing on structural beams

Photo 2 – Friable asbestos-containing sprayed fireproofing on structural beans with overspray on deck

Photo 3 – Friable sprayed fireproofing in a riser – Phase 3B

Photo 4 – Newer grey sprayed fireproofing in the print area – East Wing Phase 3A. Remnant asbestos-containing fireproofing was identified

Photo 5 – Friable sprayed fireproofing debris on top of the perimeter plaster wall – West Wing Phase 2

3.1.3 Thermal Systems Insulation (TSI)

3.1.3.1 Pipe Insulation

Parging cement insulation is present on pipe fittings (elbows, fittings, etc.) on pipe systems within the assessed areas (photos 6 and 7). The parging cement is visually similar to chrysotile asbestos containing insulation identified by Oakhill (samples M-58-02). Parging cement is a friable insulation, jacketed with canvas and is in good condition. Approximately 275 fittings are located in the ceiling spaces of Phases 3A and 3B, associated with the perimeter heating units along the floor in Phases 2 and 3A. Approximately 100 fittings are present on the hot water supply and return systems associated with the perimeter heating units in the basement below the east and west wing ground floor work areas.

A grey corrugated paper insulation (trade name Aircell), and brown layer paper insulation (known as sweatwrap) are present on straight sections of pipes throughout the East Wing and Central Core (Phases 3A, 3B, photo 8). The Aircell and sweatwrap insulations are visually similar to chrysotile asbestos containing insulation identified by Oakhill (samples M-58-01 and M-58-04 respectively). Approximately 1,000 linear feet of Aircell and sweatwrap are present in Phases 2, 3A and 3B. Aircell and sweatwrap are friable insulations, jacketed with canvas, and in good condition. Approximately 450 linear feet of Aircell is present on the hot water supply and return systems associated with the perimeter heating units in the basement below the east and west wing ground floor work areas.

It should be assumed that friable asbestos-containing parging cement, Aircell and sweatwrap are present in enclosed perimeter columns throughout the assessed area.

Black tar paper over fibreglass insulation on pipe straights in Phase 2does not contain asbestos (S0007A-C Phase 2, photo 9)

Foamglass insulation is present on a chilled water pipe in the west wing (Phase 2, photo 10). Foamglass does not contain asbestos; however it can generate hazardous levels of hydrogen sulphide and carbon monoxide when disturbed. Approximately 90 linear feet of foamglass was identified in good condition.

The remaining pipes in the assessed area are either uninsulated or insulated with non-asbestos fibreglass or white foam insulation (photo 11).

Photo 6 – Friable parging cement insulation on pipe fittings in ceiling space

Photo 7 – Friable parging cement insulation on pipe fittings associated with the perimeter heating system.

Photo 8 – Friable asbestos containing aircell and sweat wrap insulation on pipe straights

Photo 9 – Non-asbestos black tar paper over fibreglass insulation on pipe straights.

Photo 10 – Foamglass insulation on chilled water pipes in Phase 2.

Photo 11 – Non-asbestos styrofoam insulation on pipe straight.

3.1.3.2 Duct Insulation

Non-friable black tar, containing chrysotile asbestos, is present on fibreglass insulation over ducts in the assessed areas (DST sample 05A). Approximately 7,000 square feet of was identified on square rigid ducts and approximately 800 linear feet on circular rigid ducts throughout the Phases 2, 3A and 3B (photos 12 and 13). Tar in also sporadically present on hangers, plasters walls and canvas exterior of pipe straights as a result of over applications during the original construction of the building.

Remaining ducts are either uninsulated or insulated with non-asbestos fibreglass and jacketed with either canvas, foil or plastic (photo 14).

Photo 12 – Non-friable asbestos-containing black tar on square ducts

Photo 13 – Non-friable asbestos-containing black tar on circular ducts.

Photo 14 – Non asbestos fibreglass insulation on ducts.

3.1.3.3 Mechanical Equipment Insulation

Mechanical equipment is either uninsulated or insulated with non-asbestos fibreglass.

3.1.4 Acoustic Ceiling Tiles

Two distinct types of acoustic ceiling tiles are present in the assessed areas, as follows:

Size, Type, Pattern, Photo #	Locations (Quantity in Square Feet)	Sample Number or Date Code	Asbestos Type
24”x48, lay-in, pinhole with small random fissures, photos 15 and 16	WG10, Phase 2	01/18/00	None Detected
24”x48”, lay-in, pinhole with small random fissure pattern, photos 17 and 18	G047, Phase 3A	12/23/00	None Detected

All ceiling tiles are presumed to be non-asbestos based on the date of manufacture determined from the date stamp applied to the top of the tiles. The tiles were manufactured after asbestos stopped being used in acoustic ceiling tiles.

Photo 15 – 24”x48”, lay in, pinhole with small random fissure

Photo 16 – 24”x48”, lay-in, pinholes with small random fissures, date stamp 01/18/00

Photo 17 – 24”x48”, lay in, pinhole with small random fissure

Photo 18 – 24”x48”, lay-in, pinholes with small random fissures, date stamp 01/18/00

3.1.5 Plaster

Rough cast grey plaster on the perimeter walls does not contain asbestos (samples S0005A-C Phase 2, photo 19).

Grey plaster with a white scratch coat does not contain asbestos (samples S0006A-C Phase 2, S0015A-E Phase 3A, S0016A-C Phase 3A, S0017A-C Phase 3B, photos 20 and 21). Previous completed sampling of plaster by Oakhill and DST also did not identify asbestos in the plasters (M-58-15A-G and sample 09 respectively).

As noted in section 3.1.2, amosite asbestos-containing sprayed fireproofing was identified in a plaster sample collected at the top of wall above the lay-in ceiling tile tiles (sample S0006A). Based on this sample and visual inspection, the top inch of plaster walls and the surface of plaster bulkheads throughout Phases 2, 3A and 3B should be considered impacted.

Photo 19 – Non-asbestos grey rough cast wall plaster – Phase 2

Photo 20 – Non-asbestos grey plaster with a white scratch coat – Phase 2. Sprayed fireproofing was identified on the top of plaster walls, ledges, etc. during the assessment.

Photo 21 – Non asbestos grey plaster with a white scratch coat – Visually similar in Phases 3A and 3B. Sprayed fireproofing was identified on the top of plaster walls, ledges, etc. during the assessment.

3.1.6 Drywall Joint Compound

Drywall (gypsum board) and drywall joint compound present as a wall and ceiling finishes in the assessed areas does not contain asbestos (samples S0014A-C – Phase 3A, S0020A-C – Phase 3B).

Drywall joint compound was not present in Phase 2.

3.1.7 Vinyl Floor Tile and Mastic

Vinyl floor tiles are present as follows:

Size, Pattern, Colour and Photo Number	Locations (Quantity)	Sample Number	Asbestos Type (tile)	Asbestos Type (mastic)
12”x12” Beige with dark beige streaks, photo 22	WG-10, West Wing, Phase 2	S0003A-C Phase 2	None Detected	None Detected
12”x12”, Beige with beige flecks, photo 23	WG-04, West Wing, Phase 2	S0004A-C Phase 2	None Detected	None Detected
12”x12” White with beige and brown flecks	EG20, Corridor, Phase 3A	S0001A-C Phase 3A	None Detected	Chrysotile < MDL
12”x12” Rose with brown streaks, photo 24	EG22, Phase 3A	S0002A-C Phase 3A	None Detected	Chrysotile
12”x12” Beige with red streaks	EG10, Phase 3A	S0003A-C Phase 3A	None Detected	Chrysotile
9”x9” Green with white streaks, photo 25	EG02, EG08, EG17, Phase 3A ~ 1,050 square feet	S0004A-C Phase 3A	Chrysotile	Chrysotile
12”x12” Beige with small brown streaks, photo 26	EG25, Phase 3A	S0005A-C Phase 3A	None Detected	Chrysotile
9”x9”, White with brown streaks, photo 27	EG08, Phase 3A ~ 85 square feet	S0006A-C Phase 3A	Chrysotile	Chrysotile

Vinyl floor tiles are not present in Phase 3B.

The vinyl floor tiles and mastic are non-friable and are in good condition. Approximately 11,250 square feet of asbestos-containing black mastic was confirmed present in the East Wing – Phase 3A. Due to the lack of visible distinction between black mastics, all mastic is Phase 3A should be considered asbestos-containing unless a detailed delineation sampling program is completed. Where asbestos-containing mastic is present, the vinyl floor tiles must be considered asbestos-containing due to the mastic contamination.

Photo 22 – Non-asbestos 12”x12” vinyl floor tile, beige with dark streaks

Photo 23 – Non-asbestos 12”x12” vinyl floor tile, beige with beige streaks

Photo 24 – Non-asbestos 12”x12” vinyl floor tile, rose with brown streaks. Non-friable asbestos-containing mastic is present underneath tiles.

Photo 25 – Non-friable asbestos-containing 9”x9” vinyl floor tile, green with white streaks. Non-friable asbestos-containing mastic is present underneath tiles.

Photo 26 – Non-asbestos 12”x12” vinyl floor tile, beige with brown streaks. Non-friable asbestos-containing mastic is present underneath tiles

Photo 27 – Non friable asbestos-containing 9”x9” vinyl floor tile, white with brown streaks. Non-friable asbestos-containing mastic is present underneath tiles

3.1.8 Sealants, Caulking, and Putty

Grey/green duct sealant does not contain asbestos (samples S0001A-C – Phase 2, photo 28).

Burgundy duct sealant contains chrysotile asbestos (samples S0002A-C – Phase 2, photo 29). Burgundy duct sealant is non-friable and is present throughout the assessed areas in good condition.

Perimeter sealants, both grey and black, containing chrysotile asbestos, are present around doors and windows throughout the building exterior (samples S0009A-C, photo 30). Caulking is non-friable and in good condition.

Grey caulking on exterior window flashings contains chrysotile asbestos (sample S0011A-C). Caulking is non-friable and in good condition.

White duct sealant on foil over fibreglass insulated ducts in the in Phase 3A does not contain asbestos (DST samples 02A-C)

Photo 28 – Non-asbestos grey/green duct sealant

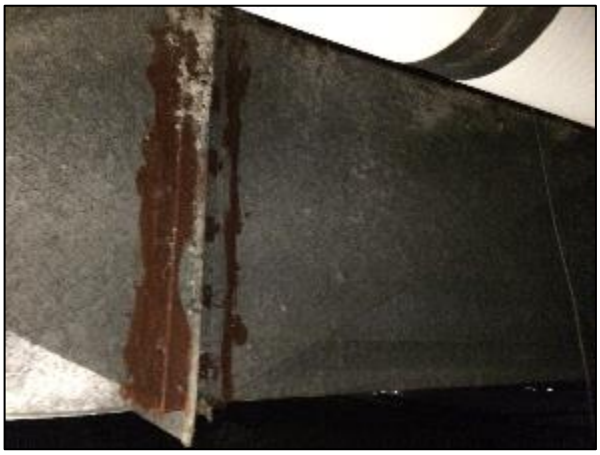


Photo 29 – Non-friable asbestos-containing burgundy sealant on ducts

Photo 30 – Asbestos containing caulking is present on window sill flashings and as perimeter sealants around door and windows throughout the assessed area.

Photo 31 – Non-asbestos white duct sealant on foil over fibreglass insulated ducts in the pipe chases of Phase 3B.

3.1.9 Exterior Cladding and Finishes

White stucco on the north elevation does not contain asbestos (samples S0007A-C, photo 31).

The red arch detail on the south elevation does not contain asbestos (samples S0008A-C, photo 32).

White exterior plaster within stone inclusions does not contain asbestos (S0010A-C, photo 33).

Photo 32 – Non-asbestos white exterior stucco on the north elevation

Photo 33 – Non-asbestos red exterior arch detail on the south elevation

Photo 34 – Non-asbestos exterior plaster with stone inclusions

3.1.10 Presumed Asbestos Materials

A number of materials which might contain asbestos were not sampled during the assessment due to limitations in scope and methodology. Where present, these materials must be presumed to be an asbestos material and are best sampled during project planning and preparation of contract documents for their removal. Materials presumed to contain asbestos include:

- roofing, felts and tar;
- concrete floor levelling compound;
- electrical components or wiring within control centers, breakers, motors or lights, insulation on wiring;
- soffit and fascia boards at elevated heights;

- mechanical packing, ropes and gaskets; and
- fire resistant doors.

3.2 Lead

3.2.1 Paints and Surface Coatings

A total of four paint samples were collected from interior painted finishes. The following table summarizes the analytical results for paints sampled and their locations:

Sample Number	Colour, Substrate Description	Locations	Lead (%)
1619026-01	Green – Plaster Wall	Phase 2	0.104
1619026-02	Beige – Plaster Wall	Phase 2	0.110
1623234-01	Beige – Plaster Wall	Phase 3A	0.204
1623233-01	Grey – Plaster Wall	Phase 3B	0.299

All paints containing elevated levels of lead were found to be in good condition and not flaking, peeling or delaminating.

3.2.2 Lead Products and Applications

Lead-containing batteries are present in emergency lighting present in the assessed area.

Lead wool or lead caulking is present in bell and spigot fittings on cast iron pipes in the assessed area.

Photo 35 – Lead rope caulking may be present in bell and spigot fittings on cast iron pipes within the assessed areas.

3.2.3 Presumed Lead Materials

Lead may be present in a number of materials which were not assessed and/or sampled. The following materials, where found, should be considered to contain lead:

- electrical components, including wiring connectors, grounding conductors, and solder; and
- glazing on ceramic tiles.

3.3 Silica

Crystalline silica is a presumed component of the following materials where present in the building:

- poured or pre-cast concrete;
- masonry and mortar;
- ceramic tiles, grout; and
- plaster.

3.4 Mercury

Mercury vapour is present in fluorescent lamps and thermostat ampules present in the assessed area.

3.5 Polychlorinated Biphenyls

3.5.1 Lighting Ballasts

The building has not been comprehensively re-lamped with new energy efficient light ballasts and lamps, and as such, it is estimated that approximately 20 percent of light ballasts will be pre-1980 and contain PCBs.

3.5.2 Transformers

All transformers in the assessed areas are dry type transformers and do not contain PCB-containing dielectric fluids.

3.6 Mould

Visible mould growth and water staining was not observed identified in the assessed areas.

4.0 RECOMMENDATIONS

4.1 General

1. Prepare plans and performance specifications for hazardous material removal required for the planned work. The specifications should include the scope of work, safe work practices, personal protective equipment, respiratory protection, and disposal of waste materials.
2. Provide this report and the detailed plans and specifications to the contractor prior to bidding or commencing work.
3. Retain a qualified consultant to specify, inspect and verify the successful removal of hazardous materials.
4. Update the asbestos inventory upon completion of the abatement and removal of asbestos-containing materials.

4.2 Building Renovation Work

The following recommendations are made regarding renovation involving the hazardous materials identified.

4.2.1 Asbestos

Remove all asbestos-containing materials (ACM) prior to renovation, alteration, maintenance or demolition work or if ACM may be disturbed by the work.

If the identified ACM will not be removed prior to commencement of the work, disturbance of ACM must follow the appropriate asbestos precautions for the classification of work being performed.

Asbestos-containing materials must be disposed of at a landfill approved to accept asbestos waste.

4.2.2 Lead

For paints identified as having elevated levels of lead (i.e., greater than the EACO guideline of 0.1% for lead-containing paints), construction disturbance may result in over-exposure to lead dust or fumes. The need for work procedures, engineering controls and personal protective equipment should be assessed on a site specific basis to comply with provincial standards or guidelines. Performing an exposure assessment during work that disturbs lead in paints and coatings may be able to reduce the use of some of these precautions.

Items painted with paints containing elevated levels of lead may be a hazardous waste. Test lead-painted materials for leachable lead prior to disposal. Well adhered paints containing elevated levels of lead on metal substrates do not require leachable lead analysis as the materials can be recycled with the paint intact.

Lead-containing items (lead-acid batteries) should be recycled when taken out of service.

4.2.3 Silica

Construction disturbance of silica-containing products may result in excessive exposures to airborne silica, especially if performed indoors and dry. Cutting, grinding, drilling or demolition of materials containing silica should be completed only with proper respiratory protection and other worker safety precautions that comply with provincial standards or guidelines.

4.2.4 Mercury

Do not break lamps or separate liquid mercury from components. Recycle and reclaim mercury from fluorescent lamps and thermostats when taken out of service. Liquid mercury is classified as a hazardous waste and must be disposed of in accordance with local regulations.

4.2.5 PCBs

When light fixtures are removed, examine light ballasts for PCB content. If ballasts are not clearly labelled as “non-PCB”, or are suspected to contain PCBs; package and ship ballasts for destruction at a federally permitted facility.

5.0 LIMITATIONS

Specific limitations related to the legal and financial and limitations to the scope of the current work are outlined in our proposal, the attached Methodology and the Authorization to Proceed which accompanied the proposal.

The work performed by Pinchin was conducted in accordance with generally accepted engineering or scientific practices current in this geographical area at the time the work was performed. No warranty is either expressed or implied by furnishing written reports or findings. The Client acknowledges that subsurface and concealed conditions may vary from those encountered or inspected. Pinchin can only comment on the environmental conditions observed on the date(s) the survey is performed. The work is limited to those materials or areas of concern identified by the Client or outlined in our proposal. Other areas of concern may exist but were not investigated within the scope of this assignment.

Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings or as to other legal matters touched on in this report, including, but not limited to, ownership of

any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issue, regulatory statutes are subject to interpretation and these interpretations may change over time. Pinchin accepts no responsibility for consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The liability of Pinchin or our officers, directors, shareholders or staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Pinchin will not be responsible for any consequential or indirect damages. Pinchin will only be liable for damages resulting from the negligence of Pinchin. Pinchin will not be liable for any losses or damage if the Client has failed, within a period of two years following the date upon which the claim is discovered (Claim Period), to commence legal proceedings against Pinchin to recover such losses or damage unless the laws of the jurisdiction which governs the Claim Period which is applicable to such claim provides that the applicable Claim Period is greater than two years and cannot be abridged by the contract between the Client and Pinchin, in which case the Claim Period shall be deemed to be extended by the shortest additional period which results in this provision being legally enforceable.

Information provided by Pinchin is intended for Client use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.

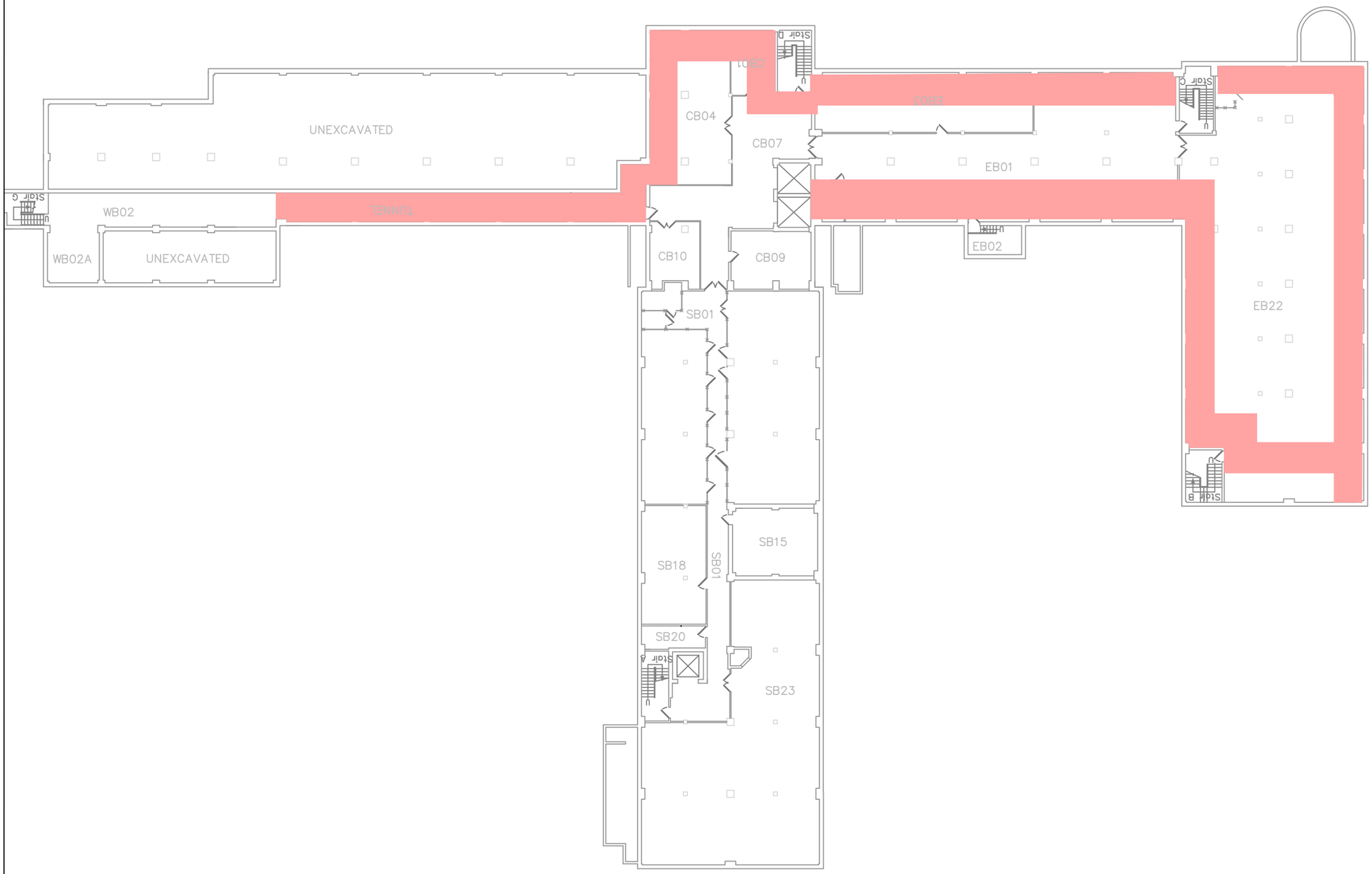
6.0 REFERENCES

The following legislation and documents were referenced in completing the assessment and this report:

1. Asbestos on Construction Projects and in Buildings and Repair Operations, Ontario Regulation 278/05.
2. Designated Substances, Ontario Regulation 490/09.
3. Lead on Construction Projects, Ministry of Labour Guidance Document.
4. Ministry of the Environment Regulation, R.R.O. 1990 Reg. 347 as amended.
5. Surface Coating Materials Regulations, SOR/2005-109, Hazardous Products Act.
6. Silica on Construction Projects, Ministry of Labour Guidance Document.
7. Alert – Mould in Workplace Buildings, Ontario Ministry of Labour.

APPENDIX I

Drawings



PINCHIN

LEGEND:

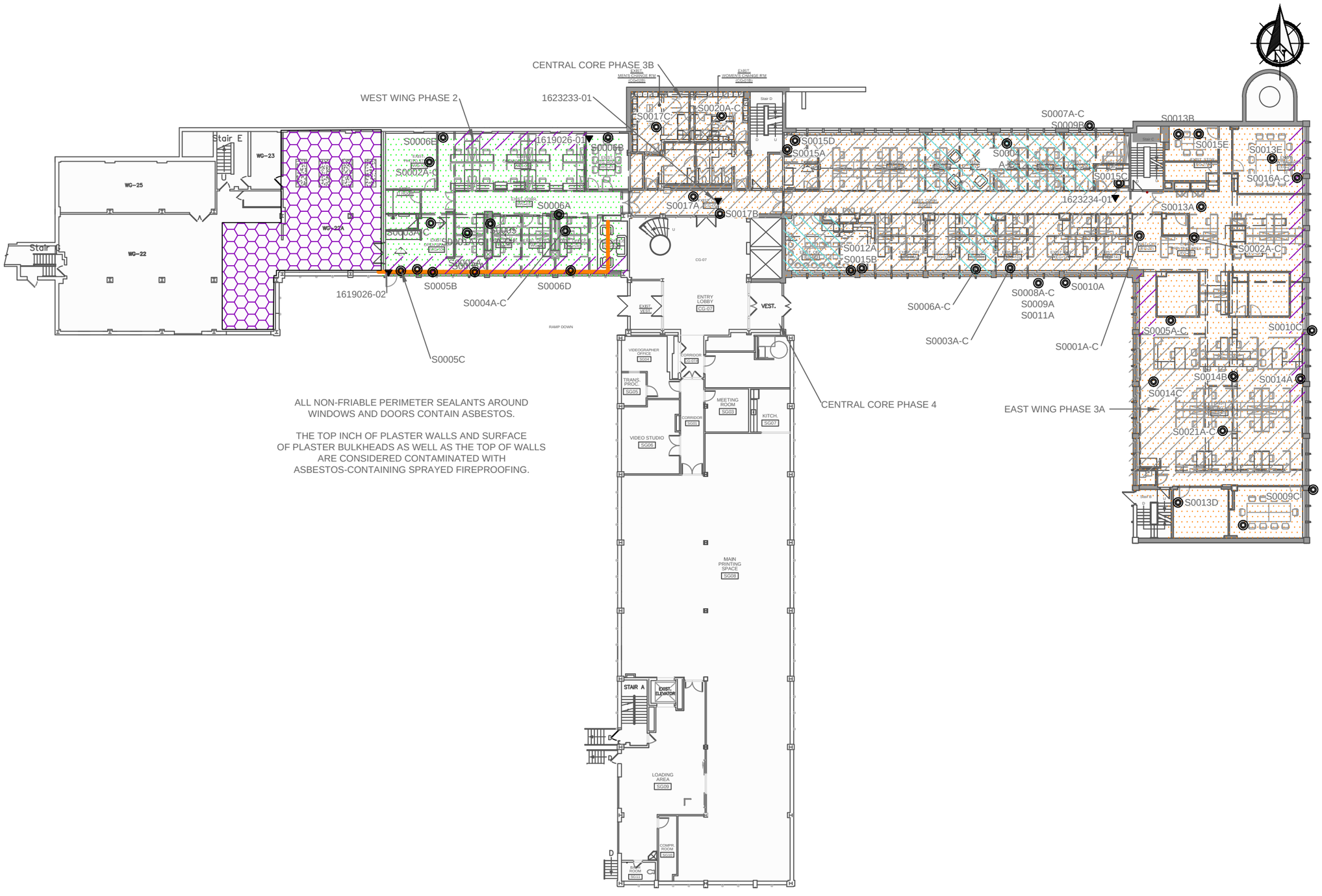
FRIABLE AIRCELL AND PARGING CEMENT INSULATION

CLIENT:
NATIONAL RESEARCH COUNCIL OF CANADA

LOCATION:
1200 MONTREAL ROAD
OTTAWA, ONTARIO
M58

TITLE:
PRE-RENOVATION HAZARDOUS BUILDING MATERIALS SURVEY
BASEMENT

DATE:	PROJECT # :
SEPTEMBER 16, 2016	113237
DRAWN BY: MG	DRAWING:
CHECKED BY: NB	1 OF 3
SCALE: NTS	



ALL NON-FRIABLE PERIMETER SEALANTS AROUND WINDOWS AND DOORS CONTAIN ASBESTOS.

THE TOP INCH OF PLASTER WALLS AND SURFACE OF PLASTER BULKHEADS AS WELL AS THE TOP OF WALLS ARE CONSIDERED CONTAMINATED WITH ASBESTOS-CONTAINING SPRAYED FIREPROOFING.

PINCHIN

LEGEND:

- ASBESTOS BULK SAMPLE
- LEAD BULK SAMPLE
- FOAM GLASS PIPE STRAIGHT INSULATION

ASBESTOS-CONTAINING MATERIALS:

- FRIABLE SPRAYED FIREPROOFING WITH CEILING SPACE
- FRIABLE REMNANT SPRAYED FIREPROOFING DEBRIS WITHIN CEILING SPACE
- FRIABLE AIRCELL, SWEAT WRAP AND PARGING CEMENT FITTING INSULATION
- NON-FRIABLE VINYL FLOOR TILE (9'X9')
- AIR HANDLING UNIT 58AHU04 AND ASSOCIATED DUCTING

- NON-FRIABLE ASBESTOS-CONTAINING BLACK MASTIC IS PRESENT UNDERNEATH VINYL FLOOR TILES IN THE EAST WING (PHASE 3A).

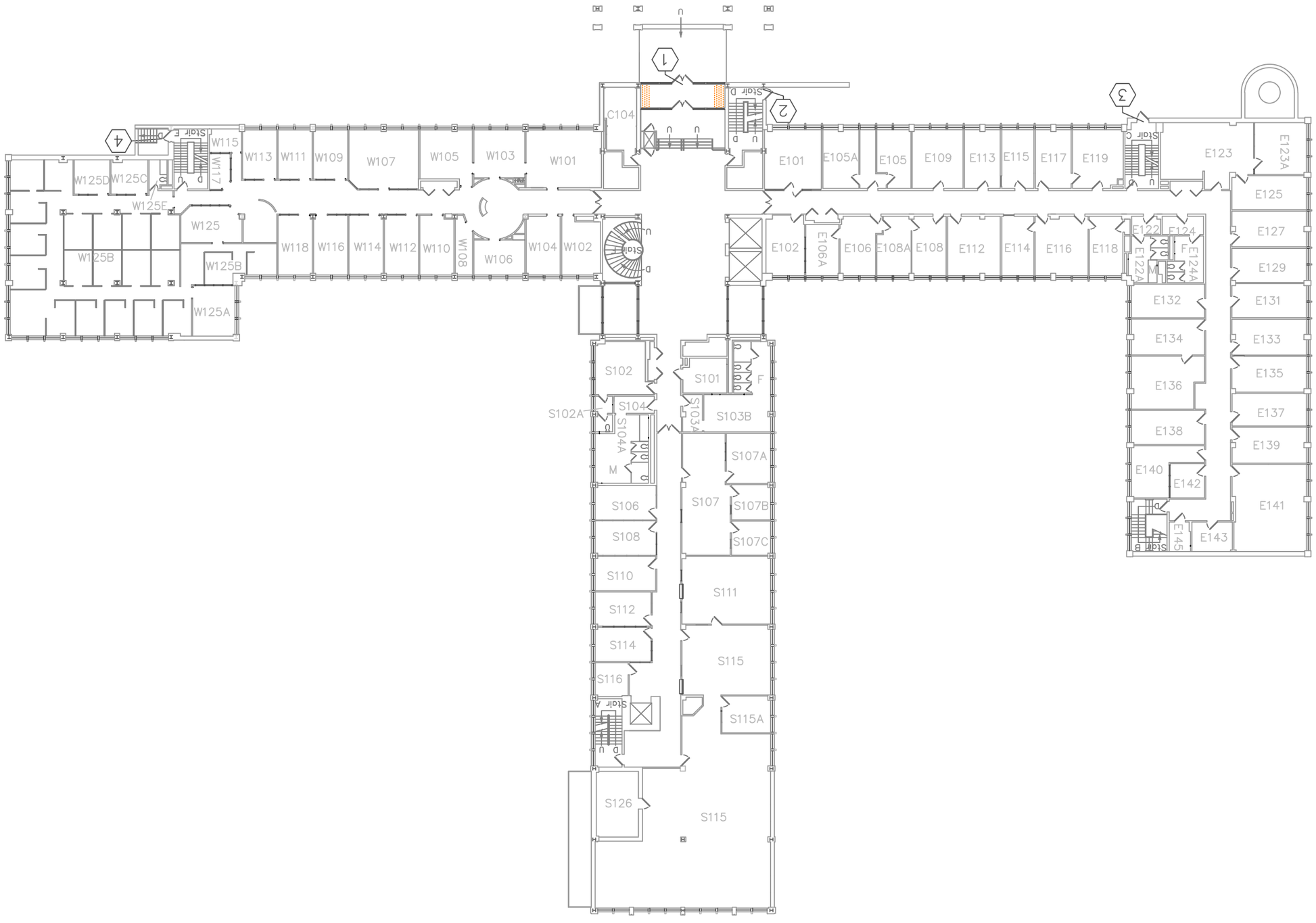
- NON-FRIABLE ASBESTOS-CONTAINING BURGUNDY DUCT SEALANT AND BLACK TAR OVER FIBERGLASS INSULATION ON DUCTS ARE PRESENT THROUGHOUT THE EAST AND WEST AREAS (PHASES 2, 3A AND 3B).

CLIENT:
NATIONAL RESEARCH COUNCIL OF CANADA

LOCATION:
1200 MONTREAL ROAD
OTTAWA, ONTARIO
M58

TITLE:
PRE-RENOVATION HAZARDOUS BUILDING MATERIALS SURVEY
GROUND FLOOR

DATE:	PROJECT # :
SEPTEMBER 16, 2016	113237
DRAWN BY: MG	DRAWING: 2 OF 3
CHECKED BY: NB	
SCALE: NTS	



PINCHIN

LEGEND:

PERIMETER INDUCTION UNITS
REMNANT SPRAYED FIREPROOFING SUSPECTED TO BE PRESENT IN WALL CAVITY.

CLIENT:
NATIONAL RESEARCH COUNCIL OF CANADA

LOCATION:
1200 MONTREAL ROAD
OTTAWA, ONTARIO
M58 FIRST FLOOR

TITLE:
PRE-RENOVATION HAZARDOUS BUILDING MATERIALS SURVEY
EAST AND WEST WING RENOVATIONS

DATE:	PROJECT # :
SEPTEMBER 2016	113237
DRAWN BY: MG	DRAWING: 3 OF 3
CHECKED BY: NB	
SCALE: NTS	

APPENDIX II-A

Asbestos Analytical Certificates

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

AIHA LAP, LLC ACCREDITED LABORATORY INDUSTRIAL HYGIENE ISO/IEC 17025:2005 www.aihaaccreditedlabs.org LAB #173190

NVLAP® NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
555 Legget Drive
Kanata, ON K2K 2X3

Attn: Neil Box
Gordon Gillespie

Project: 113237 - P2 - National Research Council Canada, M58, 1200 Montreal Road, Ottawa, ON 278/05

Lab Order ID: 1608685
Analysis ID: 1608685_PLM
Date Received: 5/4/2016
Date Reported: 5/9/2016
Date Amended: *5/25/2016*

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
S0001A *1608685PLM_1*	Grey Duct Sealant, WG-10	**None Detected**		**100% Other**	Gray Non Fibrous Heterogeneous Dissolved
S0001B *1608685PLM_2*	Grey Duct Sealant, WG-10	**None Detected**		**100% Other**	Gray Non Fibrous Heterogeneous Dissolved
S0001C *1608685PLM_3*	Grey Duct Sealant, WG-10	**None Detected**		**100% Other**	Gray Non Fibrous Heterogeneous Dissolved
S0002A *1608685PLM_4*	Burgundy Duct Sealant, WG-13,	**5% Chrysotile**		**95% Other**	Red Non Fibrous Heterogeneous Dissolved
S0002B *1608685PLM_5*	Burgundy Duct Sealant, WG-13,	**Not Analyzed**			
S0002C *1608685PLM_6*	Burgundy Duct Sealant, WG-13,	**Not Analyzed**			
S0003A - A *1608685PLM_7*	12"x12" beige with dark beige streak, WG-10 *floor tile*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Dissolved
S0003A - B *1608685PLM_24*	12"x12" beige with dark beige streak, WG-10 *mastic*	**None Detected**		**100% Other**	Black Non Fibrous Heterogeneous Dissolved

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Byron Stroble (41)

Analyst

Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

AIHA LAP, LLC ACCREDITED LABORATORY INDUSTRIAL HYGIENE ISO/IEC 17025:2005 www.aihaaccreditedlabs.org
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NVLAP®
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Customer: Pinchin Ltd.
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Gordon Gillespie

Lab Order ID: 1608685
Analysis ID: 1608685_PLM
Date Received: 5/4/2016
Date Reported: 5/9/2016
Date Amended: *5/25/2016*

Project: 113237 - P2 - National Research Council Canada, M58, 1200 Montreal Road, Ottawa, ON 278/05

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
S0003B - A *1608685PLM_8*	12"x12" beige with dark beige streak, WG-10 *floor tile*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Dissolved
S0003B - B *1608685PLM_25*	12"x12" beige with dark beige streak, WG-10 *mastic*	**None Detected**		**100% Other**	Black Non Fibrous Heterogeneous Dissolved
S0003C - A *1608685PLM_9*	12"x12" beige with dark beige streak, WG-10 *floor tile-ashed*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Ashed
S0003C - B *1608685PLM_26*	12"x12" beige with dark beige streak, WG-10 *mastic*	**None Detected**		**100% Other**	Black Non Fibrous Heterogeneous Dissolved
S0004A - A *1608685PLM_10*	12"x12"beige with Beige flecks, WG-04 *floor tile*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Dissolved
S0004A - B *1608685PLM_27*	12"x12"beige with Beige flecks, WG-04 *mastic*	**None Detected**		**100% Other**	Black Non Fibrous Heterogeneous Dissolved
S0004B - A *1608685PLM_11*	12"x12"beige with Beige flecks, WG-05 *floor tile*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Dissolved
S0004B - B *1608685PLM_28*	12"x12"beige with Beige flecks, WG-05 *mastic*	**None Detected**		**100% Other**	Black Non Fibrous Heterogeneous Dissolved

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Byron Stroble (41)

Analyst

Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

AIHA LAP, LLC ACCREDITED LABORATORY INDUSTRIAL HYGIENE ISO/IEC 17025:2005 www.aihaaccreditedlabs.org LAB #173190

NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
555 Legget Drive
Kanata, ON K2K 2X3

Attn: Neil Box
Gordon Gillespie

Project: 113237 - P2 - National Research Council Canada, M58, 1200 Montreal Road, Ottawa, ON 278/05

Lab Order ID: 1608685
Analysis ID: 1608685_PLM
Date Received: 5/4/2016
Date Reported: 5/9/2016
Date Amended: *5/25/2016*

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
S0004C - A *1608685PLM_12*	12"x12"beige with Beige flecks, WG-06 *floor tile-ashed*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Ashed
S0004C - B *1608685PLM_29*	12"x12"beige with Beige flecks, WG-06 *mastic*	**None Detected**		**100% Other**	Black Non Fibrous Heterogeneous Dissolved
S0005A *1608685PLM_13*	Rough Cast, WG-10	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Crushed
S0005B *1608685PLM_14*	Rough Cast, WG-10	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Crushed
S0005C *1608685PLM_15*	Rough Cast, WG-10	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Crushed
S0005D *1608685PLM_16*	Grey Plaster with White scratch coat, WG-04	**Not Submitted**			
S0005E *1608685PLM_17*	Grey Plaster with White scratch coat, WG-13	**Not Submitted**			
S0006A - A *1608685PLM_18*	Grey Plaster with White scratch coat, Southeast corridor *finish*	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Teased

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Byron Stroble (41)

Analyst

Approved Signatory

P-F-002 r15 1/15/2018

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

AIHA LAP, LLC ACCREDITED LABORATORY INDUSTRIAL HYGIENE ISO/IEC 17025:2005 www.aihaaccreditedlabs.org
LAB #173190

NVLAP®
NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
555 Legget Drive
Kanata, ON K2K 2X3

Attn: Neil Box
Gordon Gillespie

Project: 113237 - P2 - National Research Council Canada, M58, 1200 Montreal Road, Ottawa, ON 278/05

Lab Order ID: 1608685
Analysis ID: 1608685_PLM
Date Received: 5/4/2016
Date Reported: 5/9/2016
Date Amended: *5/25/2016*

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
S0006A - B *1608685PLM_30*	Grey Plaster with White scratch coat, Southeast corridor *base*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Crushed
S0006A - C *1608685PLM_37*	Grey Plaster with White scratch coat, Southeast corridor *fibrous layer*	**20% Amosite**	**30% Cellulose**	**50% Other**	Brown Non Fibrous Heterogeneous Teased
S0006B - A *1608685PLM_19*	Grey Plaster with White scratch coat, WG-01 *finish*	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Teased
S0006B - B *1608685PLM_31*	Grey Plaster with White scratch coat, WG-01 *base*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Crushed
S0006B - C *1608685PLM_38*	Grey Plaster with White scratch coat, WG-01 *fibrous layer*	**Not Analyzed**			
S0006C - A *1608685PLM_20*	Grey Plaster with White scratch coat, WG-10 *finish*	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Teased
S0006C - B *1608685PLM_32*	Grey Plaster with White scratch coat, WG-10 *base*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Crushed
S0006C - C *1608685PLM_39*	Grey Plaster with White scratch coat, WG-10 *fibrous layer*	**Not Analyzed**			

Byron Stroble (41)

Analyst

Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

AIHA LAP, LLC ACCREDITED LABORATORY INDUSTRIAL HYGIENE ISO/IEC 17025:2005 www.aihaaccreditedlabs.org LAB #173190

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Project: 113237 - P2 - National Research Council Canada, M58, 1200 Montreal Road, Ottawa, ON 278/05

Lab Order ID: 1608685
Analysis ID: 1608685_PLM
Date Received: 5/4/2016
Date Reported: 5/9/2016
Date Amended: *5/25/2016*

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
S0006D - A *1608685PLM_33*	*finish-not on coc*	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Teased
S0006D - B *1608685PLM_35*	*base-not on coc*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Crushed
S0006D - C *1608685PLM_40*	*fibrous layer*	**Not Analyzed**			
S0006E - A *1608685PLM_34*	*finish-not on coc*	**None Detected**		**100% Other**	White Non Fibrous Heterogeneous Teased
S0006E - B *1608685PLM_36*	*base-not on coc*	**None Detected**		**100% Other**	Beige Non Fibrous Heterogeneous Crushed
S0006E - C *1608685PLM_41*	*fibrous layer*	**Not Analyzed**			
S0007A *1608685PLM_21*	Black Tar Paper over Fibreglass, South side of Corridor, Riser	**None Detected**	**60% Cellulose**	**40% Other**	Brown, Black Fibrous Heterogeneous Teased, Dissolved
S0007B *1608685PLM_22*	Black Tar Paper over Fibreglass, South side of Corridor, Riser	**None Detected**	**60% Cellulose**	**40% Other**	Brown, Black Fibrous Heterogeneous Teased, Dissolved

Byron Stroble (41)

Analyst

Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

AIHA LAP, LLC ACCREDITED LABORATORY INDUSTRIAL HYGIENE ISO/IEC 17025:2005 www.aihaaccreditedlabs.org LAB #173190

NVLAP Lab Code: 200664-0

Customer: Pinchin Ltd.
555 Legget Drive
Kanata, ON K2K 2X3

Attn: Neil Box
Gordon Gillespie

Project: 113237 - P2 - National Research Council Canada, M58, 1200 Montreal Road, Ottawa, ON 278/05

Lab Order ID: 1608685
Analysis ID: 1608685_PLM
Date Received: 5/4/2016
Date Reported: 5/9/2016
Date Amended: *5/25/2016*

Sample ID *Lab Sample ID*	Description *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes Treatment
S0007C	Black Tar Paper over Fibreglass, South side of Corridor, Riser	None Detected	60% Cellulose	40% Other	Brown, Black Fibrous Heterogeneous
1608685PLM_23					Teased, Dissolved

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommend that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Analytical uncertainty available upon request. Scientific Analytical Institute participates in the NVLAP Proficiency Testing program. Unless otherwise noted blank sample correction was not performed. Estimated MDL is 0.1%.

Byron Stroble (41)

Analyst

Approved Signatory

1608685

Version 1-15-2012

Client:	Pinchin Ltd.
Contact:	Neil Box / Gordon Gillespie
	555 Legget Drive, Suite 1001, Tower A
Address:	Kanata, ON K2K 2X3
Phone:	613-592-3387
Fax:	613-592-5897
Email:	nbox@pinchin.com
	ggillespie@pinchin.com
Project:	113237- P2 - National Research Council Canada, M58, 1200 Montreal Road, Ottawa, ON
Client Notes:	278/05
P.O. #.	113237- P2
Date Submitted:	May 3rd 2016
Analysis:	PLM - Stop Positive
TurnAroundTime:	4 days

Instructions:

Use Column "B" for your contact info

To See an Example Click the bottom Example Tab.

Enter samples between "<<" and ">>"

Begin Samples with a "<< "above the first sample and end with a ">>" below the last sample.

Only Enter your data on the first sheet "Sheet1"

Note: Data 1 and Data 2 are optional fields that do not show up on the official report, however they will be included in the electronic data returned to you to facilitate your reintegration of the report data.

Invoice to:

Neil Box

nbox@pinchin.com

Scientific Analytical Institute

4604 Dundas Dr.

Greensboro, NC 27407

Phone: 336.292.3888

Fax: 336.292.3313

Email: lab@sailab.com

Sample Number	Data 1 (Lab use only)	Sample Description	Data 2 (Lab use only\)
<<			
S0001A		Grey Duct Sealant, WG-10	
S0001B		Grey Duct Sealant, WG-10	
S0001C		Grey Duct Sealant, WG-10	
S0002A		Burgundy Duct Sealant, WG-13,	
S0002B		Burgundy Duct Sealant, WG-13,	
S0002C		Burgundy Duct Sealant, WG-13,	
S0003A		12"x12" beige with dark beige streak, WG-10	
S0003B		12"x12" beige with dark beige streak, WG-10	
S0003C		12"x12" beige with dark beige streak, WG-10	
S0004A		12"x12"beige with Beige flecks, WG-04	
S0004B		12"x12"beige with Beige flecks, WG-05	
S0004C		12"x12"beige with Beige flecks, WG-06	

BMulay 5/4 9:30

Accepted ☑

Rejected ☐

1608685

S0005A	Rough Cast, WG-10
S0005B	Rough Cast, WG-10
S0005C	Rough Cast, WG-10
S0005D	Grey Plaster with White scratch coat, WG-04
S0005E	Grey Plaster with White scratch coat, WG-13
S0006A	Grey Plaster with White scratch coat, Southeast corridor
S0006B	Grey Plaster with White scratch coat, WG-01
S0006C	Grey Plaster with White scratch coat, WG-10
S0007A	Black Tar Paper over Fibreglass, South side of Corridor, Riser
S0007B	Black Tar Paper over Fibreglass, South side of Corridor, Riser
S0007C	Black Tar Paper over Fibreglass, South side of Corridor, Riser

>>

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name:	**National Research Council , Building M58 1200 Montreal Road, Ottawa, Ontario**		
Project No.:	**113237**		
Prepared For:	**Neil Box**	**Date Received:**	**June 3, 2016**
Lab Reference No.:	**b130538**	**Date Analyzed:**	**June 9, 2016**
Analyst(s):	**M. Tipgos / T. Tran / N. Barinque**		
		# Samples submitted:	**39**
		# Phases analyzed:	**46**

Method of Analysis:

EPA 600/R-93/116 - Method for the Determination of Asbestos in Bulk Building Materials dated July, 1993

Bulk samples are checked visually and scanned under a stereomicroscope. Slides are prepared and observed under a Polarized Light Microscope (PLM) at magnifications of 40X, 100X or 400X as appropriate. Asbestos fibres are identified by a combination of morphology, colour, refractive index, extinction, sign of elongation, birefringence and dispersion staining colours. A visual estimate is made of the percentage of asbestos present. A reported concentration of less than (<) the regulatory threshold (see chart below) indicates the presence of confirmed asbestos in trace quantities, limited to only a few fibres or fibre bundles in an entire sample. This method complies with provincial regulatory requirements where applicable. Multiple phases within a sample are analyzed and reported separately.

Provincial Jurisdiction	Regulatory Threshold	Provincial Jurisdiction	Regulatory Threshold
Ontario, British Columbia, Nova Scotia	0.5%	Manitoba	0.1% friable 1% non-friable
Quebec	0.1%	Saskatchewan	0.5% friable 1% non-friable
Alberta, NWT, Yukon, Nunavut	1%	Newfoundland and Labrador, PEI and New Brunswick	1%

All bulk samples submitted to this laboratory for asbestos analysis are retained for a minimum of three months. Samples may be retrieved, upon request, for re-examination at any time during that period.

Pinchin Ltd. is accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 101270-0) for the 'EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples' and meets all requirements of ISO/IEC 17025:2005.

This report relates only to the items tested.

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council , Building M58
1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: Neil Box

Lab Reference No.: b130538
Date Analyzed: June 9, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE) ASBESTOS		OTHER	
0001A 12"x12" Vinyl Floor Tile, White with beige and brown flecks, EG-20, Phase 3A	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected		Non-Fibrous Material Tar and other non-fibrous	> 75% > 75%
Comments:	Phase b) is small in size. For more reliable results, a larger sample is required.				
0001B 12"x12" Vinyl Floor Tile, White with beige and brown flecks, Corridor (west), Phase 3A	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected None Detected		Non-Fibrous Material Tar and other non-fibrous	> 75% > 75%
Comments:	Phase b) is small in size. For more reliable results, a larger sample is required.				
0001C 12"x12" Vinyl Floor Tile, White with beige and brown flecks, Corridor (east), Phase 3A	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected Chrysotile	<0.5%	Non-Fibrous Material Tar and other non-fibrous	> 75% > 75%
Comments:	Phase b) is small in size. For more reliable results, a larger sample is required.				
0002A 12"x12" Vinyl Floor Tile, Rose with brown and streaks, EG-22, Phase 3A	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected Chrysotile	0.5-5%	Non-Fibrous Material Tar and other non-fibrous	> 75% > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council , Building M58
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Prepared For: Neil Box

Lab Reference No.: b130538
Date Analyzed: June 9, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE) ASBESTOS	OTHER
0002B 12"x12" Vinyl Floor Tile, Rose with brown and streaks, EG-22, Phase 3A	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
0002C 12"x12" Vinyl Floor Tile, Rose with brown and streaks, EG-22, Phase 3A	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
0003A 12"x12" Vinyl Floor Tile, Beige with Red Streaks, EG 10, Phase 3A	2 Phases: a) Homogeneous, grey, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected Chrysotile 0.5-5%	Non-Fibrous Material > 75% Tar and other non-fibrous > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council , Building M58
1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: Neil Box

Lab Reference No.: b130538
Date Analyzed: June 9, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
0003B 12"x12" Vinyl Floor Tile, Beige with Red Streaks, EG 14, Phase 3A	2 Phases: a) Homogeneous, white, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
0003C 12"x12" Vinyl Floor Tile, Beige with Red Streaks, EG 07, Phase 3A	2 Phases: a) Homogeneous, grey, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		
0004A 9"x9" Vinyl Floor Tile, Green with White Streaks, EG-17, Phase 3A	2 Phases: a) Homogeneous, green, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	Chrysotile 0.5-5% Chrysotile 0.5-5%	Non-Fibrous Material > 75% Tar and other non-fibrous > 75%
0004B 9"x9" Vinyl Floor Tile, Green with White Streaks, EG-02, Phase 3A			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council , Building M58
1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: Neil Box

Lab Reference No.: b130538
Date Analyzed: June 9, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
0004C 9"x9" Vinyl Floor Tile, Green with White Streaks, EG-08, Phase 3A			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
0005A 12"x12" Vinyl Floor Tile, Beige with small brown streaks, EG-25, Central Printing Area, Phase 3A	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected Chrysotile 0.5-5%	Non-Fibrous Material > 75% Tar and other non-fibrous > 75%
0005B 12"x12" Vinyl Floor Tile, Beige with small brown streaks, EG-25, Central Printing Area, Phase 3A	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis ofphase b) was stopped due to a previous positive result.		
0005C 12"x12" Vinyl Floor Tile, Beige with small brown streaks, EG-25, Central Printing Area, Phase 3A	2 Phases: a) Homogeneous, beige, consolidated, vinyl floor tile. b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	None Detected	Non-Fibrous Material > 75% Not Analyzed
Comments:	Analysis of phase b) was stopped due to a previous positive result.		

Pinchin Ltd. Asbestos Laboratory
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BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE) ASBESTOS	OTHER
0006A 9"x9" Vinyl Floor Tile, White with brown streaks, EG-08, Phase 3A	2 Phases: a) Homogeneous, grey, consolidated, vinyl floor tile.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%
	b) Homogeneous, black, soft, sticky material on the back of vinyl floor tile.	Chrysotile 0.5-5%	Tar and other non-fibrous > 75%
0006B 9"x9" Vinyl Floor Tile, White with brown streaks, EG-08, Phase 3A			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
0006C 9"x9" Vinyl Floor Tile, White with brown streaks, EG-08, Phase 3A			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
0007A White Stucco/plaster, Building Exterior, North Elevation, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious material.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, white, hard, cementitious material.	None Detected	Non-Fibrous Material > 75%
0007B White Stucco/plaster, Building Exterior, North Elevation, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious material.	None Detected	Non-Fibrous Material > 75%
	b) Homogeneous, white, hard, cementitious material.	None Detected	Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
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BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
0007C White Stucco/plaster, Building Exterior, North Elevation, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious material. b) Homogeneous, white, hard, cementitious material.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
0008A Red Arch Detail, Building Exterior, South Elevation, Phase 3A	2 Phases: a) Homogeneous, red, hard, cementitious material. b) Homogeneous, red, soft, consolidated material.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
0008B Red Arch Detail, Building Exterior, South Elevation, Phase 3A	Homogeneous, red, hard, cementitious material.	None Detected	Non-Fibrous Material > 75%
0008C Red Arch Detail, Building Exterior, South Elevation, Phase 3A	Homogeneous, red, hard, cementitious material.	None Detected	Non-Fibrous Material > 75%
0009A Grey Window Glazing, Building Exterior, South Elevation, Phase 3A	2 Phases: a) Homogeneous, grey, caulking material. b) Homogeneous, black, soft, caulking material.	None Detected Chrysotile 0.5-5%	Man-made Vitreous Fibres 0.5-5% Non-Fibrous Material > 75% Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council , Building M58
1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: Neil Box

Lab Reference No.: b130538
Date Analyzed: June 9, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
0009B Grey Window Glazing, Building Exterior, North Elevation, Phase 3A	Homogeneous, light grey, caulking material.	None Detected	Man-made Vitreous Fibres 0.5-5% Non-Fibrous Material > 75%
0009C Grey Window Glazing, Building Exterior, East Elevation, Phase 3A	Homogeneous, light grey, caulking material.	Chrysotile 0.5-5%	Non-Fibrous Material > 75%
0010A White with stone inclusion, Building exterior, South Elevation, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious material. b) Homogeneous, white, hard, cementitious material.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
0010B White with stone inclusion, Building exterior, East Elevation, Phase 3A	Homogeneous, off-white, hard, cementitious material.	None Detected	Non-Fibrous Material > 75%
0010C White with stone inclusion, Building exterior, East Elevation, Phase 3A	Homogeneous, off-white, hard, cementitious material.	None Detected	Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council , Building M58
1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: Neil Box

Lab Reference No.: b130538
Date Analyzed: June 9, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE) ASBESTOS		OTHER	
0011A Grey Window (Flashing) Caulking, Building Exterior, South Elevation, Phase 3A	3 Phases: a) Homogeneous, light grey, consolidated caulking material. b) Homogeneous, grey, soft caulking material. c) Homogeneous, grey, rubbery caulking material.	Chrysotile None Detected None Detected	0.5-5%	Non-Fibrous Material Non-Fibrous Material Non-Fibrous Material	> 75% > 75% > 75%
0011B Grey Window (Flashing) Caulking, Building Exterior, North Elevation, Phase 3A	Homogeneous, light grey, consolidated caulking material.			Not Analyzed	
Comments:	Analysis was stopped due to a previous positive result.				
0011C Grey Window (Flashing) Caulking, Building Exterior, East Elevation, Phase 3A	Homogeneous, grey, rubbery caulking material.	None Detected		Non-Fibrous Material	> 75%
0012A Sprayed Fireproofing, Deck, EG-04, Phase 3A	Homogeneous, beige, fibrous material.	Amosite	> 75%	Non-Fibrous Material	10-25%
0013A Sprayed Fireproofing, Deck, EG-25, North, Phase 3A	Homogeneous, grey, fibrous material.	Amosite	0.5-5%	Man-made Vitreous Fibres Non-Fibrous Material	> 75% 0.5-5%

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Project No.: 113237
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BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
0013B Sprayed Fireproofing, Deck, EG-27A, Phase 3A			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
0013C Sprayed Fireproofing, Deck, EG-25, South, Phase 3A			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
0013D Sprayed Fireproofing, Deck, EG-25, South, Phase 3A			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
0013E Sprayed Fireproofing, Deck, EG-27, Phase 3A			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		

Reviewed by: **Reporting Analyst:**

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name:	**National Research Council, 1200 Montreal Road, Ottawa, Ontario**		
Project No.:	**113237**		
Prepared For:	**N. Box**	**Date Received:**	**June 24, 2016**
Lab Reference No.:	**b131194**	**Date Analyzed:**	**July 4, 2016**
Analyst(s):	**A. Wells / A. Williams**	**# Samples submitted:**	**26**
		# Phases analyzed:	**46**

Method of Analysis:

EPA 600/R-93/116 - Method for the Determination of Asbestos in Bulk Building Materials dated July, 1993

Bulk samples are checked visually and scanned under a stereomicroscope. Slides are prepared and observed under a Polarized Light Microscope (PLM) at magnifications of 40X, 100X or 400X as appropriate. Asbestos fibres are identified by a combination of morphology, colour, refractive index, extinction, sign of elongation, birefringence and dispersion staining colours. A visual estimate is made of the percentage of asbestos present. A reported concentration of less than (<) the regulatory threshold (see chart below) indicates the presence of confirmed asbestos in trace quantities, limited to only a few fibres or fibre bundles in an entire sample. This method complies with provincial regulatory requirements where applicable. Multiple phases within a sample are analyzed and reported separately.

Provincial Jurisdiction	Regulatory Threshold	Provincial Jurisdiction	Regulatory Threshold
Ontario, British Columbia, Nova Scotia	0.5%	Manitoba	0.1% friable 1% non-friable
Quebec	0.1%	Saskatchewan	0.5% friable 1% non-friable
Alberta, NWT, Yukon, Nunavut	1%	Newfoundland and Labrador, PEI and New Brunswick	1%

All bulk samples submitted to this laboratory for asbestos analysis are retained for a minimum of three months. Samples may be retrieved, upon request, for re-examination at any time during that period.

Pinchin Ltd. is accredited by the National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP Lab Code 101270-0) for the 'EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples' and meets all requirements of ISO/IEC 17025:2005.

This report relates only to the items tested.

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council, 1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: N. Box

Lab Reference No.: b131194
Date Analyzed: July 4, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0014A Drywall Joint Compound, EG-25, East Area, Phase 3A	Homogeneous, off-white, drywall joint compound.	None Detected	Non-Fibrous Material > 75%
S0014B Drywall Joint Compound, EG-25, North Area, Phase 3A	Homogeneous, white, drywall joint compound.	None Detected	Non-Fibrous Material > 75%
S0014C Drywall Joint Compound, EG-25, West Area, Phase 3A	2 Phases: a) Homogeneous, off-white, drywall joint compound. b) Homogeneous, white, drywall joint compound.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
S0015A Grey Plaster with White Scratch Coat, EG-01 Column, Phase 3A	3 Phases: a) Homogeneous, black, tar material. b) Homogeneous, grey, hard, cementitious, plaster base coat. c) Homogeneous, white, hard, cementitious, plaster top coat.	None Detected None Detected None Detected	Tar and other non-fibrous > 75% Non-Fibrous Material > 75% Non-Fibrous Material > 75%
Comments:	Foam is present on the surface of this sample.		
S0015B Grey Plaster with White Scratch Coat, EG-04 Wall, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council, 1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: N. Box

Lab Reference No.: b131194
Date Analyzed: July 4, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0015C Grey Plaster with White Scratch Coat, EG-21 Wall, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
S0015D Grey Plaster with White Scratch Coat, EG-01 North Wall, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
S0015E Grey Plaster with White Scratch Coat, EG-27 Wall, Phase 3A	3 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat. c) Homogeneous, black, tar material.	None Detected None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75% Tar and other non-fibrous > 75%
S0016A Grey Plaster with White Scratch Coat, EG-27 South West Corner, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, off-white, drywall joint compound.	None Detected None Detected	Perlite 10-25% Other Non-Fibrous > 75% Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council, 1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: N. Box

Lab Reference No.: b131194
Date Analyzed: July 4, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0016B Grey Plaster with White Scratch Coat, EG-27 South West Corner, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, off-white, drywall joint compound.	None Detected None Detected	Perlite 10-25% Other Non-Fibrous > 75% Non-Fibrous Material > 75%
S0016C Grey Plaster with White Scratch Coat, EG-27 South West Corner, Phase 3A	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, off-white, drywall joint compound.	None Detected None Detected	Perlite 10-25% Other Non-Fibrous > 75% Non-Fibrous Material > 75%
S0017A Grey Plaster with White Scratch Coat, North Side of Corridor, CG-05, Phase 3B	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat.	None Detected None Detected	Hair 0.5-5% Non-Fibrous Material > 75% Non-Fibrous Material > 75%
S0017B Grey Plaster with White Scratch Coat, South Side of Corridor, CG-05, Phase 3B	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat.	None Detected None Detected	Hair < 0.5% Non-Fibrous Material > 75% Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council, 1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: N. Box

Lab Reference No.: b131194
Date Analyzed: July 4, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0017C Grey Plaster with White Scratch Coat, Men's Shower Room - CG-28, Phase 3B	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
S0018A Grey Plaster with White Scratch Coat, North Side of Lobby, CG-07, Phase 4	3 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat. c) Homogeneous, tan, fibrous material.	None Detected None Detected Amosite 50-75%	Non-Fibrous Material > 75% Non-Fibrous Material > 75% Non-Fibrous Material 25-50%
Comments:	Phase c) is present on the surface of phase b).		
S0018B Grey Plaster with White Scratch Coat, East Side of Lobby, CG-07, Phase 4	3 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat. c) Homogeneous, off-white, drywall joint compound.	None Detected None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75% Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council, 1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: N. Box

Lab Reference No.: b131194
Date Analyzed: July 4, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0018C Grey Plaster with White Scratch Coat, West Side of Lobby, CG-07, Phase 4	2 Phases: a) Homogeneous, grey, hard, cementitious, plaster base coat. b) Homogeneous, white, hard, cementitious, plaster top coat.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
S0019A 12"x12", ACT with Random Fissure Pattern, Lobby, CG-07, Phase 4	Homogeneous, off-white, compressed, acoustic ceiling tile.	None Detected	Man-made Vitreous Fibres > 75% Non-Fibrous Material 5-10%
S0019B 12"x12", ACT with Random Fissure Pattern, Lobby, CG-07, Phase 4	Homogeneous, off-white, compressed, acoustic ceiling tile.	None Detected	Man-made Vitreous Fibres > 75% Non-Fibrous Material 5-10%
S0019C 12"x12", ACT with Random Fissure Pattern, Lobby, CG-07, Phase 4	Homogeneous, off-white, compressed, acoustic ceiling tile.	None Detected	Man-made Vitreous Fibres > 75% Non-Fibrous Material 5-10%
S0020A Drywall Joint Compound, Wall, Women's Shower Room, CG-01B, Phase 3B	2 Phases: a) Homogeneous, off-white, drywall joint compound. b) Homogeneous, white, drywall joint compound.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
S0020B Drywall Joint Compound, Wall, Women's Shower Room, CG-01B, Phase 3B	2 Phases: a) Homogeneous, off-white, drywall joint compound. b) Homogeneous, white, drywall joint compound.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%

Pinchin Ltd. Asbestos Laboratory
Certificate of Analysis

Project Name: National Research Council, 1200 Montreal Road, Ottawa, Ontario
Project No.: 113237
Prepared For: N. Box

Lab Reference No.: b131194
Date Analyzed: July 4, 2016

BULK SAMPLE ANALYSIS

SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	% COMPOSITION (VISUAL ESTIMATE)	
		ASBESTOS	OTHER
S0020C Drywall Joint Compound, Wall, Women's Shower Room, CG-01B, Phase 3B	2 Phases: a) Homogeneous, off-white, drywall joint compound. b) Homogeneous, white, drywall joint compound.	None Detected None Detected	Non-Fibrous Material > 75% Non-Fibrous Material > 75%
S0021A Sprayed Fireproofing, Deck, EG-25, Phase 3A	Homogeneous, beige, fibrous material.	Amosite 50-75%	Non-Fibrous Material 25-50%
S0021B Sprayed Fireproofing, Deck, North Side, CG-07, Phase 4			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		
S0021C Sprayed Fireproofing, Deck, Shower Room, CG-02B, Phase 3B			Not Analyzed
Comments:	Analysis was stopped due to a previous positive result.		

Reviewed by: **Reporting Analyst:**

APPENDIX II-B

Lead Analytical Certificates

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Certificate of Analysis

Pinchin Ltd. (Ottawa)

555 Legget Dr., Suite 1001, Tower A
Ottawa, ON K2K2X3
Attn: Neil Box

Client PO: Phase 2
Project: 113237
Custody:

Report Date: 5-May-2016
Order Date: 2-May-2016

Order #: 1619026

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1619026-01	PB0001-Green Paint-Wall
1619026-02	PB0001-Beige Paint-Wall

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-OES	based on MOE E3470, ICP-OES	3-May-16	3-May-16

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Sample Results

Lead

Matrix: Paint
Sample Date: 19-Apr-16

Paracel ID	Client ID	Units	MDL	Result
1619026-01	PB0001-Green Paint-Wall	% by Wt.	0.0020	0.104
1619026-02	PB0001-Beige Paint-Wall	% by Wt.	0.0020	0.110

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	ND	0.0020	% by Wt.						
Matrix Duplicate									
Lead	0.0395	0.0020	% by Wt.	0.0447			12.4	30	
Matrix Spike									
Lead	404		ug/L	223	72.3	70-130			

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Client Name: Pinchin Ltd.	Project Reference: 113237 - Phase 2
Contact Name: Neil Box	Quote #
Address: 555 Legget Drive, Ottawa, Ontario	PO #
Telephone: 613.592.3387	Email Address: nbox@pinchin.com

TAT: ☑ Regular ☐ 3 Day ☐ 2 Day ☐ 1 Day

Date Required: _____

Criteria: ☐ O. Reg. 153/04 (As Amended) Table __ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: **S** (Soil/Sed.) **GW** (Ground Water) **SW** (Surface Water) **SS** (Storm/Sanitary Sewer) **P** (Paint) **A** (Air) **O** (Other)

Paracel Order Number: 1619026

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	Required Analyses: lead
1	PB0001 - Green Paint - Wall	P	NA	1	April 19,2016		✓
2	PB0001 - Beige Paint - Wall	P	NA	1	April 19, 2106		✓
3							
4							
5							
6							
7							
8							
9							
10							

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: M. Stouse	Received at Lab:	Verified By:
Relinquished By (Print): Neil Box	Date/Time: 07/05/16 11:00 am	Date/Time: MAY 2 16 12:40	Date/Time: MAY 2 16 12:55
Date/Time: April 29, 2016	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By: N/A

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Certificate of Analysis

Pinchin Ltd. (Ottawa)

555 Legget Dr., Suite 1001, Tower A
Ottawa, ON K2K2X3
Attn: Neil Box

Client PO: 3A
Project: 113237
Custody:

Report Date: 6-Jun-2016
Order Date: 1-Jun-2016

Order #: 1623234

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1623234-01	PB 0001 Beige Paint wall

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Pinchin Ltd. (Ottawa)
Client PO: 3A

Report Date: 06-Jun-2016
Order Date: 1-Jun-2016
Project Description: 113237

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-OES	based on MOE E3470, ICP-OES	2-Jun-16	2-Jun-16

Sample and QC Qualifiers Notes

1- QR-04 : Duplicate results exceeds RPD limits due to non-homogeneous matrix.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Certificate of Analysis
Client: Pinchin Ltd. (Ottawa)
Client PO: 3A

Report Date: 06-Jun-2016
Order Date: 1-Jun-2016
Project Description: 113237

Sample Results

Lead

Matrix: Paint
Sample Date: 23-Apr-16

Paracel ID	Client ID	Units	MDL	Result
1623234-01	PB 0001 Beige Paint wall	ug/g	20	2040

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	ND	20	ug/g						
Matrix Duplicate									
Lead	6730	20	ug/g	4100			48.5	30	QR-04
Matrix Spike									
Lead	259		ug/L	ND	104	70-130			

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Page 1 of 1

Client Name: Pinchin Ltd	Project Reference: 113237-3A
Contact Name: Nat Box	Quote #
Address: 555 Legget Drive Suite 1005, Ottawa ON	PO #
Telephone: 613.592.3387	Email Address: NBox@pinchin.com

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☑ Regular
Date Required: _____

Criteria: ☐ O. Reg. 153/04 (As Amended) Table __ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1623234

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: Lead										
1	PB0001 Beige Paint wall	P			April 23/16		☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot:	Received at Lab:	Verified By:
Relinquished By (Print): Nat Box	Date/Time: 01/06/16 10:15AM	Date/Time: JUN 01, 2016 12:17	Date/Time: June 1/16
Date/Time: May 31, 2016	Temperature: 1 °C	Temperature: 1 °C	pH Verified [ ] By: N/A

1:01p

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Certificate of Analysis

Pinchin Ltd. (Ottawa)

555 Legget Dr., Suite 1001, Tower A
Ottawa, ON K2K2X3
Attn: Neil Box

Client PO: Phase 3B
Project: 113237
Custody:

Report Date: 6-Jun-2016
Order Date: 1-Jun-2016

Order #: 1623233

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1623233-01	PB 0001 - Grey Paint Wall (corridor)

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: Pinchin Ltd. (Ottawa)
Client PO: Phase 3B

Report Date: 06-Jun-2016
Order Date: 1-Jun-2016
Project Description: 113237

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-OES	based on MOE E3470, ICP-OES	2-Jun-16	2-Jun-16

Sample and QC Qualifiers Notes

1- QR-04 : Duplicate results exceeds RPD limits due to non-homogeneous matrix.

Sample Data Revisions

None

Work Order Revisions/Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Certificate of Analysis
Client: Pinchin Ltd. (Ottawa)
Client PO: Phase 3B

Report Date: 06-Jun-2016
Order Date: 1-Jun-2016
Project Description: 113237

Sample Results

Lead

Matrix: Paint
Sample Date: 23-Apr-16

Paracel ID	Client ID	Units	MDL	Result
1623233-01	PB 0001 - Grey Paint Wall (corridor)	ug/g	20	2990

Laboratory Internal QA/QC

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Matrix Blank									
Lead	ND	20	ug/g						
Matrix Duplicate									
Lead	6730	20	ug/g	4100			48.5	30	QR-04
Matrix Spike									
Lead	259		ug/L	ND	104	70-130			

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Client Name: Pinchin Ltd	Project Reference: 113237 - Phase 3B
Contact Name: Nil Bor	Quote #
Address: 555 Legget Drive Suite 1005, Ottawa ON	PO #
Telephone: 613.592.3387	Email Address: NBor@pinchin.com

Turnaround Time:
☐ 1 Day ☐ 3 Day
☐ 2 Day ☑ Regular
Date Required: _____

Criteria: ☐ O. Reg. 153/04 (As Amended) Table __ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1623233

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Required Analyses: Lead										
1	PB 0001 - Grey Paint Wall (corridor)	P	—	—	Apr 29/16		☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comments:

Method of Delivery: Paracel

Relinquished By (Sign):	Received by Driver/Depot: T. Trouse	Received at Lab: Stittsville DON MM	Verified By:
Relinquished By (Print): Nil Bor	Date/Time: 01/06/16 10:15 AM	Date/Time: JUN 01 2016 12:17	Date/Time: June 1/16
Date/Time: May 31, 2016	Temperature: ____ °C	Temperature: ____ °C	pH Verified [ ] By: N/A

1:01p

APPENDIX III
Methodology

1.0 GENERAL

Pinchin conducts a room-by-room survey (rooms, corridors, service areas, exterior, etc.) to identify the hazardous building materials as defined by the scope of work. All work is conducted in accordance with our own internal Standard Operating Procedures.

Information regarding the location and condition of hazardous building materials encountered and visually estimated quantities are recorded. The locations of any samples collected are recorded on small-scale plans.

As-built drawings and previous reports are referenced where provided.

1.1 Scope Limitations

The assessment excludes the following:

- Articles belonging to the owner, tenant or occupant (e.g. stored items, furniture, appliances, etc.);
- Underground materials or equipment (e.g. vessels, drums, underground storage tanks, pipes, etc.);
- Building envelope, structural components, inaccessible or concealed materials or other items where sampling may cause consequential damage to the property;
- Energized systems (e.g. internal boiler components, elevators, mechanical or electrical components); and
- Controlled products (e.g. stored chemicals, operational or process-related substances).

The assessment includes limited demolition of wall and ceiling finishes (drywall or plaster) to view concealed conditions at representative areas as permitted by the current building use. Limited destructive testing of flooring is conducted where possible (under carpets or multiple layers of flooring). Demolition of masonry walls (chases, shafts etc.), structural items or exterior building finishes is not conducted.

1.2 Asbestos

Pinchin conducts an inspection for the presence of friable and non-friable asbestos-containing materials (ACM). A friable material is a material that when dry can be crumbled, pulverized or powdered by hand pressure.

A separate set of samples is collected of each type of homogenous material suspected to contain asbestos. A homogenous material is defined by the US EPA as material that is uniform in texture and appearance, was installed at one time, and is unlikely to consist of more than one type or formulation of

material. The homogeneous materials are determined by visual examination and available information on the phases of construction and prior renovations.

Pinchin collects samples at a rate that is in compliance with Table 1 of O.Reg. 278/05.

The sampling strategy is also based on known ban dates and phase out dates of the use of asbestos; sampling of certain building materials is not conducted after specific construction dates. In addition, to be conservative, several years past these dates are added to account for some uncertainty in the exact start/finish date of construction and associated usage of ACM.

In some cases, manufactured products such as asbestos cement pipe are visually identified without sample confirmation.

Flooring mastic/adhesive and leveling compounds are only sampled and analyzed if present on the underside of flooring samples (vinyl floor tile and vinyl sheet flooring).

If present, the following materials are presumed to be asbestos-containing and are best sampled immediately prior to commencing renovation/disturbance:

- roofing, felts and tar;
- concrete floor levelling compound;
- elevator and lift brakes;
- electrical components or wiring within control centers, breakers, motors or lights, insulation on wiring;
- moulded plastic components (laboratory bench tops);
- refractory materials and insulations in boilers, incinerators and stacks;
- insulation under metal clad boilers and vessels;
- vermiculite in concrete block wall cavities;
- fibre reinforced paints and coatings;
- paper products under wood flooring or metal or slate roofing;
- soffit and fascia boards at elevated heights;
- mechanical packing, ropes and gaskets;
- fire resistant doors or metal clad finishes; and
- exterior cladding.

Pinchin submits the bulk samples to a NVLAP accredited laboratory for analysis. The analysis is performed in accordance with Test Method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials, July 1993.

In Ontario an ACM is defined as materials containing 0.5% or more asbestos by weight.

The asbestos analysis is completed using a stop positive approach. Only one result meeting the above regulated criteria is required to determine that a material is asbestos-containing, but all samples must be analyzed to conclusively determine that a material is non-asbestos. The laboratory stops analyzing samples from a homogeneous material once a result equal to or greater than the regulated criteria is detected in any of the samples of that material. All samples of a homogeneous material are analyzed if no asbestos is detected. In some cases, all samples are analyzed in the sample set regardless of result. Where building materials are described in the report as non-asbestos, this means that either no asbestos was detected by the analytical method utilized in any of the multiple samples or, if detected, it is below the lower limit of an asbestos-containing material in the applicable regulation.

Asbestos materials are evaluated in order to make recommendations regarding remedial work. The priority for remedial action is based on several factors:

- Friability (friable or non-friable);
- Condition (good, fair, poor, debris);
- Accessibility (ranking from accessible to all building users to inaccessible);
- Visibility (whether the material is obscured by other building components); and
- Efficiency of the work (for example, if damaged ACM is being removed in an area, it may be most practical to remove all ACM in the area even if it is in good condition).

1.3 Lead

Pinchin collects samples of distinctive paint finishes and surface coatings present in more than a limited application, where removal of the paint is possible. Pinchin collects samples by scraping the painted finish to include base and covering applications. Drawings included show sample locations.

Analysis for lead in paints or surface coatings is performed at an accredited laboratory in accordance with EPA Method No. 3050B/Method No. 7420; flame atomic absorption.

The Ontario Ministry of Labour (MOL) has not established a lower limit for concentrations of lead in paint, below which precautions do not need to be considered during construction projects. Pinchin follows the recommendations of the Environmental Abatement Council of Ontario (EACO) Lead Guideline for Construction, Renovation, Maintenance or Repair. The Guideline suggests that 0.1% (1,000 ppm) lead in paint represents a de minimis concentration of lead in paint for construction hygiene purposes, that is a concentration below which the lead content is not the limiting hazard in any disturbance of leaded paint for non-aggressive disturbance of painted finishes, (hand powered demolition, chipping, scraping, light sanding, etc.). The use of aggressive methods such as power grinding, torching, welding, etc. may result

in significant lead exposures even with low concentrations of lead in paints (below 0.1%). Paint and surface coatings are evaluated for condition such as flaking, chipping or spalling.

Other lead building products (e.g. batteries, lead sheeting, flashing) are identified by visual observation only.

1.4 Silica

Pinchin identifies building materials suspected of containing crystalline silica (e.g. concrete, cement, tile, brick, masonry, mortar) by knowledge of current and historic applications and visual inspection only. Pinchin does not perform sampling of these materials for laboratory analysis of crystalline silica content.

1.5 Mercury

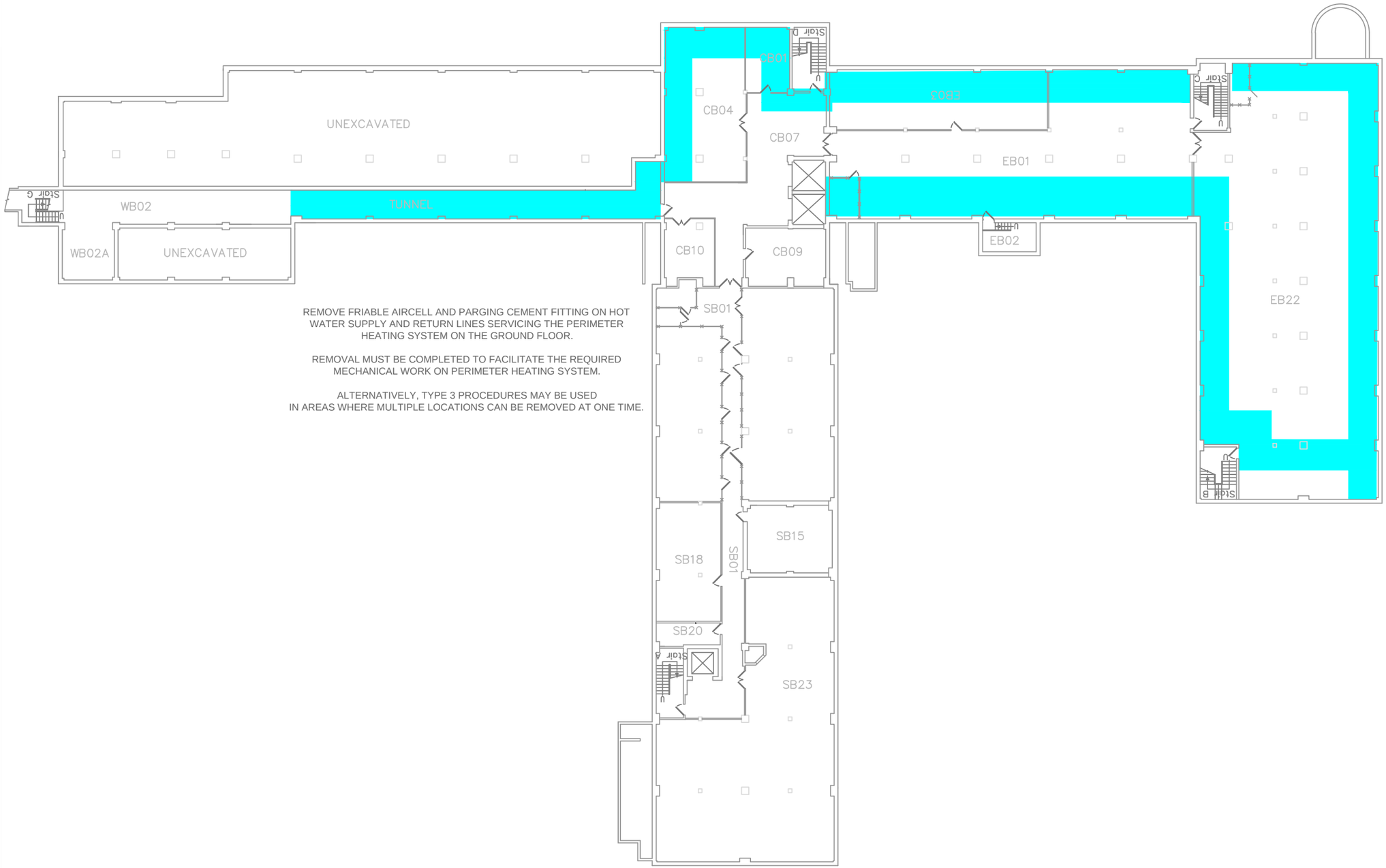
Building materials/products/equipment (e.g. thermostats, barometers, pressure gauges, light tubes), suspected to contain mercury are identified by visual inspection only. Dismantling of equipment suspected of containing mercury is not performed. Sampling of these materials for laboratory analysis of mercury content is not performed.

1.6 Polychlorinated Biphenyls

Pinchin determines the potential for light ballasts to contain PCBs based on the age of the building, a review of maintenance records and examination of labels or nameplates on equipment, where present and accessible. The information is compared to known ban dates of PCBs and Environment Canada publications. Other than light ballasts and pole mounted transformers, all other liquid uses of PCBs should have been discontinued.

1.7 Visible Mould

Pinchin identifies the presence of mould if visibly present in a significant quantity on exposed building surfaces. If any mould growth is concealed within wall cavities it is not addressed in this assessment.



REMOVE FRIABLE AIRCELL AND PARGING CEMENT FITTING ON HOT WATER SUPPLY AND RETURN LINES SERVICING THE PERIMETER HEATING SYSTEM ON THE GROUND FLOOR.

REMOVAL MUST BE COMPLETED TO FACILITATE THE REQUIRED MECHANICAL WORK ON PERIMETER HEATING SYSTEM.

ALTERNATIVELY, TYPE 3 PROCEDURES MAY BE USED IN AREAS WHERE MULTIPLE LOCATIONS CAN BE REMOVED AT ONE TIME.

PINCHIN

LEGEND:

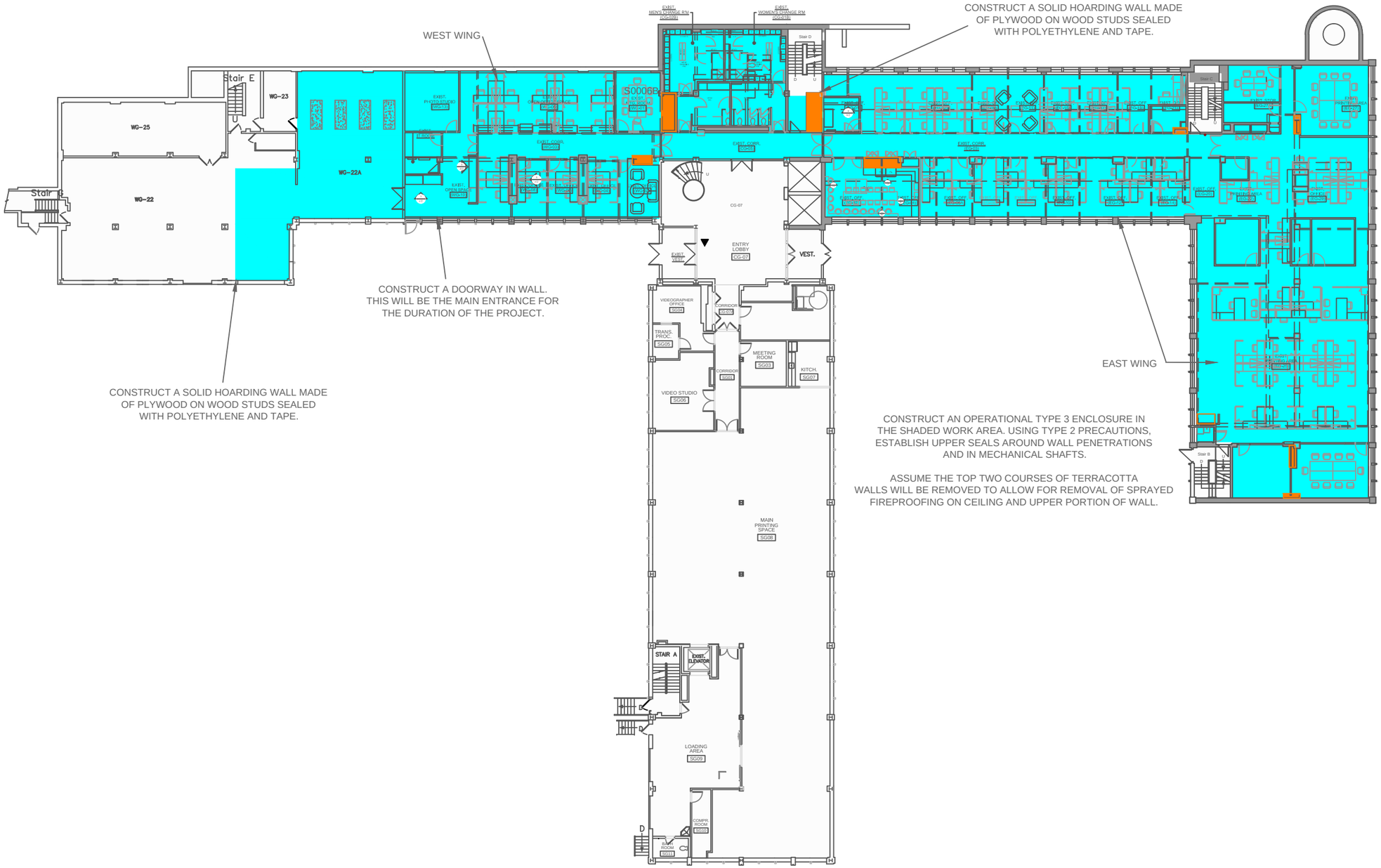
TYPE 2 GLOVEBAG REMOVAL OR TYPE 3 ABATEMENT ENCLOSURES

CLIENT:
NATIONAL RESEARCH COUNCIL OF CANADA

LOCATION:
1200 MONTREAL ROAD
OTTAWA, ONTARIO
M58 BASEMENT

TITLE:
GROUND LEVEL EAST AND WING WING RENOVATIONS

DATE:	PROJECT # :
SEPTEMBER 16, 2016	113237
DRAWN BY: MG	DRAWING: 1 OF 3
CHECKED BY: NB	
SCALE: NTS	



LEGEND:

TYPE 2 ASBESTOS ABATEMENT ENCLOSURE

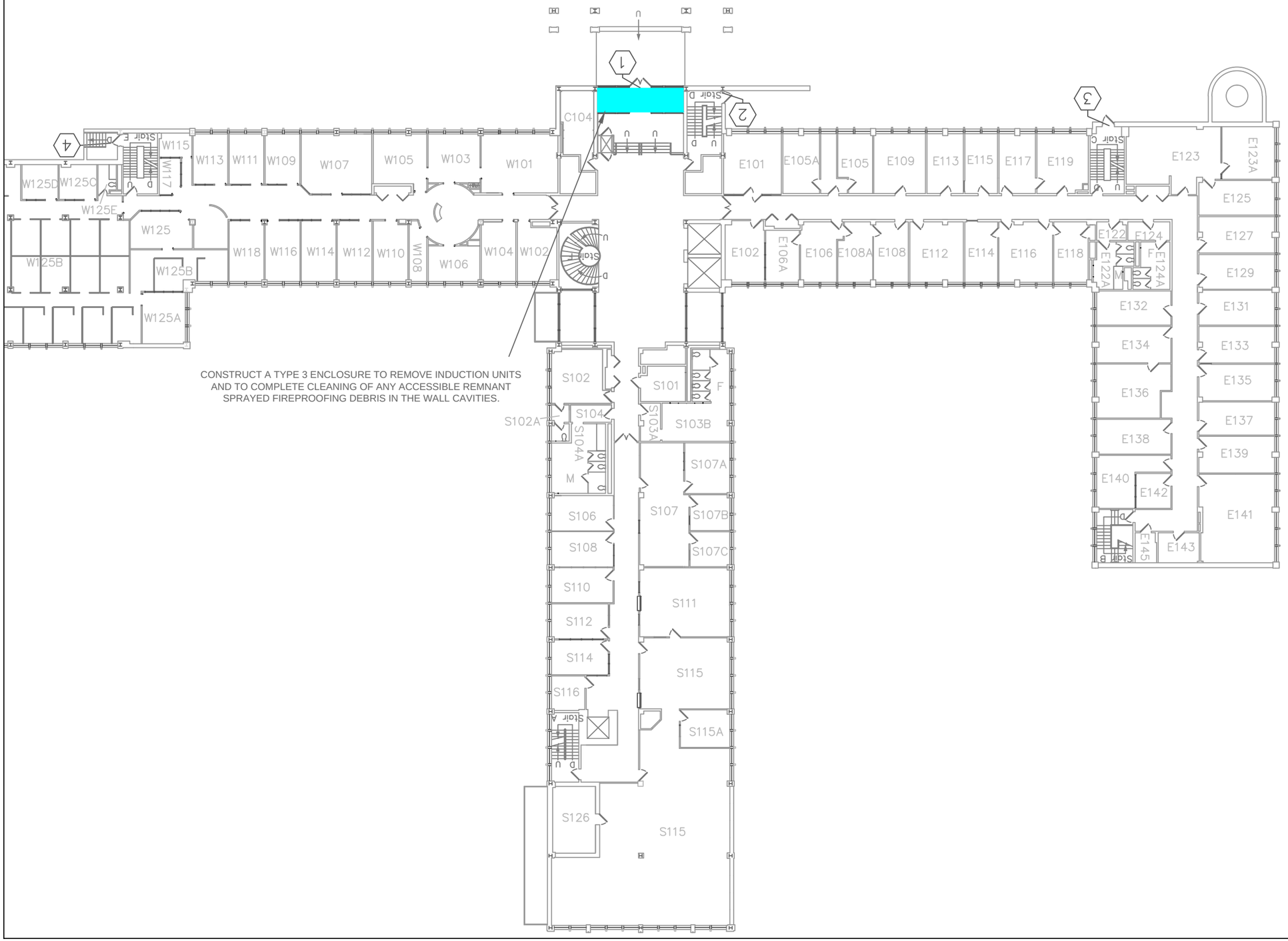
LOCATION OF MECHANICAL SHAFTS AND ELECTRICAL ROOM CLOSETS. THESE ME BE OPENED TO ALLOW FOR REMOVAL OF ASBESTOS-CONTANING PIPE INSULATION AND REMNANT SPRAYED FIREPROOFING WITHIN.

CLIENT:
NATIONAL RESEARCH COUNCIL OF CANADA

LOCATION:
1200 MONTREAL ROAD
OTTAWA, ONTARIO
M58 GROUND FLOOR

TITLE:
GROUND LEVEL EAST
WEST WING RENOVATIONS

DATE:	PROJECT # :
SEPTEMBER 16, 2016	113237
DRAWN BY: MG	DRAWING: 2 OF 3
CHECKED BY: NB	
SCALE: NTS	



PINCHIN

LEGEND:

TYPE 3 ASBESTOS ABATEMENT ENCLOSURE

ASBESTOS-CONTAINING VINYL SHEET FLOORING POSSIBLY PRESENT BENEATH NEW FINISHES.

CLIENT:
NATIONAL RESEARCH COUNCIL OF CANADA

LOCATION:
1200 MONTREAL ROAD
OTTAWA, ONTARIO
M58 FIRST FLOOR

TITLE:
GROUND LEVEL EAST AND WEST WING RENOVATIONS

DATE:	PROJECT # :
SEPTEMBER 16, 2016	113237
DRAWN BY: MG	DRAWING: 3 OF 3
CHECKED BY: NB	
SCALE: NTS	

NATIONAL RESEARCH COUNCIL CANADA
1200 MONTREAL ROAD
OTTAWA, ONTARIO
K1A 0R6

DESIGNATED SUBSTANCES SURVEY
BUILDING M-58
OTTAWA, ONTARIO

Prepared by:

OAKHILL
ENVIRONMENTAL

Distribution:
2 copies - National Research Council Canada
1 copy - Oakhill Environmental

March 2007 PR-06-039

EXECUTIVE SUMMARY

Oakhill Environmental (Oakhill) was retained by National Research Council Canada (NRC) to conduct a designated substances survey within Building M-58 in Ottawa, Ontario. All site work was completed from February 13th to February 21st and March 29th, 2007.

All work carried out meets the requirements of the Ontario Occupational Health and Safety Act and WHMIS Regulation (formerly Bill 208). The purpose of the investigation was to identify any potential designated substances and mould.

Based on the visual inspection and laboratory analyses, designated substances were identified to be present in the facility. A summary of the survey recommendations is presented in Table 1.

Table 1 - Summary of Recommendations

Issue	Comments	Recommendations
Asbestos	Room Tunnel WB02, WB02A (FS# B001)	
	One moderately damaged MJC fitting was identified on the domestic cold water system.	Encapsulate the moderately damaged fitting on the domestic cold water system.
	One moderately damaged MJC fitting was identified on the domestic hot water system.	Encapsulate the moderately damaged fitting on the domestic hot water system.
	Damaged tank insulation (.07m^2) on the condensate system.	Encapsulate the moderately damaged tank insulation.
	Room Hall Elevator Area (FS# B002)	
	Damaged MJC fitting insulation on the secondary hot water heating system – 2 units	Encapsulate the two moderately damaged fittings on the secondary hot water heating system.
	Damaged MJC Fitting Insulation on the hot water heating system – 1 unit	Encapsulate the moderately damaged fitting on the hot water heating system.
	One moderately damaged MJC fitting was identified on the domestic hot water system.	Encapsulate the moderately damaged fitting on the domestic hot water system.
	Room EB01 (FS # B005)	
	Moderately damaged aircell pipe insulation (0.1 LM) was found on the domestic hot water system.	Encapsulate the moderately damaged section or aircell pipe insulation on the domestic hot water system.
	Moderately damaged sweat wrap (with white paper layer) pipe insulation (0.2 LM) was found on the domestic cold water system.	Encapsulate the moderately damaged section or sweat wrap pipe insulation on the domestic cold water system.

Issue	Comments	Recommendations
	Two moderately damaged MJC fittings were identified on the hot water heating system.	Encapsulate the two moderately damaged fittings on the hot water heating system.
	Moderately damaged aircell pipe insulation (0.2 LM) was found on the hot water heating system.	Encapsulate the moderately damaged section or aircell pipe insulation on the hot water system.
	Severely damaged aircell pipe insulation (0.2 LM) was found on the hot water heating system.	Remove the severely damaged section of aircell pipe insulation (0.2 LM) on the hot water heating system.
	Room EB22 (FS # B007)	
	Two moderately damaged MJC fittings were identified on the hot water heating system.	Encapsulate the two moderately damaged fittings on the hot water heating system.
	Damaged mud joint compound fitting on the domestic cold water system. One encapsulation required	Encapsulate the moderately damaged fitting on the domestic cold water system
	Moderately damaged aircell pipe insulation (0.8 LM) was found on the domestic hot water system.	Four encapsulations are required on the moderately damaged section or aircell pipe insulation on the domestic hot water system.
	Room SB01 & Hall (FS # B008)	
	One moderately damaged MJC fitting was identified on the domestic hot water system.	Encapsulate the moderately damaged fitting on the domestic hot water system.
	Two moderately damaged MJC fitting was identified on the domestic cold water system.	Encapsulate the two moderately damaged fittings on the domestic cold water system.
	Damaged duct insulation (FG with tar paper and parging) –0.5LM	Encapsulate the moderately damaged duct insulation.
	Room SB23 & Hall (FS # B010)	
	Three moderately damaged MJC fittings were identified on the domestic hot water system.	Encapsulate the three moderately damaged fittings on the domestic hot water system.
	One moderately damaged MJC fitting was identified on the hot water heating system.	Encapsulate the moderately damaged fitting on the hot water heating system.
	Damaged Duct Insulation (FG with tar paper and parging) – 0.4LM	Encapsulate the moderately damaged duct insulation.
	Room CB09 & Hall (FS # B013)	
	Moderately damaged mag block pipe insulation (0.2 LM) was identified on the hot water heating system.	Two encapsulations are required on the moderately damaged section or mag block pipe insulation on the hot water heating system.

Issue	Comments	Recommendations
	Room SB20 & Hall (FS # B015)	
	Severely damaged aircell pipe insulation (0.5 LM) was found on the hot water heating system.	Remove the severely damaged section of aircell pipe insulation (0.5 LM) on the hot water heating system.
	Room Penthouse (FS # PH01)	
	Duct Insulation (fibreglass with tar paper and parging) on the HVAC – 0.9 m sq.	Six encapsulations are required on the damaged sections on the HVAC system.
	Twelve moderately damaged MJC fittings were identified on the hot water heating system.	Encapsulate the twelve moderately damaged fittings on the hot water heating system.
	One severely damaged MJC fitting was identified on the chiller system.	Remove the one severely damaged MJC fitting that was identified on the chiller system.
	Mud joint compound elbow was observed lying on the floor.	Clean-up is required.
Lead	Seven paint samples were submitted for lead analysis. A significant concentration of lead was detected in two of the samples. Sample M58-L3 (grey paint over blue paint) sampled in Rm#EB22 (F.S.B007) had a reading of 9,610ppm. Sample M58-L5 peach paint sampled in Rm#CB07 (F.S.B002) had a reading of 7,280ppm. The remaining five samples were not found to contain significant levels of lead (i.e., equal to or greater than 5000 ppm). Lead may also be present in the solder used on copper domestic water lines, as caulking in bell fittings for cast iron drainage pipes, in glazing on the ceramic tiles and in electrical equipment, wiring or fixtures.	The draft Proposed Lead Regulation on Construction Projects, May 5, 1995, (enforced by the Ministry of Labour) does not require removal of lead paint or lead-based materials, unless work on these materials is likely to produce lead fumes or dust, for example during welding, torch cutting, grinding, sanding or sandblasting. In the event that such work is conducted at this facility, ensure that lead fumes or dust do not exceed the maximum allowable Time Weighted Average Exposure Value (TWAEV) of 0.15 mg/m^3 as prescribed by the OHSA.

Issue	Comments	Recommendations
Mercury	Mercury vapour may be present in fluorescent light tubes and thermostats. Mercury may also be present in paints and adhesives.	Mercury, or mercury vapour within light fixtures, pose no risk to workers or occupants, provided the mercury containers remain intact and undisturbed. Where possible, fluorescent lights should be recycled at an approved recycling facility. Mercury must be handled and disposed of in accordance with O. Reg. 390/00 and O. Reg. 558/00.
Silica	Silica may be present in concrete, cement mortar and non-fibreglass acoustic ceiling tiles.	Ensure workers performing demolition work are not exposed to airborne silica levels in excess of 0.20 mg/m^3 by providing respiratory protection, and/or wetting down work area, and providing workers with a facility to properly wash prior to exiting the work area as prescribed by O.Reg.845/90.
Mould	Mould is suspect to be present in Rm#SB20 (F.S. #B015) located on the ceiling and in Rm#E200 (F.S. #2014) located on a ceiling tile.	Recommend that initially, bulk fungal analysis be performed to the species level. Once the hazard can be qualified, the mouldy ceiling tile can be removed and the source of the moisture can be mitigated.

None of the other designated substances were observed during the course of the survey inspection.

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APPENDICES

1.0 INTRODUCTION

Oakhill Environmental (Oakhill) was retained by the National Research Council Canada (NRC) to perform a survey for Designated Substances and mould of Building M-58 in Ottawa, Ontario. Building M-58 was surveyed from February 13th to February 21st and March 29th, 2007.

The purpose of the investigation was to identify any building materials or equipment containing certain substances termed "Designated Substances" and mould.

This survey will enable NRC to:

1. Manage asbestos containing materials (ACM's) to ensure that these materials are in good condition and provide recommendations for ACM's that are in need of repair,
2. Provide this report to NRC building managers, project managers, contractors and subcontracts enabling them to comply with O. Reg. 278/05, the regulation regarding asbestos on construction projects and in buildings and repair operations, and
3. Provide a comprehensive survey, which will enable NRC to develop a Management Plan to deal with designated substances.

1.1 Limitations

This report details the accessible Designated Substances found within the building and the exterior walls. Representative views were made above accessible suspended ceiling systems. Throughout the process of inspection there were, on numerous occasions, areas that were inaccessible. These areas include but are not limited to: areas above solid ceilings, areas behind solid walls and internal components of machinery or equipment. These areas require intrusive investigative techniques, which may compromise the integrity of that system. An example of an intrusive issue is asphaltic roofing felts (tar paper), which may contain asbestos. However, due to the potential for damages to the building and its contents, as well as safety reasons, no samples were obtained from the roofing systems at the facility. Intrusive investigative techniques are only undertaken at the expressed request of NRC staff where forthcoming renovations projects are known.

Any area that was not inspected and considered inaccessible in this report should be dealt with cautiously in future endeavours before undertaking any form of work, as there may be ACM in this area. In such future situations, samples should be collected and analyzed of all suspect ACM before commencing work. Any area that was not accessible at the time of inspection would be noted within the report.

The report reflects the observations of accessed areas, findings and analysis of materials sampled during the survey. Designated Substances may have been removed from or added to the project area. It is the NRC's responsibility to disclose whether any Designated Substances have been added to or removed from the project area.

The material in it reflects Oakhill's best judgement based on the information discovered at the time of preparation and within the Designated Substance Survey scope of work. There may be materials on-site, which are not represented by these investigations. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Oakhill accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

2.0 SCOPE OF WORK

The purpose of the investigation was to identify any building materials or equipment containing certain substances termed "Designated Substances" and mould. The scope defined for this project is summarized below.

1. To provide assessments for the presence of Designated Substances which include:
    - Acrylonitrile
    - Arsenic
    - Asbestos
    - Benzene
    - Coke Oven Emissions
    - Ethylene Oxide
    - Isocyanates
    - Lead
    - Mercury
    - Silica (free crystalline silica)
    - Vinyl Chloride (vinyl chloride monomer, not PVC)
    - and in addition Mould
2. Assessment will include building materials and components incorporated in the structure and finishes (including exterior finishes). Items not included are building and service tunnels, owner or occupant articles within the building (e.g. process materials or equipment, furniture, etc.), soil contaminants, groundwater, vessels, drums or underground storage tanks)
3. To collect samples of suspect building materials to verify the presence of asbestos and lead
4. To provide testing from a certified laboratory on samples collected of suspect asbestos and lead
5. Provide three hard and electronic (PDF) copies of the final report

3.0 REGULATORY CRITERIA, STANDARDS AND GUIDELINES

The following regulatory criteria, standards, and guidelines were applied for the interpretation and reporting of observations, laboratory data, and on-site monitoring data. The building materials and contents were visually examined to determine the presence of the following designated substances in accordance with the requirements of the Ministry of Labour's (MOL) Occupational Health and Safety Act, Section 30:

Acrylonitrile	O. Reg. 835/90 as amended by O. Reg. 101/04
Arsenic	O. Reg. 836/90 as amended by O. Reg. 102/04
Asbestos	O. Reg. 278/05 and O. Reg. 347/90
Benzene	O. Reg. 839/90 as amended by O. Reg. 105/04
Ethylene Oxide	O. Reg. 841/90 as amended by O. Reg. 107/04
Isocyanates	O. Reg. 842/90 as amended by O. Reg. 108/04
Lead	O. Reg. 843/90 as amended by O. Reg. 109/04
Mercury	O. Reg. 844/90 as amended by O. Reg. 110/04 and the MOL guideline
Silica	O. Reg. 845/90 as amended by O. Reg. 111/04
Vinyl Chloride	O. Reg. 846/90 as amended by O. Reg. 112/04

Asbestos Containing Material (ACM) is defined as "Material that contains 0.5% or more asbestos by dry weight". Friable Material is defined as "material that: (a) when dry, can be crumbled, pulverized or powdered by hand pressure, or (b) is crumbled, pulverized or powdered".

For asbestos, lead and silica the above regulations define exposure guidelines for a worker's time-weighted average exposure of the material in air. Airborne levels should not exceed 0.01 fibres/m^3 of asbestos in air, 0.15 mg/m3 of lead in air, 4.3 mg/m^3 of acrylonitrile in air, 0.2 mg/m^3 of arsenic in air, 3.0 mg/m^3 of benzene in air and 0.2 mg/m^3 of silica in air. The above regulations classify disturbances (Type 1, Type 2, and Type 3), handling requirements, respiratory requirements and monitoring requirements.

The Ministry of Labour published, The Safe Handling of Mercury, A Guideline for the Construction Industry, Jan 1991, outlining the health effects, sources, respiratory protection during the clean up of mercury. From the U.S. Department of Housing and Urban Development, Lead- Based Paint is classified as any paint application containing at least 1.0 milligrams of lead per square centimetre of surface area (1.0 mg/cm2) or at least 0.5% lead content by weight (5,000 ppm) or 5,000 µg/g.

The Provincial Government has issued O. Reg. 558/00 controlled under R.R.O. 1990, Regulation 347 outlining generator, hauler and receiver requirements for wastes dependant on the results of leachate analyses. Provincial and Federal regulations also outline the packaging and transportation of wastes.

4.0 SURVEY METHODOLOGY

4.1 Background Information Review

Reviewing existing reports, interviewing knowledgeable NRC staff, and reviewing as-built drawings allowed Oakhill to obtain a basic understanding of potential issues regarding each building.

4.2 Field Investigation

A detailed visual survey of all accessible areas of the building on a room-by-room basis, including ceiling spaces above removable acoustical ceiling tiles; and wall spaces behind removable panels. Each area or room of the building was assigned a four-digit functional space identification number beginning with 1001. A room-by-room inspection was conducted for Designated Substances in all accessible areas. All suspect ACM and lead were sampled and were categorized with a unique homogeneous material number. Visual assessment of all known and suspect ACM included assessment as to friability, type, quantity, condition, accessibility, appropriate response, as well as comments made on the potential or likelihood of future damage or exposure to ACM by building occupants. Quantification of all ACM's were approximations only, not actual measurements were taken. Square metres or lineal metres were generally used for quantifying ACM. All ACM's are documented through functional space forms and photographs.

In the performance of this Designated Substances survey, Oakhill utilized the project team comprised of the following staff:

Mr. Fil Barillaro, M.A.Sc., P.Eng.	Project Manager
Mr. Kevin Christian, M.Sc., P.Geo.	QA Reviewer
Mr. Bill McGovern	Environmental Analyst
Mr. Raivo Tahiste	Environmental Analyst
Mr. Gino Barillaro	Environmental Analyst
Mr. Sean Bagnulo	Environmental Analyst
Ms. Tanya Fiocca	Administration

4.2.1 Homogenous Materials

Materials were grouped to be homogenous. That is, materials that are uniform in colour and texture were assumed to be similar in content. Regarding asbestos, samples collected of suspect materials adhered to O. Reg. 278/05, Table 1 Bulk Material Samples – Section 3 (3), for minimum sample requirements for respective suspect materials and quantities. Samples were randomly collected to be representative of each suspect ACM and lead material and then assigned a homogenous material number accordingly. A homogenous materials list was generated which consists of suspect ACM sampled, with positive materials highlighted. The Homogenous Materials List is located in Table 2 of this report**.**

4.3 Sample Collection

Collection of bulk samples of suspect materials for submission to AGAT Laboratories Ltd., in Mississauga, Ontario for analysis for asbestos (as percentage asbestos fibre, and type of asbestos fibre) and for lead (ug/g).

4.3.1 Bulk Sample Collection

Oakhill field staff wore half-face respirators with P100 cassettes during bulk sampling events. Building materials were pre-dampened with an application of amended water from a spray bottle to suppress surface and airborne fibres prior to disturbance for sample collection.

The building material sampled was sealed with caulking after sample collection to restore the material to its original condition. Every effort to minimize intrusion of the sampled building materials was always of paramount consideration. Each sample was sealed in a new plastic bag and labelled with a unique sample number and then double bagged. Chain of custody records were completed on-site and submitted with all samples to an approved laboratory.

All bulk materials sampled were randomly collected and are representative of each area of homogenous material. The minimum number of bulk materials to be collected from an area of homogenous material was in accordance with O. Reg. 278/05, Section 3 (3) (Table 1). All analysis of suspect asbestos containing materials was conducted according to O. Reg. 278/05, Section 3 (1) which states that the following standard be used: U.S. Environmental Protection Agency. Test method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. June 1993. Sample locations are depicted in Appendix D.

4.3.2 Sample Analysis

All bulk samples were submitted to AGAT Laboratories Inc. (AGAT) in Mississauga, Ontario, an independent laboratory, for analysis.

AGAT has been evaluated and has been found to comply with the criteria and standards established by the Canadian Association for Environmental Laboratories (CAEAL) for asbestos fibre analysis by phase contrast microscopy. The American Industrial Hygiene Association (AIHA) has accredited AGAT for the Industrial Hygiene Laboratory Accreditation Program for Asbestos using optical microscopy. Suspect bulk samples were analyzed using polarized light microscopy, and were based on a “test for first positive”

approach. Laboratory results of the asbestos and lead sampling can be found in Appendices B and C respectively.

5.0 FINDINGS AND RECOMMENDATIONS

The results of the survey for designated substances and mould at building M-58 are discussed below.

5.1 Asbestos

All potential asbestos-containing materials sampled have been compiled into a homogenous materials list. Each homogenous material is given a homogeneous number, description, analytical result and corresponding sample numbers. The homogeneous materials list for building M-58 is shown in Table 2.

Table 2 – Homogeneous Materials List

Homo Mat. No.	Material Description	Asbestos Type & Conc.	Sample No.
01	**Aircell Pipe Insulation**	**15% Chrysotile**	**M58-01**
02	**Mud Joint Compound Fitting Insulation (grey)**	**15% Chrysotile**	**M58-02**
03	Sweat Wrap (with tar paper layer) Pipe Insulation	N/D	M58-03
04	**Sweat Wrap (with white paper layer) Pipe Insulation**	**5% Chrysotile**	**M58-04**
05	Mud Joint Compound Fitting Insulation (beige)	N/D	M58-05
06	**Duct Insulation (fibreglass with tar paper and parging)**	**20% Chrysotile**	**M58-06 & M58-07**
07	**9"x 9" Floor Tile**	**N/D****	**M58-08, M5-12 & M58-19**
08	**Mag Block Pipe Insulation**	**2%Amosite & 4% Chrysotile**	**M58-09**
09	**Tank Insulation (Chiller)**	**12% Chrysotile**	**M58-10**
10	**Tank Insulation (Condensate)**	**12% Chrysotile**	**M58-11**
11	12"x12" Floor Tile	N/D	M58-13 & M-58-16
12	Plaster	N/D	M58-14
13	**Terracotta Tile with Mortar**	**2% Amosite**	**M58-15**
14	**Duct Insulation (styrofoam and parging)**	**15% Chrysotile**	**M58-17**
15	**Mud Joint Compound Fitting Insulation (grey)**	**15% Chrysotile**	**M58-18**
16	Exterior Finish	N/D	M58-20

Homo. Mat. No. – Homogeneous Material Number Conc. – Concentration
**TEM analysis is required to confirm the asbestos content of this material.

5.1.1 Survey Findings

Suspect ACM building materials on the ceilings, floors, walls, mechanical, and structural systems were sampled throughout the facility. Of the sixteen building materials that were sampled and compiled into the homogenous list, ten were found to contain asbestos. In addition, two building materials, 9" x 9" floor tile and fireproofing are suspect ACM's.

In the case of the 9" x 9" floor tiles, although PLM analytical results indicate that this material is non-asbestos, it is the opinion of Oakhill that this material does contain asbestos and that PLM analysis has limitations regarding separating bound materials such as floor tile to properly identify asbestos content. TEM analysis is recommended for this material.

Regarding fireproofing, it was reported to Oakhill that ACM fireproofing is located in various areas throughout the building above suspended ceilings. Oakhill was provided with a building drawing that indicates the locations of ACM fireproofing. No inspection or sampling was conducted in these areas due to Type II requirements for access into areas above suspended ceilings where the ACM fireproofing is located and debris is likely to be present. Oakhill has incorporated the locations of ACM fireproofing into this report based on the location drawing that was provided.

Oakhill was requested to perform an intrusive survey investigation on the first floor due to the potential of a renovation project that may be initiated in the near future and the likelihood of wall structure changes, etc. Samples of plaster and mortar (from terracotta tile) from walls were collected throughout the first floor. Of these samples, mortar was found to contain asbestos. Three samples of mortar were collected on the first floor, west wing corridor. The first sample, or 'A' sample, was found to contain 2% Amosite and therefore the second and third samples ('B' and 'C' samples) were not analysed according to the "test to first positive" approach as outlined in Ontario Regulation 278/05. It is the opinion of Oakhill that more samples of mortar should be collected randomly throughout the building before considering this material an ACM conclusively in all of building M-58. At this time, mortar used with terracotta tile in wall structures should be treated as an ACM throughout the west wing corridor of the first floor.

The ten confirmed building materials that contain asbestos are as follows:

1) Mud joint compound fitting insulation on the secondary hot water heating, hot water heating, domestic cold water, domestic hot water, condensate, chiller and roof drain.

2) Aircell pipe insulation on the hot water heating, domestic hot water and condensate systems.
3) Duct / HVAC insulation (styrofoam with parging) on duct and HVAC systems in the penthouse (F.S.# PH01).
4) Duct insulation (fibreglass with tar paper and parging) on duct system throughout the basement.
5) Mag Block pipe insulation on the hot water heating system in room CB09 (F.S.#B013)
6) Sweat wrap (with white paper layer) pipe insulation on the domestic cold water system.
7) Tank Insulation on the condensate and chiller system in room WB02 (F.S.#B001).
8) Mortar from terracotta tile walls on the first floor, west wing corridor (F.S.# 1041).

Table 3 provides a summary of all asbestos-containing materials by room. This table can be cross-referenced with the functional space forms in Appendix B to find a complete description of the room where ACM materials were encountered.

Table 3 – Summary of ACM by Room Listing

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
Basement				
B001	Tunnel WB02, WB02A	10	Damaged tank insulation (.07m^2) on the condensate system.	3 encapsulations
		10	Tank Insulation on the condensate system – 6m^2	O&M
		09	Tank Insulation on the chiller system – 4m^2	O&M
		01	Aircell Pipe Insulation on the hot water heating system – 286 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 98 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 38 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 1 Unit.	1 encapsulation
		01	Aircell Pipe Insulation on the domestic hot water system – 107 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 24 Units	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 1Units.	1 encapsulation
		02	Mud Joint Compound Fitting Insulation on the secondary hot water heating system – 8 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the condensate system – 18 Units.	O&M
		01	Aircell Pipe Insulation on the condensate system – 26 LM.	O&M
B002	Hall Elevator Area CB07	01	Aircell Pipe Insulation on the domestic hot water system – 38 LM.	O&M
		01	Aircell Pipe Insulation on the hot water heating system – 68 LM.	O&M

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 10 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 1 unit	1 encapsulation
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 16 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 3 Units.	O&M
		02	Mud Joint Compound fitting insulation on the secondary hot water heating system – 2 units	2 encapsulations
		02	Mud Joint Compound Fitting Insulation secondary hot water heating system – 18 Units.	O&M
		06	Duct Insulation (FG with tar paper and parging) --9LM	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 1 Unit.	1 encapsulation
B003	CB04	01	Aircell Pipe Insulation on the hot water heating system – 45 LM.	O&M
		01	Aircell Pipe Insulation on the domestic hot water system – 55 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system. – 12 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 20 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 11 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the secondary hot water heating system – 4 Units.	O&M
		06	Duct Insulation (FG with tar paper and parging) –34LM	O&M
B004	CB01 Storage	01	Aircell Pipe Insulation on the hot water heating system – 20 LM.	O&M
		02	Mud Joint Compound Fitting Insulation hot water heating system – 12 Units.	O&M
		01	Aircell Pipe Insulation on the domestic hot water system – 1 LM.	O&M
B005	EB01	01	Aircell Pipe Insulation on the domestic hot water system – 0.1LM	1 encapsulation
		04	Sweat Wrap (With white paper layer) Pipe Insulation on the domestic cold water system - 0.2 LM.	1 encapsulation
		01	Aircell Pipe Insulation on the hot water heating system – 155 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 73 Units.	O&M
		02	Mud Joint Compound Fitting Insulation hot water heating system – 2 Units.	2 encapsulations
		01	Aircell Pipe Insulation on the hot water heating system – 0.2 LM.	1 encapsulation
		04	Sweat Wrap (With white paper layer) Pipe Insulation on the domestic cold water system – 3 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 8 Units.	O&M
		01	Aircell Pipe Insulation on the hot water heating system – 0.2 LM.	Removal
		01	Aircell Pipe Insulation on the domestic hot water system – 71 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 12 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the roof drain – 3 Units.	O&M
		06	Duct Insulation (FG with tar paper and parging) –72LM	O&M

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
B006	EB03 Record Storage	02	Mud Joint Compound Fitting Insulation on the hot water heating system – 9 Units.	O&M
		01	Aircell Pipe Insulation on the hot water heating system – 16 LM.	O&M
B007	EB22	02	Mud Joint Compound Fitting Insulation on the roof drain system – 3 Units.	O&M
		01	Aircell Pipe Insulation on the hot water heating system – 222 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 121 Units.	O&M
		01	Aircell Pipe Insulation on the domestic hot water system – 114 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 46 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 34 Units.	O&M
		04	Sweat Wrap (with white paper layer) Pipe Insulation on the domestic cold water system – 18 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 2 Units.	2 encapsulations
		01	Aircell Pipe Insulation on the domestic hot water system – 0.8 LM.	4 encapsulations
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 1 Unit.	1 encapsulation
		06	Duct Insulation (FG with tar paper and parging) –105 LM	O&M
B008	SB01 & Hall	02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 2 Unit	2 encapsulation
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 1 Unit	1 encapsulation
		01	Aircell Pipe Insulation on the domestic hot water system – 5 LM	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 16 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the secondary hot water heating system – 35 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the storm drain – 4 Units	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 13 Units.	O&M
		01	Aircell Pipe Insulation on the hot water heating system – 60 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 8 Units.	O&M
		06	Duct Insulation (FG with tar paper and parging) –157LM	O&M
		06	Duct Insulation (FG with tar paper and parging) –0.5LM	1 encapsulation
B010	SB23	02	Mud Joint Compound Fitting Insulation on the secondary hot water heating system – 30 Units.	O&M
		01	Aircell Pipe Insulation on the domestic hot water system – 55 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 14 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 3 Units.	3 encapsulations
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 1 Unit.	1 encapsulation

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
		01	Aircell Pipe Insulation on the hot water heating system – 39 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 28 Units.	O&M
		06	Duct Insulation (FG with tar paper and parging) – 50LM	O&M
		06	Duct Insulation (FG with tar paper and parging) – 0.4LM	1 encapsulation
B011	SB18	01	Aircell Pipe Insulation on the hot water heating system – 25 LM.	O&M
		01	Aircell Pipe Insulation on the domestic hot water system – 27 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 3 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 10 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 6 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the secondary hot water heating system – 8 Units.	O&M
		06	Duct Insulation (FG with tar paper and parging) –26LM	O&M
B012	CB10	02	Mud Joint Compound Fitting Insulation on the hot water heating system – 3 Units.	O&M
		01	Aircell Pipe Insulation on the hot water heating system – 6 LM.	O&M
		02	Duct Insulation (FG with tar paper and parging) –11 LM	O&M
B013	CB09	01	Aircell Pipe Insulation on the hot water heating system – 2 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 3 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 2 Units.	O&M
		08	Mag Block Pipe Insulation on the hot water hearing system – 0.2 LM.	2 encapsulations
		07	9” x 9” Floor Tile (white with grey streaks) – 33 m^2	O&M
B014	EB02 Pump Rm.	01	Aircell Pipe Insulation on the hot water heating system – 7 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 8 Units.	O&M
B015	SB20	01	Aircell Pipe Insulation on the hot water heating system – 15 LM.	O&M
		01	Aircell Pipe Insulation on the domestic hot water system – 2 LM.	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 10 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic hot water system – 1 Unit.	O&M
		02	Mud Joint Compound Fitting Insulation domestic cold water system – 5 Units.	O&M
		01	Aircell Pipe Insulation on the hot water heating system – 0.5 LM.	Removal
		06	Duct Insulation (FG with tar paper and parging) --3LM	O&M
Ground Floor				
G001	SG01	None	ACM Fireproofing above suspended ceiling	Type II access required
G002	SG01A	None	ACM Fireproofing above suspended ceiling	Type II access required
G003	SG05	None	ACM Fireproofing above suspended ceiling	Type II access required

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
G004	SG05A	None	ACM Fireproofing above suspended ceiling	Type II access required
G005	SG07	None	ACM Fireproofing above suspended ceiling	Type II access required
G006	Hall in east side of wing	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 5 m^2	O&M
G007	SG- 09A Lunch Rm.	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 12 m^2	O&M
G008	SG09	None	ACM Fireproofing above suspended ceiling	Type II access required
G009	SG11A	None	ACM Fireproofing above suspended ceiling	Type II access required
G010	SG- 15A	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 12 m^2	O&M
G011	SG-11	None	ACM Fireproofing above suspended ceiling	Type II access required
G012	SG-19A Lunch Rm.	07	9" x 9" Floor Tile – 13 m^2	O&M
	SG-19A Lunch Rm.	None	ACM Fireproofing above suspended ceiling	Type II access required
G013	SG-17	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 11 m^2	O&M
G014	SG-21	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 12 m^2	O&M
G015	SG-21A	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 10 m^2	O&M
G016	SG-27	None	ACM Fireproofing above suspended ceiling	Type II access required
G017	SG-27A	None	ACM Fireproofing above suspended ceiling	Type II access required
G018	SG-26A	None	ACM Fireproofing above suspended ceiling	Type II access required
G019	SG-22 washroom	None	ACM Fireproofing above suspended ceiling	Type II access required
G020	SG-26	None	ACM Fireproofing above suspended ceiling	Type II access required
		01	Aircell Pipe Insulation on the hot water heating system – 2 LM	O&M
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 2 Units	O&M
G021	SG-20 SG-20A	None	ACM Fireproofing above suspended ceiling	Type II access required
G022	South Hall	None	ACM Fireproofing above suspended ceiling	Type II access required

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
G023	SG-16	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 16 m^2	O&M
G024	SG-14	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 14 m^2	O&M
G025	SG-12	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 17 m^2	O&M
G026	SG-10	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 13 m^2	O&M
G027	SG-08	None	ACM Fireproofing above suspended ceiling	Type II access required
G028	SG-06	None	ACM Fireproofing above suspended ceiling	Type II access required
G029	SG-04	None	ACM Fireproofing above suspended ceiling	
		07	9" x 9" Floor Tile (green) – 14 m^2	O&M
G030	SG-04A	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile (white with grey streaks) – 18 m^2	O&M
G031	CG-07	None	ACM Fireproofing above suspended ceiling	Type II access required
G032	EG-02	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 24 m^2	O&M
G033	EG-04	None	ACM Fireproofing above suspended ceiling	Type II access required
G034	EG-06A	None	ACM Fireproofing above suspended ceiling	Type II access required
G035	EG-06B	None	ACM Fireproofing above suspended ceiling	Type II access required
G036	EG-08	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 17 m^2	O&M
G037	EG-10	None	ACM Fireproofing above suspended ceiling	Type II access required
G038	EG-12	None	ACM Fireproofing above suspended ceiling	Type II access required
G039	EG-14	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 15 m^2	O&M
G040	EG-21	None	ACM Fireproofing above suspended ceiling	Type II access required
G041	EG-17	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 17 m^2	O&M
G042	EG-15	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 16 m^2	O&M

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
G043	EG-11	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 16 m^2	O&M
G044	EG-09	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 16 m^2	O&M
G045	EG-07 EG-01	None	ACM Fireproofing above suspended ceiling	Type II access required
G046	EG-03 CG-05	None	ACM Fireproofing above suspended ceiling	Type II access required
G050	EG-25	None	ACM Fireproofing above suspended ceiling	Type II access required
G051	CG-01 CG-01B CG-01C	None	ACM Fireproofing above suspended ceiling	Type II access required
G052	CG-02 CG-02A CG-02B	None	ACM Fireproofing above suspended ceiling	Type II access required
First Floor				
1001	Rm. E145	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 5 m^2	O&M
1002	Rm.E143	None	ACM Fireproofing above suspended ceiling	Type II access required
1003	Rm.E141	None	ACM Fireproofing above suspended ceiling	Type II access required
1004	Rm.E139	None	ACM Fireproofing above suspended ceiling	Type II access required
1005	Rm.E137	None	ACM Fireproofing above suspended ceiling	Type II access required
1006	Rm.E135	None	ACM Fireproofing above suspended ceiling	Type II access required
1007	Rm.E133	None	ACM Fireproofing above suspended ceiling	Type II access required
1008	Rm.E131	None	ACM Fireproofing above suspended ceiling	Type II access required
1009	Rm.E129	None	ACM Fireproofing above suspended ceiling	Type II access required
1010	Rm.E127	None	ACM Fireproofing above suspended ceiling	Type II access required
1011	Rm.E125	None	ACM Fireproofing above suspended ceiling	Type II access required
1012	Rm.E123	None	ACM Fireproofing above suspended ceiling	Type II access required
1013	Rm.E123	None	ACM Fireproofing above suspended ceiling	Type II access required
1014	Rm.E119	None	ACM Fireproofing above suspended ceiling	Type II access required
1015	Rm.E117	None	ACM Fireproofing above suspended ceiling	Type II access required

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
1016	Rm.E115	None	ACM Fireproofing above suspended ceiling	Type II access required
1017	Rm.E113	None	ACM Fireproofing above suspended ceiling	Type II access required
1018	Rm.E109	None	ACM Fireproofing above suspended ceiling	Type II access required
1019	Rm.E105	None	ACM Fireproofing above suspended ceiling	Type II access required
1020	Rm.E105	None	ACM Fireproofing above suspended ceiling	Type II access required
1021	Rm.E105	None	ACM Fireproofing above suspended ceiling	Type II access required
1022	Rm. E101	07	9” x 9” Floor Tile (green & grey) – 25 m^2	O&M
1023	Rm.E102	None	ACM Fireproofing above suspended ceiling	Type II access required
1024	Rm.E106A	None	ACM Fireproofing above suspended ceiling	Type II access required
1025	Rm.E106	None	ACM Fireproofing above suspended ceiling	Type II access required
1026	Rm.108A	None	ACM Fireproofing above suspended ceiling	Type II access required
1027	Rm.E108	None	ACM Fireproofing above suspended ceiling	Type II access required
1028	Rm.E112	None	ACM Fireproofing above suspended ceiling	Type II access required
1029	Rm.E114	None	ACM Fireproofing above suspended ceiling	Type II access required
1030	Rm.E116	None	ACM Fireproofing above suspended ceiling	Type II access required
1031	Rm.E118	None	ACM Fireproofing above suspended ceiling	Type II access required
1032	Rm.E122 E122A	None	ACM Fireproofing above suspended ceiling	Type II access required
1033	Rm.E124 E124A	None	ACM Fireproofing above suspended ceiling	Type II access required
1034	Rm.E132	None	ACM Fireproofing above suspended ceiling	Type II access required
1035	Rm.E134	None	ACM Fireproofing above suspended ceiling	Type II access required
1036	Rm.E136	None	ACM Fireproofing above suspended ceiling	Type II access required
1037	Rm.E138	None	ACM Fireproofing above suspended ceiling	Type II access required
1038	Rm.E140	None	ACM Fireproofing above suspended ceiling	Type II access required
1039	RmE142.	None	ACM Fireproofing above suspended ceiling	Type II access required
1040	East Hall	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9” x 9” Floor Tile (brown & white) – 143 m^2	O&M

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
1041	West Hall	13	Terracotta with mortar walls	O&M
1042	Rm.S101	None	ACM Fireproofing above suspended ceiling	Type II access required
1043	Rm.S103A S103B	None	ACM Fireproofing above suspended ceiling	Type II access required
1048	Rm.S104 S104A	None	ACM Fireproofing above suspended ceiling	Type II access required
1049	Rm.S102 S102A	None	ACM Fireproofing above suspended ceiling	Type II access required
1055	Hall	07	9" x 9" Floor Tile – 78 m^2	O&M
Second Floor				
2006	RmC210 C210A	None	ACM Fireproofing above suspended ceiling	Type II access required
2010	Rm.S214 S214A	None	ACM Fireproofing above suspended ceiling	Type II access required
2013	South Hall	07	9" x 9" Floor Tile – 38 m^2	O&M
Third Floor				
3001	Rm.E322	None	ACM Fireproofing above suspended ceiling	Type II access required
3002	Rm.E320	None	ACM Fireproofing above suspended ceiling	Type II access required
3003	Rm.E318	None	ACM Fireproofing above suspended ceiling	Type II access required
3004	Rm.E316	None	ACM Fireproofing above suspended ceiling	Type II access required
3005	Rm.E314	None	ACM Fireproofing above suspended ceiling	Type II access required
3006	Rm.E312	None	ACM Fireproofing above suspended ceiling	Type II access required
3007	Rm.E310	None	ACM Fireproofing above suspended ceiling	Type II access required
3008	Rm.E308	None	ACM Fireproofing above suspended ceiling	Type II access required
3009	Rm.E306	None	ACM Fireproofing above suspended ceiling	Type II access required
3010	Rm.E302	None	ACM Fireproofing above suspended ceiling	Type II access required
3011	Rm.E301	None	ACM Fireproofing above suspended ceiling	Type II access required
3012	Rm.E303	None	ACM Fireproofing above suspended ceiling	Type II access required
3013	Rm.E305	None	ACM Fireproofing above suspended ceiling	Type II access required
3014	Rm.E307	None	ACM Fireproofing above suspended ceiling	Type II access required
3015	Rm.E309	None	ACM Fireproofing above suspended ceiling	Type II access required
3016	Rm.E311	None	ACM Fireproofing above suspended ceiling	Type II access required

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
3017	Rm.E315	None	ACM Fireproofing above suspended ceiling	Type II access required
3018	Rm.E317	None	ACM Fireproofing above suspended ceiling	Type II access required
3019	Rm.E319	None	ACM Fireproofing above suspended ceiling	Type II access required
3020	East Hall	07	9" x 9" Floor Tile – 14 m^2	O&M
		None	ACM Fireproofing above suspended ceiling	Type II access required
3021	Rm.C310A C310	None	ACM Fireproofing above suspended ceiling	Type II access required
3022	Rm.S304	None	ACM Fireproofing above suspended ceiling	Type II access required
3023	Rm.S306	None	ACM Fireproofing above suspended ceiling	Type II access required
3024	Rm.S308	None	ACM Fireproofing above suspended ceiling	Type II access required
3025	Rm.S310	None	ACM Fireproofing above suspended ceiling	Type II access required
3026	Rm.S314	None	ACM Fireproofing above suspended ceiling	Type II access required
3027	Rm.S316	None	ACM Fireproofing above suspended ceiling	Type II access required
3028	Rm.S318	None	ACM Fireproofing above suspended ceiling	Type II access required
3029	Rm.S320	None	ACM Fireproofing above suspended ceiling	Type II access required
3030	Rm.S325	None	ACM Fireproofing above suspended ceiling	Type II access required
3031	Rm.S319 S323	None	ACM Fireproofing above suspended ceiling	Type II access required
3032	Rm.S321	None	ACM Fireproofing above suspended ceiling	Type II access required
3033	Rm.S317	None	ACM Fireproofing above suspended ceiling	Type II access required
3034	Rm.S315	None	ACM Fireproofing above suspended ceiling	Type II access required
3035	Rm.S313	None	ACM Fireproofing above suspended ceiling	Type II access required
3039	Rm.C309 C309A	None	ACM Fireproofing above suspended ceiling	Type II access required
3040	Rm.C311	None	ACM Fireproofing above suspended ceiling	Type II access required
3041	South Hall	07	9" x 9" Floor Tile – 71 m^2	O&M
		None	ACM Fireproofing above suspended ceiling	Type II access required
3042	Elevator Mechanical Rm.	None	ACM Fireproofing above suspended ceiling	Type II access required

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
3043	Halls around foyer	None	ACM Fireproofing above suspended ceiling	Type II access required
3044	Foyer	None	ACM Fireproofing above suspended ceiling	Type II access required
3048	Rm.W310	None	ACM Fireproofing above suspended ceiling	Type II access required
3049	Rm.W312	None	ACM Fireproofing above suspended ceiling	Type II access required
3050	Rm.W314	None	ACM Fireproofing above suspended ceiling	Type II access required
3051	Rm.W318	None	ACM Fireproofing above suspended ceiling	Type II access required
3052	Rm.W322	None	ACM Fireproofing above suspended ceiling	Type II access required
3053	Rm.W324	None	ACM Fireproofing above suspended ceiling	Type II access required
3061	Rm.W300 West Hall	None	ACM Fireproofing above suspended ceiling	Type II access required
		07	9" x 9" Floor Tile – 77m^2	O&M
Penthouse				
PH01	Penthouse	02	Mud Joint Compound Fitting Insulation on the hot water heating system – 125 Units.	O&M
		15	Mud Joint Compound Fitting Insulation on the chiller system – 35 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the domestic cold water system – 21 Units.	O&M
		02	Mud Joint Compound Fitting Insulation on the roof drain system – 6 Units.	O&M
		14	Duct Insulation (Fibreglass with tar paper and parging) on the HVAC system – 65 m sq.	O&M
		14	Duct Insulation (Fibreglass with tar paper and parging) on the HVAC – 0.85 m sq.	6 encapsulations
		02	Mud Joint Compound Fitting Insulation on the hot water heating system – 12 units.	12 encapsulations
		15	Mud Joint Compound Fitting Insulation on the chiller system – 1 unit.	Removal
		02	ACM debris (MJC FI) 0.5 units	Removal
Stairwells				
SW01	Stairwell F	None	ACM Fireproofing above suspended ceiling	Type II access required
SW02	Stairwell E	None	ACM Fireproofing above suspended ceiling	Type II access required
SW03	Stairwell A	None	ACM Fireproofing above suspended ceiling	Type II access required
SW04	Stairwell D	None	ACM Fireproofing above suspended ceiling	Type II access required
SW05	Stairwell C	None	ACM Fireproofing above suspended ceiling	Type II access required

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
SW06	Stairwell B	None	ACM Fireproofing above suspended ceiling	Type II access required
SW07	Stairwell G	None	ACM Fireproofing above suspended ceiling (only shown on first floor of stairwell)	Type II access required

Asbestos was detected in ten homogeneous building materials sampled from the facility and is suspect in one other material. The ACM was categorized as to whether it was friable or non-friable. Further, the materials were grouped according to their similar composition, system and general appearance. The following sub-sections are the result of which materials were considered friable or non-friable. Photographs are provided along with a brief description of the material.

5.1.2 Friable ACM

Mud Joint Compound
A representative photograph of mud joint compound fitting insulation. This material is a malleable grey insulation that has the appearance of granular mud. It appears smooth, round and hard when it is intact with appropriate exterior jacketing.

Aircell

A representative photograph of aircell pipe insulation. This material is grey and white in colour. Aircell is layers of corrugated paper, which gives it the appearance of a honeycomb pattern when the profile is observed.

Duct Insulation

A representative photograph of asbestos duct insulation. This material is a malleable grey insulation that has the appearance of granular mud. It typically is found with appropriate jacketing which gives it a hard and durable appearance. In this building, there are two types of duct insulation that are ACM. One has fibreglass with tar paper and parging. The other has Styrofoam with parging (as shown).

MagBlock

A representative photograph of MagBlock pipe insulation. This material is normally white or off-white in colour. MagBlock pipe insulation typically consists of a chalky, fibrous collection of blocks that is friable when found as seen in this photograph (without jacketing).

Tank Insulation
A representative photograph of tank insulation. This material is a malleable grey insulation that has the appearance of granular mud. It appears hard when it is intact with appropriate jacketing and is very similar to mud joint compound.

Sweat Wrap (with white paper layer) A representative photograph of sweat wrap with white paper layer pipe insulation. This material has several layers of brown or grey waffle pattern paper layers with the outer layer consisting of a white paper layer that contains asbestos. This type of pipe insulation was used for low temperature applications only.

5.1.3 Non-Friable ACM

9" x 9" Floor Tile
A representative photograph of 9" x 9" vinyl asbestos floor tile (VAT). This material may be found in any number of different colours and patterns. VAT's are sometimes found under carpeting or they may be present as the only flooring.

5.1.4 Survey Recommendations

Under Ontario Regulation (O. Reg.) 278/05 damaged and exposed ACM's are required to be repaired or removed. In building M-58, the damaged/exposed ACM's, found in Table 3 and summarized in Table 1, will require Type 2 asbestos abatement procedures for removal or repair of 1 square meter or less of material and Type 3 asbestos abatement precautions for removal of greater than 1 square meter of material. These issues should be addressed as soon as possible.

The O. Reg. 278/05 also requires the removal of all ACM's that have a potential of being disturbed during renovations or demolition. Should friable ACM's remain in the building, in GOOD condition, the regulation also requires that an Asbestos Management Plan be implemented and kept in place until such time that the ACM's have been removed. The management plan will include periodic assessment and record updating to be performed on the remaining ACM at least every 12 months.

It is the opinion of Oakhill that more samples of mortar (from terracotta tiles used in wall structures) should be collected randomly throughout the building before considering this material an ACM conclusively in all of building M-58. At this time, mortar used with terracotta tile in wall structures should be treated as an ACM throughout the west wing corridor of the first floor.

Building staff and contractors should be made aware of the location and hazards associated with the ACM's and instructed to not disturb this material. Any disturbance of this material should be reported immediately to property management and appropriate control measures put into place without delay.

5.2 Lead

5.2.1 Survey Findings

Based on visual observations during Oakhill's room-by-room surveys, potential lead was sampled in seven paint finishes. Samples were collected from the painted interior surfaces of building M-58 and were analysed for lead content.

The analytical results are provided in Appendix C and are summarized below in Table 4.

Table 4 – Results of Lead Investigation

Sample	Location	Colour	Results (ppm Lead)	Considered Lead Based Paint*
M58-L1	F.S. #B001 Rm.#WB02	Red paint (on floor)	1,430ppm	No
M58-L2	F.S. #B008 Rm. #SB20	Peacock Blue Paint (on door)	4,570ppm	No
M58-L3	**F.S. #B007 Rm. #EB22**	**Grey paint over blue paint (on floor)**	**9,610ppm**	**Yes**
M58-L4	F.S. #B008 Rm. #SB01	Grey paint over red paint	1,640ppm	No
M58-L5	**F.S. #B002 Rm. #CB07**	**Peach Paint**	**7,280ppm**	**Yes**
M58-L6	F.S. #B008 Rm. #SB01	Pale sea green paint	1,470ppm	No
M58-L7	F.S. #B008 Rm. #SB01	Cream Paint	1,530ppm	No

***Note:** Ontario Ministry of Labour (MOL) considers 5,000ppm lead to be a lead-based paint (LBP).

5.2.2 Survey Recommendations

Based on the analytical results, the grey paint over blue paint used in F.S.#B007 room#EB22 and peach paint used in F.S.#B002 room#CB07 contains greater than 5,000 ppm lead and is therefore classified as lead-based paint. The remaining five samples did not contain greater than 5,000 ppm lead and are therefore classified as non-lead-based paints.

Lead may be present in the solder used on copper domestic water lines, as caulking in bell fittings for cast-iron drainage pipes and in electrical equipment, wiring or fixtures.

Direct disturbance of the materials can minimize the impact of lead products during removal. Removal of lead materials as an intact unit is the preferred method of removal. Mechanically powered tools increase the airborne concentration of lead dust.

Contractors are responsible to ensure that the workers are not exposed to airborne lead dust levels in excess of 0.15 mg/m3. This can be accomplished by:

- Providing respiratory protection and coveralls
- Suppressing dust levels by wetting with amended water, mops or HEPA vacuums
- Using drop-sheets and polyethylene barriers to control dust
- Ensuring the work areas have adequate ventilation
- Provide workers with the means to practice good hygiene practices when leaving the work area

The removal of metallic lead materials should be carried out in accordance with Ontario Regulation 843/90 and the Ontario Ministry of Labour (MOL) draft Proposed Lead Regulation on Construction Projects, both

made under the Occupational Health and Safety Act. Any lead-containing materials should also be disposed of in accordance with Ontario Regulation 558 (formerly O. Reg. 347).

In addition, it is recommended that the United States Department of Housing and Urban Development Guideline, of 0.5 % lead (by weight) or 5,000 parts per million (ppm) lead be used as a guideline for determining whether the use of precautions as outlined in the proposed regulation would be required during the above noted operations. Airborne lead dust or fumes should not exceed the MOL TWAEV of 0.15 milligram per cubic metre (mg/m^3) during the removal of lead based paints and products.

5.3 Mercury

5.3.1 Survey Findings

Mercury vapour is present inside fluorescent light fixtures. Tubes should be removed intact prior to removing the fixtures. Liquid mercury may also be present inside thermostats and manometers in mechanical equipment.

5.3.2 Survey Recommendations

Prior to removal of fluorescent light fixtures, the tubes should be removed from the fixtures intact to prevent the mercury vapour from escaping. As long as the tubes are not broken, workers will not be exposed to hazardous mercury vapour. Prior to demolition of the facility, mercury-containing materials must be removed as per Ontario Regulation 844/90. During demolition, ensure that the maximum concentration of exposure to airborne mercury does not exceed 0.03 mg Hg/m^3 of air.

If applicable, mercury should be collected from thermostats, thermometers, and manometers prior to demolition, however care should be taken to control the release of mercury into the air.

5.4 Silica

5.4.1 Survey Findings

Based on the historic composition of building materials, crystalline silica is present in the following building materials:

- Concrete floor slabs;
- Terra cotta and masonry block walls;
- Mortar; and
- Acoustic ceiling tiles.

5.4.2 Survey Recommendations

Contractors are responsible to ensure workers are not exposed to airborne silica levels in excess of 0.20 mg/m3 when dealing with the above materials. This can be accomplished by:

- Minimize disturbance of the material
- Providing respiratory protection and coveralls
- Suppressing dust levels by wetting with amended water, mops or HEPA vacuums
- Using drop-sheets and polyethylene barriers to control dust
- Ensuring the work areas have adequate ventilation
- Provide workers with the means to practice good hygiene practices when leaving the work area

Use of mechanically powered tools for any demolition work increases the concentration of airborne silica and therefore requires more stringent respiratory protection and controlled work procedures.

5.5 Isocyantes

5.5.1 Survey Findings

At the time of the site inspection, no evidence of isocyanates was noted as part of the structure or finishes.

5.6 Vinyl Chloride Monomer

5.6.1 Survey Findings

At the time of the site inspection, no evidence of vinyl chloride monomer was noted as part of the structure or finishes.

5.7 Benzene

5.7.1 Survey Findings

Benzene may be present in a stable form within roofing materials, paints and adhesives.

5.7.2 Survey Recommendations

It is not expected that benzene concentrations in air will exceed the maximum allowable TWAEV for a worker to benzene (3.0 mg/m^3). To minimize potential benzene exposure, apply paints and adhesives in well-ventilated areas.

5.8 Acrylonitrile

5.8.1 Survey Findings

At the time of the site inspection, no evidence of acrylonitrile was noted as part of the structure or finishes.

5.9 Coke Oven Emissions

5.9.1 Survey Findings

At the time of the site inspection, no evidence of coke oven emissions was noted as part of the structure or finishes.

5.10 Arsenic

5.10.1 Survey Findings

At the time of the site inspection, no evidence of arsenic was noted as part of the structure or finishes.

5.10.2 Survey Recommendations

Arsenic or arsenic-containing compounds may be present in stable form in paints and adhesives. It is not expected that arsenic concentrations in air will exceed the maximum allowable TWAEV for a worker to arsenic (0.2 mg/m^3). To minimize potential arsenic exposure, apply paints and adhesives in well-ventilated areas.

5.11 Ethylene Oxide

5.11.1 Survey Findings

At the time of the site inspection, no evidence of ethylene oxide was noted in the survey.

5.12 Mould

5.12.1 Survey Findings

At the time of the site inspection, mould is suspect to be present in Rm.SB20 (F.S.#B015) located on the ceiling and in Rm.#E200 (F.S. # 2014) located on a ceiling tile.

5.12.2 Survey Recommendations

Oakhill recommends that fungal laboratory sampling be added to the scope of work for this project in the next fiscal year. It is important to identify the type of mould fungus present and mould growth.

Continued diligence is recommended to avoid scenarios, which can support fungi growth specifically: water in the presence of cellulose-based surfaces. There must be moisture (such as leaking pipes, cracked window seals, etc.) as well as an indoor substrate (such as the paper layer of drywall, wood, potted plants, etc.) to support

fungal growth. Simply replacing the substrate is not a solution to the problem. The root cause is required to be identified.

6.0 CLOSURE

This report has been prepared for the sole benefit of the National Research Council of Canada.

The conclusions presented represent the best judgement of the assessor based on current environmental standards and on the site conditions observed from February 13th to February 21st, and March 29th, 2007. Due to the nature of the investigation and the limitations of the available data, the assessor cannot warrant against undiscovered environmental liabilities. It is possible that additional, concealed designated substances may become evident during demolition activities.

Should additional information become available, Oakhill requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

We trust that the report meets your current requirements. Should you have any questions or concerns regarding the above, please do not hesitate to contact the undersigned.

Oakhill Environmental Inc.

Fil Barillaro, M.A.S.c., P.Eng.
Project Manager

APPENDIX A

DESIGNATED SUBSTANCES BACKGROUND INFORMATION

Acrylonitrile

Acrylonitrile is regulated in Ontario under Regulation 835/90 of the Occupational Heath and Safety Act. Acrylonitrile is a clear liquid that may be colourless or yellow and that readily reacts with other chemicals to produce long, chain-like molecules (polymers). Acrylonitrile-based polymers are used to produce nitrile rubbers, plastics, acrylic fibres, coatings and adhesives. Workers are typically exposed to acrylonitrile at manufacturing facilities that produce the aforementioned products through inhaling its vapour, direct skin contact, or through ingestion. Although acrylonitrile may be present in some of the building materials, including adhesives and coatings, the chemical will likely be bonded in the polymer form. Therefore, it is not expected that an adverse exposure to acrylonitrile will occur unless the building materials are heated to extreme temperatures. Acrylonitrile vapours may become released from the acrylonitrile-based polymers during a process where high temperatures are applied. Acrylonitrile is classified as *possibly carcinogenic to humans (Group 2b)* as evidence from long-term epidemiological studies since 1980 is conflicting. It is not expected that acrylonitrile concentrations in the air will exceed the maximum allowable time weighted average exposure value (TWAEV) for a worker to acrylonitrile (4.3 mg/m^3).

Arsenic

Arsenic is regulated in Ontario under Regulation 836/90 of the Occupational Heath and Safety Act. The presence of arsenic in the paint coating on interior and exterior finishes is possible. There are no regulated procedures for the removal of paint containing arsenic. If the paint does not contain lead, but does contain arsenic, the comments concerning lead paint, discussed in below, are expected to address the potential arsenic emissions. As the painted surfaces will be handled as per the proposed lead regulation, it is not expected that arsenic concentrations in the air will exceed the maximum allowable TWAEV for a worker to arsenic (0.2 mg/m^3). Human health studies from Argentina and Chile have concluded that arsenic ingestion can result in increased risk of bladder and lung cancer. Non-cancer effects include skin lesions and chronic respiratory disease.

Asbestos

The term "asbestos" describes six naturally occurring fibrous minerals, namely chrysotile, amosite, crocidolite, tremolite, anthophylitte and actinolite. Of the six forms of asbestos, chrysotile (white asbestos), amosite (brown asbestos) and crocidolite (blue asbestos) are the most commonly used. Asbestos has been known to man for centuries and has been used in literally hundreds of products. Asbestos was used because it is strong, insulates well, and resists fire and corrosion.

The Regulation for Asbestos, Ontario Regulation 278/05, made under the Occupational Health and Safety Act defines asbestos as any of the following fibrous silicates:

- Actinolite, Amosite, Anthophyllite, Chrysotile, Crocidolite and Tremolite.

It is important to note that asbestos is defined further as either “friable” or “non-friable”. O. Reg. 278/05 defines friable as:

"friable material" means material that,

- *when dry, can be crumbled, pulverized or powdered by hand pressure, or*
- *is crumbled, pulverized or powdered;*

Non-friable is any material that doesn’t fit the criteria for friable. Essentially, any material that cannot be *crumbled, pulverized or powdered by hand pressure or is not crumbled, pulverized or powdered.*

The distinction between whether an asbestos containing material (ACM) is friable or non-friable is a notable characteristic as the *‘friability’* of the ACM translates the **potential** risk of producing an airborne fibre release. Non-friable ACM’s offer far less potential risk of producing an airborne fibre release. These materials should not be cut or shaped using power tools, because this procedure allows for the release of asbestos fibres.

Materials that contain asbestos are commonly referred to as ACM's. O. Reg. 278/05, defines an ACM as:

- *material that contains 0.5 per cent or more asbestos by dry weight;*

The Revised Regulations of Ontario (1990), Regulation 347 (The General Waste Regulation) requires the disposal of asbestos waste in a double sealed container, properly labelled and free of cuts, tears or punctures. The waste must be disposed of in a licensed waste facility, which has been properly notified of the presence of asbestos waste. The federal "Transportation of Dangerous Goods Act" covers the transport of asbestos waste to the disposal site. Asbestos waste is to be handled by a licensed waste hauler.

Asbestos is typically found in plaster, mechanical insulation, gaskets, thermal insulation on pipes, refractory material, roofing felts, floor tiles, ceiling tiles and parging, heat resistant panels, incandescent light fixture reflector plates, and any other material requiring a high degree of durability or thermal resistance. The common use of potential friable (breakable by hand) ACM's in construction ceased voluntarily in the mid 1970s; however, the spray application of asbestos-containing fireproofing was not prohibited until 1986. The airborne maximum allowable TWAEV for a worker to asbestos depends on the type of asbestos, they include, amosite (0.1 f/cc), crocidolite (0.1 f/cc) and other forms of asbestos (1.0 f/cc). Asbestos fibres cumulate in the lungs. Human health effects are proportional to exposure. Studies show long term or high dose exposure can result in scarring of the lung and restricted breathing. Mesothelioma (cancer of the pleural lining) and other lung cancers are also related to asbestos exposure.

Benzene

Benzene is regulated in Ontario under Regulation 839/90 of the Occupational Heath and Safety Act Historically; benzene has been produced as a by-product of coal gasification and metallurgical coke production in steel making. The light oil product from such processes contains benzene, toluene, ethyl benzene and xylene, and these components are separated by distillation. Today, most benzene is produced from the refining of petroleum.

Benzene has applications as a solvent in synthetic rubber manufacturing and processing, and in paints, varnishes, stains, adhesives, roofing materials and sealants. The use of benzene in tire and other rubber goods manufacturing and as a solvent and component of paints and adhesives has declined considerably as a result of concerns about workplace exposure. Nevertheless, it is often present in trace quantities in petroleum and aromatic solvents, some of which have replaced benzene in many uses. Benzene is also a minor component of gasoline sold in Canada.

The maximum allowable TWAEV for a worker to benzene is 3 mg/m^3. Based on the age of the facility, it is possible that benzene was present in the paints, adhesives and roofing materials used during the original construction of the facilities. However, over time, the benzene component typically volatilizes out of the paints, solvents and roofing bitumens and is released into the ambient air. Therefore, it is likely that only trace levels of benzene presently exist in these building materials. It is not expected that benzene emissions from any existing building materials on site will exceed the allowable TWAEV.

Exposure to benzene can range in severity from nausea to suppression of the immune system and death. Long-term exposure to benzene can potentially result in Acute Myeloid Leukemia, Secondary Aplastic Leukemia and damage to the reproductive system.

Ethylene Oxides

Ethylene Oxides are regulated in Ontario under Regulation 841/90 of the Occupational Heath and Safety Act. Ethylene oxide is a common by-product of fumigation or sterilization procedures. The airborne maximum allowable TWAEV for a worker to Ethylene Oxides is 1.8 mg/m^3. Acute exposure may result in vomiting, shortness of breath and dizziness. Chronic exposure has been associated with the occurrence of cancer, reproductive effects, mutagenic changes and neurotoxicity.

Isocyanates

Isocyanates is regulated in Ontario under Regulation 842/90 of the Occupational Heath and Safety Act Isocyanates are a class of chemicals used in the manufacture of certain types of plastics, foams and roof insulation. The Isocyanate (-CNO) group reacts very readily with certain other types of molecules, a property responsible for the usefulness of Isocyanates in industry. Due to the high reactivity of the Isocyanate group, exposure to Isocyanates can result in primary irritation, sensitization and hypersensitivity reactions. The respiratory system, the eyes and the skin are the main areas affected by exposure. Isocyanates in their initial form are found as a vapour, a mist, or a dust which become airborne and then taken into the body. Once the Isocyanates are chemically bonded to other chemicals during manufacturing processes, the Isocyanates are not readily available to become airborne unless heated. Therefore, Isocyanate exposure is not expected to be a concern as long as the burning of plastics, foams, and insulation is not carried out. The airborne maximum allowable TWAEV for a worker to Isocyanates is 0.005 ppm.

Lead

Lead is regulated in Ontario under Regulation 843/90 of the Occupational Heath and Safety Act. The Ontario Ministry of Labour (MOL) draft Proposed Lead Regulation on Construction Projects, made under the Occupational Health and Safety Act, May 5, 1995, states that the removal of lead paint is not required unless work on these materials are likely to produce airborne lead dust or fumes, for example during welding, torch cutting, sanding and sand blasting. If these operations are likely to occur during building renovations or demolition, it is recommended that the removal of lead paint be carried out in accordance with procedures outlined in the proposed regulation.

Based on conversations with the MOL, it is recommended that the United States Department of Housing and Urban Development Guideline, of 0.5 % lead (by weight) or 5,000 parts per million (ppm) lead be used as a guideline for determining whether the use of precautions as outlined in the proposed regulation would be required during the above noted operations. Airborne lead dust or fumes should not exceed the MOL TWAEV of 0.15 milligram per cubic metre (mg/m^3) during the removal of lead based paints and products.

Lead may be used in its pure metallic form or combined chemically with other elements to form lead compounds. Metallic lead is used to make products such as electric storage batteries, ammunition, lead solder, radiation shields, pipes, and sheaths for electric cables. Metallic lead is sometimes combined with other metals such as copper, tin and antimony as lead alloys for use in the manufacture of a variety of metal products.

Organic lead compounds contain a lead atom covalently bonded to carbon. Common examples of organic lead compounds include lead “soaps” such as lead oleates, high-pressure lubricants, and anti-knock agents in gasoline.

Inorganic lead compounds (or lead salts) result when lead is combined with an element other than carbon. Examples are lead oxide, lead chromate, lead carbonate and lead nitrate. Inorganic lead compounds may occur as solids or in solutions, and are used in insecticides, pigments, paints, frits, glasses, plastics, and rubber compounds.

Lead may affect the health of workers if it is in a form that may be inhaled, ingested or absorbed through the skin. Lead dust consists of small, solid particles of metallic lead or lead compounds that are generated by sanding, grinding, polishing, and sawing operations. Lead fume is produced in significant amounts when solid lead or materials containing lead are heated to temperatures above 500^{o} C, as in welding and flame cutting or burning.

Mercury

Mercury is regulated in Ontario under Regulation 844/90 of the Occupational Heath and Safety Act. Mercury is commonly found in buildings as mercury vapour lighting, in thermometers, thermostats and some electrical switches. Mercury can also be found in minor amounts in fluorescent lamp tubes and in paints and adhesives.

Mercury, or mercury vapour within light fixtures, thermometers, thermostats and electrical switches poses no risk to workers or occupants provided the mercury containers remain intact and undisturbed. Prior to demolition, remove mercury containers and store in a safe location. The airborne maximum allowable TWAEV for a worker to mercury is 0.05 mg/m^3.

Short-term exposure to mercury is a rare occurrence due to the more stringent controls. Historically, short- term exposure to high concentrations of mercury vapour included: harmful effects of the nervous, respiratory and digestive systems and the kidneys.

Silica

Silica is regulated in Ontario under Regulation 845/90 of the Occupational Heath and Safety Act Silica, also referred to as free crystalline silica, is found in concrete, cement, mortar, ceramic wall and floor tiles, stucco finishes and acoustic ceiling tiles. Prolonged exposure to, and inhalation of free crystalline silica, may result in respiratory disease known as silicosis, which is characterised by progressive fibrosis of the inner lung tissue and marked shortness of breath or impaired lung function. The maximum TWAEV for airborne Silica dust is 0.20 mg/m^3.

Precautions should be taken during work on concrete (coring etc.) and ceiling tiles to minimize exposure to free crystalline silica dust. Silica exposure should not exceed the MOL TWAEV of 0.20 milligrams per cubic metre (mg/m^3) during demolition activities. This can be achieved by:

- providing workers with respiratory protection;
- wetting the surface of the materials to prevent dust emissions;
- provide workers with facilities to properly wash prior to exiting the work area.

Vinyl Chloride

Vinyl Chloride is regulated in Ontario under Regulation 846/90 of the Occupational Heath and Safety Act. Vinyl chloride is found in many applications in buildings such as plumbing pipes, protective coatings on insulated pipes and interior finishes (i.e., vinyl baseboard trim). Vinyl chlorides in the above materials are bound in a solid matrix and are unlikely to become airborne such that it would exceed the maximum allowable TWAEV of 5.2 mg/m^3.

Human health effects from long-term exposure include: cancer of the liver, damage to the immune and reproductory systems.

Fungi

There is essentially no fungus-free environment in our daily lives. Fugal spores are abundant in outdoor air and exposure to fungi occurs commonly in indoor environments.

Continued cleaning diligence is recommended to avoid scenarios which can support fungi growth such as water in the presence of cellulose-based surfaces. There must be a moisture or water problem to support fungal growth.

APPENDIX B

ANALYTICAL RESULTS – ASBESTOS

Certificate of Analysis

AGAT WORK ORDER: 07T211063

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Bulk Asbestos

DATE SAMPLED: February 12 2007 | DATE RECEIVED: February 20 2007 | DATE REPORTED: February 27 2007 | SAMPLE TYPE: Other

	Unit	G / S	M.D.L	M58-01 658006	M58-02 658007	M58-03A 658008	M58-03B 658009	M58-03C 658010	M58-04 658011	M58-05A 658012	M58-05B 658013
Asbestos	%		0.5	15	15	ND	ND	ND	5	ND	ND

	Unit	G / S	M.D.L	M58-06A 658014	M58-06B 658015	M58-07 658016	M58-08A 658017	M58-08B 658018	M58-08C 658019	M58-09 658020	M58-10 658021
Asbestos	%		0.5	ND	ND	20	ND	ND	ND	6	12

	Unit	G / S	M.D.L	M58-11 658022	M58-12A 658023	M58-12B 658024	M58-12C 658025	M58-13A 658026	M58-13B 658027	M58-13C 658028	M58-14A 658029
Asbestos	%		0.5	12	<0.5	<0.5	<0.5	ND	ND	ND	<0.5

	Unit	G / S	M.D.L	M58-14B 658030	M58-14C 658031	M58-14D 658032	M58-14E 658033	M58-14F 658034	M58-14G 658035	M58-15A 658036	M58-06C 658046
Asbestos	%		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2	ND

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 07T211063

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Bulk Asbestos

DATE SAMPLED: February 12 2007 | DATE RECEIVED: February 20 2007 | DATE REPORTED: February 27 2007 | SAMPLE TYPE: Other

Comments: M.D.L - Method Detection Limit; G / S - Guideline / Standard

658006	Condition of sample was satisfactory at time of arrival in laboratory.
	Asbestos containing: chrysotile
658007	Condition of sample was satisfactory at time of arrival in laboratory.
	Asbestos containing: chrysotile
658008	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658009	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658010	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658011	Condition of sample was satisfactory at time of arrival in laboratory.
	Asbestos containing: chrysotile
658012	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658013	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658014	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658015	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658016	Condition of sample was satisfactory at time of arrival in laboratory.
	Asbestos containing: chrysotile
658017	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658018	Condition of sample was satisfactory at time of arrival in laboratory.
	"ND" - Not Detected
658019	Condition of sample was satisfactory at time of arrival in laboratory.

Certified By:

Bulk Asbestos

DATE SAMPLED: February 12 2007 | DATE RECEIVED: February 20 2007 | DATE REPORTED: February 27 2007 | SAMPLE TYPE: Other

"ND" - Not Detected

658020 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: Amosite (2%) and chrysotile (4%)

658021 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

658022 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

658023 Condition of sample was satisfactory at time of arrival in laboratory.

A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.

658024 Condition of sample was satisfactory at time of arrival in laboratory.

A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.

658025 Condition of sample was satisfactory at time of arrival in laboratory.

A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.

658026 Condition of sample was satisfactory at time of arrival in laboratory.

"ND" - Not Detected

658027 Condition of sample was satisfactory at time of arrival in laboratory.

"ND" - Not Detected

658028 Condition of sample was satisfactory at time of arrival in laboratory.

"ND" - Not Detected

658029 Condition of sample was satisfactory at time of arrival in laboratory.

A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.

658030 Condition of sample was satisfactory at time of arrival in laboratory.

A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.

658031 Condition of sample was satisfactory at time of arrival in laboratory.

A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.

658032 Condition of sample was satisfactory at time of arrival in laboratory.

A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.

658033 Condition of sample was satisfactory at time of arrival in laboratory.

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 07T211063

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Bulk Asbestos

DATE SAMPLED: February 12 2007 | DATE RECEIVED: February 20 2007 | DATE REPORTED: February 27 2007 | SAMPLE TYPE: Other

	A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.
658034	Condition of sample was satisfactory at time of arrival in laboratory.
	A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.
658035	Condition of sample was satisfactory at time of arrival in laboratory.
	A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.
658036	Condition of sample was satisfactory at time of arrival in laboratory.
	Asbestos containing: Amosite
658046	Condition of sample was satisfactory at time of arrival in laboratory.

"ND" - Not Detected

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 07T213768

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillaro

Bulk Asbestos

DATE SAMPLED: February 16 2007 | DATE RECEIVED: March 08 2007 | DATE REPORTED: March 16 2007 | SAMPLE TYPE: Other

	Unit	G / S	M.D.L	M58-16A 665058	M58-16B 665059	M58-16C 665060	M58-17 665061	M58-18 665062	M58-19A 665063	M58-19B 665064	M58-19C 665065
Asbestos	%		0.5	ND	ND	ND	15	15	<0.5	<0.5	<0.5

Comments: M.D.L - Method Detection Limit; G / S - Guideline / Standard

665058-665060 Condition of sample was satisfactory at time of arrival in laboratory.

"ND" - Not Detected

665061-665062 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

665063-665065 Condition of sample was satisfactory at time of arrival in laboratory.

A reported concentration of "<0.5%" indicates the presence of confirmed asbestos in trace quantities less than the MDL.

Certified By:

AGAT® Laboratories

5623 McADAM ROAD
MISSISSAUGA, ON
CANADA L4Z 1N9

PH: (905)501-9998
FAX: (905)501-0589
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 07T217961
PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Bulk Asbestos

DATE SAMPLED: Mar 29, 2007 | DATE RECEIVED: Apr 02, 2007 | DATE REPORTED: Apr 16, 2007 | SAMPLE TYPE: Other

	Unit	G / S	M.D.L	M58-20A ` 678152	M58-20B 678153	M58-20C 678154	M58-20D 678155	M58-20E 678156
Asbestos	%		0.5	ND	ND	ND	ND	ND

Comments: M.D.L - Method Detection Limit; G / S - Guideline / Standard

678152-678156 Condition of sample was satisfactory at time of arrival in laboratory.

"ND" - Not Detected

Certified By:

APPENDIX C

ANALYTICAL RESULTS – LEAD

Certificate of Analysis

AGAT WORK ORDER: 07T211064

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Lead in Paint

DATE SAMPLED: February 13 2007 | DATE RECEIVED: February 20 2007 | DATE REPORTED: February 27 2007 | SAMPLE TYPE: Paint

	Unit	G / S	M.D.L	M58-L1 658049	M58-L2 658050	M58-L3 658052	M58-L4 658053	M58-L5 658054	M58-L6 658055	M58-L7 658056
Lead	µg/g		7.0	1430	4570	9610	1640	7280	1470	1530

Comments: M.D.L - Method Detection Limit; G / S - Guideline / Standard

Certified By: Elizabeth Rolakowska

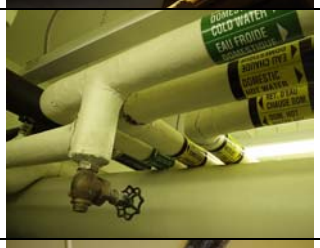
APPENDIX D

PHOTOGRAPH LOGS

M-58 ASBESTOS PHOTOGRAPH LOG

Photo #	Photograph	Functional Space #	Comments
01		B002	Damaged mud joint compound fitting (elbow) on the domestic hot water system. One encapsulation required
02		B005	Damaged aircell pipe insulation on the domestic hot water system. Encapsulate 0.1 LM.
03		B005	Damaged sweat wrap (with white paper layer) pipe insulation on the domestic cold water system. Encapsulate 0.2 LM.
04		B005	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.
05		B005	Damaged aircell pipe insulation on the hot water heat system. Encapsulate 0.2LM.
06		B005	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.
07		B005	Severely damaged aircell pipe insulation on the hot water heat system. Removal required.

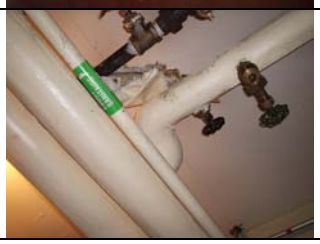
08		B007	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.
09		B007	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.
10		B007	Two damaged aircell PI on the domestic hot water system. Encapsulate 0.4LM
11		B007	Two damaged aircell PI on the domestic hot water system. Encapsulate 0.4LM.
12		B007	Damaged mud joint compound fitting on the domestic cold water system. One encapsulation required.
13		B008	Two damaged mud joint compound fittings, one on the domestic cold water system and one on the domestic hot water system. Two encapsulations required.
14		B008	Damaged valve on the domestic cold water system. One encapsulation required.

15		B013	Two open ends of Mag block PI on the hot water heating system. Encapsulate 0.2LM
16		B002	Two damaged mud joint compound elbows on the secondary hot water heating system. 2 encapsulations required.
17		B002	Damaged mud joint compound fittings on the hot water heat system. One encapsulation required.
18		B010	Damaged mud joint compound fittings on the domestic hot water system. Two encapsulations required.
19		B010	Damaged mud joint compound fitting on the hot water heating system. One encapsulation required.
20		B010	Damaged mud joint compound fitting on the domestic hot water system. One encapsulation required.
21		B010	Damaged duct insulation (ACM parging). Encapsulate 0.4LM

22				B008	Damaged duct insulation (ACM parging) Encapsulate 0.5 LM
23				B001	Damaged tank insulation on the condensate system. One encapsulation required.
24				B001	Damaged tank insulation on the condensate system. One encapsulation required.
25				B001	Damaged vent insulation on the condensate system. One encapsulation required.
26				B001	Damaged mud joint compound fitting on the domestic cold water system. One encapsulation required
27				B001	Damaged mud joint compound fitting on the domestic hot water system. One encapsulation required.

28				PH01	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.
29				PH01	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.
30				PH01	Two damaged mud joint compound fittings on the hot water heat system. Two encapsulations required.
31				PH01	Four damaged mud joint compound fittings on the hot water heat system. Four encapsulations required.
32				PH01	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.
33				PH01	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.

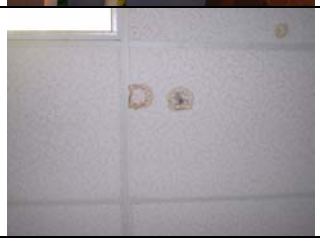
34		PH01	Damaged mud joint compound fitting on the hot water heating system. One encapsulation required.
35		PH01	Damaged mud joint compound fitting on the hot water heat system. One encapsulation required.
36		PH01	Damaged mud joint compound fitting on the chiller system. One encapsulation required.
37		PH01	Damaged HVAC insulation (parging) Requires 0.15m^2 encapsulation.
38		PH01	Damaged HVAC insulation (parging) Requires 0.15m^2 encapsulation.
39		PH01	Damaged HVAC insulation (parging) Requires 0.15m^2 encapsulation.
40		PH01	Damaged HVAC insulation (parging) Requires 0.15m^2 encapsulation.

41		PH01	Damaged HVAC insulation (parging) Requires 0.15m^2 encapsulation.
42		PH01	Damaged HVAC insulation (parging) Requires 0.15m^2 encapsulation.
43		PH01	ACM debris (elbow intact) lying beside the HVAC unit. Remove elbow.
44		B015	Severely damaged Aircell PI on the hot water heat system. Remove 0.5LM

M-58 LEAD PHOTOGRAPH LOG

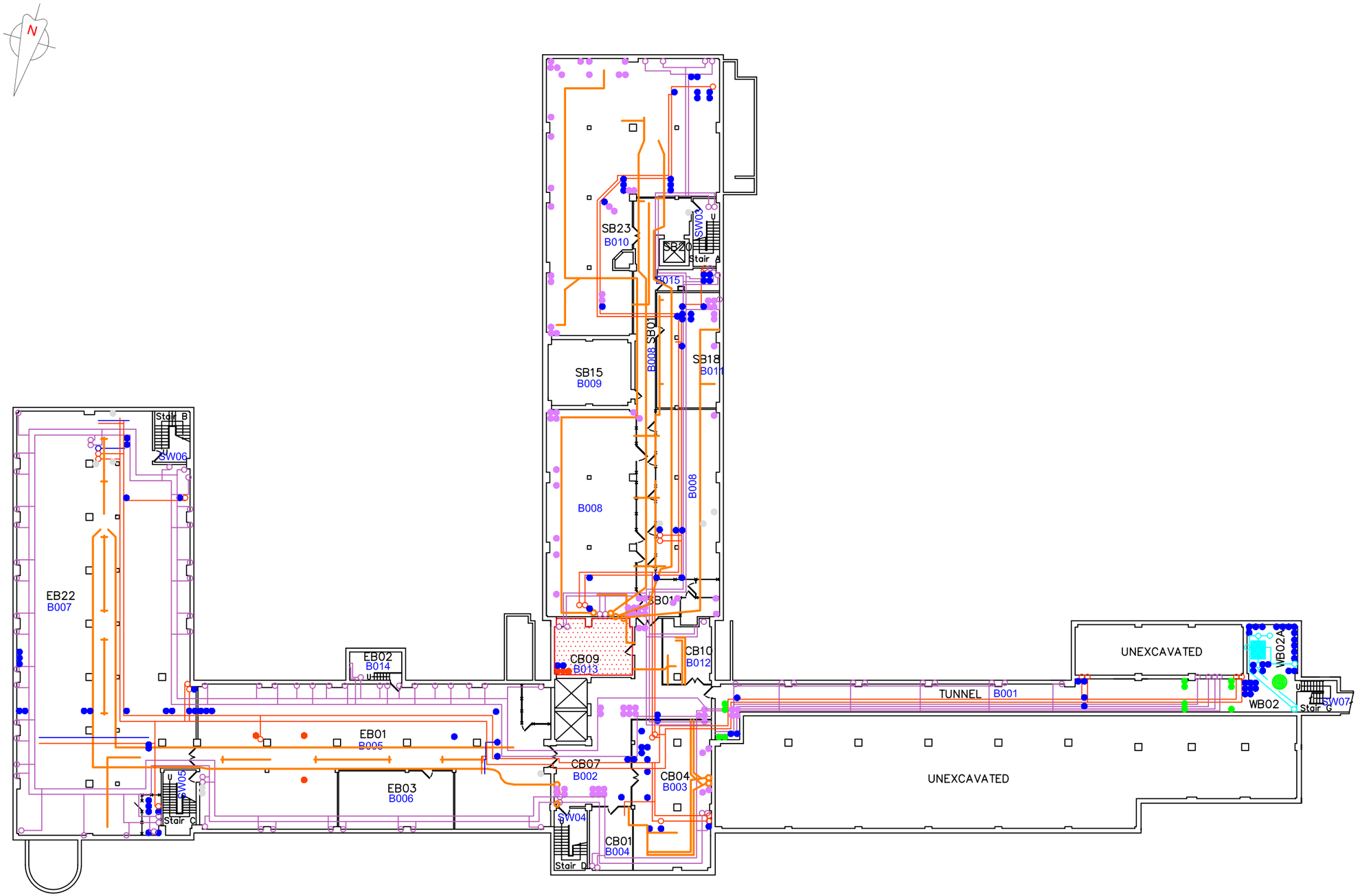
Photo #	Photograph	Functional Space #	Comments
P#-L1		B007	Grey paint over blue paint (on floor) Rm. #EB22 (9,610ppm)
P#-L2		B002	Peach Paint (on door) (7,280ppm) Rm. #CB07

M-58 MOULD PHOTOGRAPH LOG

Photo #	Photograph	Functional Space #	Comments
M-1		B015	Significant mould growth on the ceiling in back of room.
M-2		2014	Mould was observed on the ceiling tile.

APPENDIX E

FLOOR PLANS



OAKHILL
ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

- ACM PIPE INSULATION: CONDENSATE
- ACM PIPE INSULATION: HW HEATING
- ACM PIPE INSULATION: DOMESTIC CW
- ACM PIPE INSULATION: DOMESTIC HW
- ACM DUCTINSULATION: HVAC
- ACM FITTING INSULATION: SECONDARY HWH
- ACM FITTING INSULATION: CONDENSATE
- ACM FITTING INSULATION: HW HEATING
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: DOMESTIC HW
- ACM FITTING INSULATION: CHILLER
- ACM FITTING INSULATION: DRAIN
- ACM TANK INSULATION: CHILLER
- ACM TANK INSULATION: CONDENSATE
- ACM FLOOR TILE

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

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DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

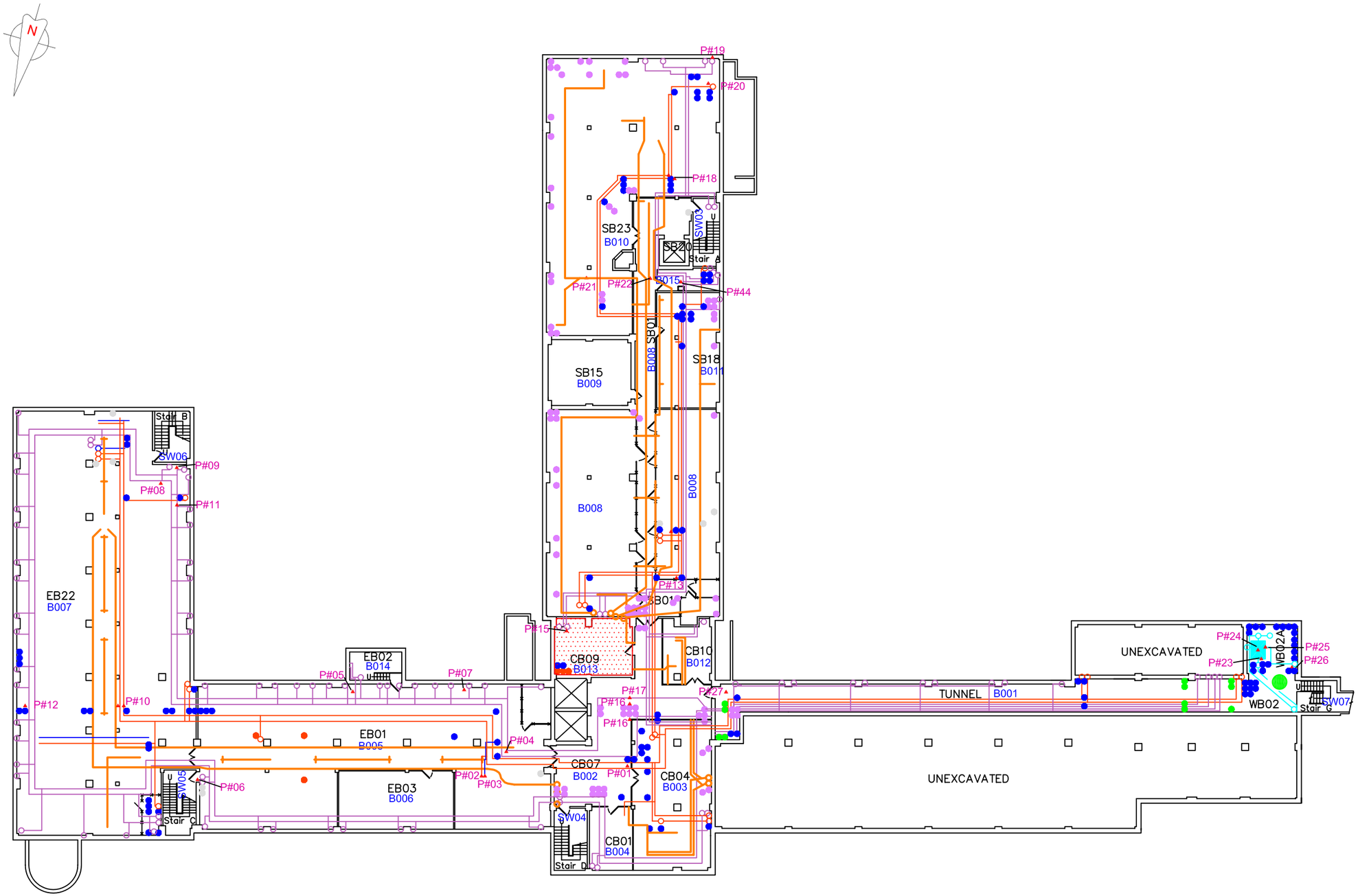
PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
BASEMENT ASBESTOS LOCATIONS

SHEET
B-1



OAKHILL ENVIRONMENTAL

LEGEND

- 1001 FUNCTIONAL SPACE #
- ▲ DAMAGED ACM LOCATION
- P# PHOTOGRAPH #
- ACM PIPE INSULATION: CONDENSATE
- ACM PIPE INSULATION: HW HEATING
- ACM PIPE INSULATION: DOMESTIC CW
- ACM PIPE INSULATION: DOMESTIC HW
- ACM DUCTINSULATION: HVAC
- ACM FITTING INSULATION: SECONDARY HWH
- ACM FITTING INSULATION: CONDENSATE
- ACM FITTING INSULATION: HW HEATING
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: DOMESTIC HW
- ACM FITTING INSULATION: CHILLER
- ACM FITTING INSULATION: DRAIN
- ACM TANK INSULATION: CHILLER
- ACM TANK INSULATION: CONDENSATE
- ACM FLOOR TILE

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

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PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
BASEMENT ASBESTOS SURVEY

SHEET
B-2

OAKHILL ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

SAMPLE LOCATION: NON-ACM

SAMPLE LOCATION: ACM

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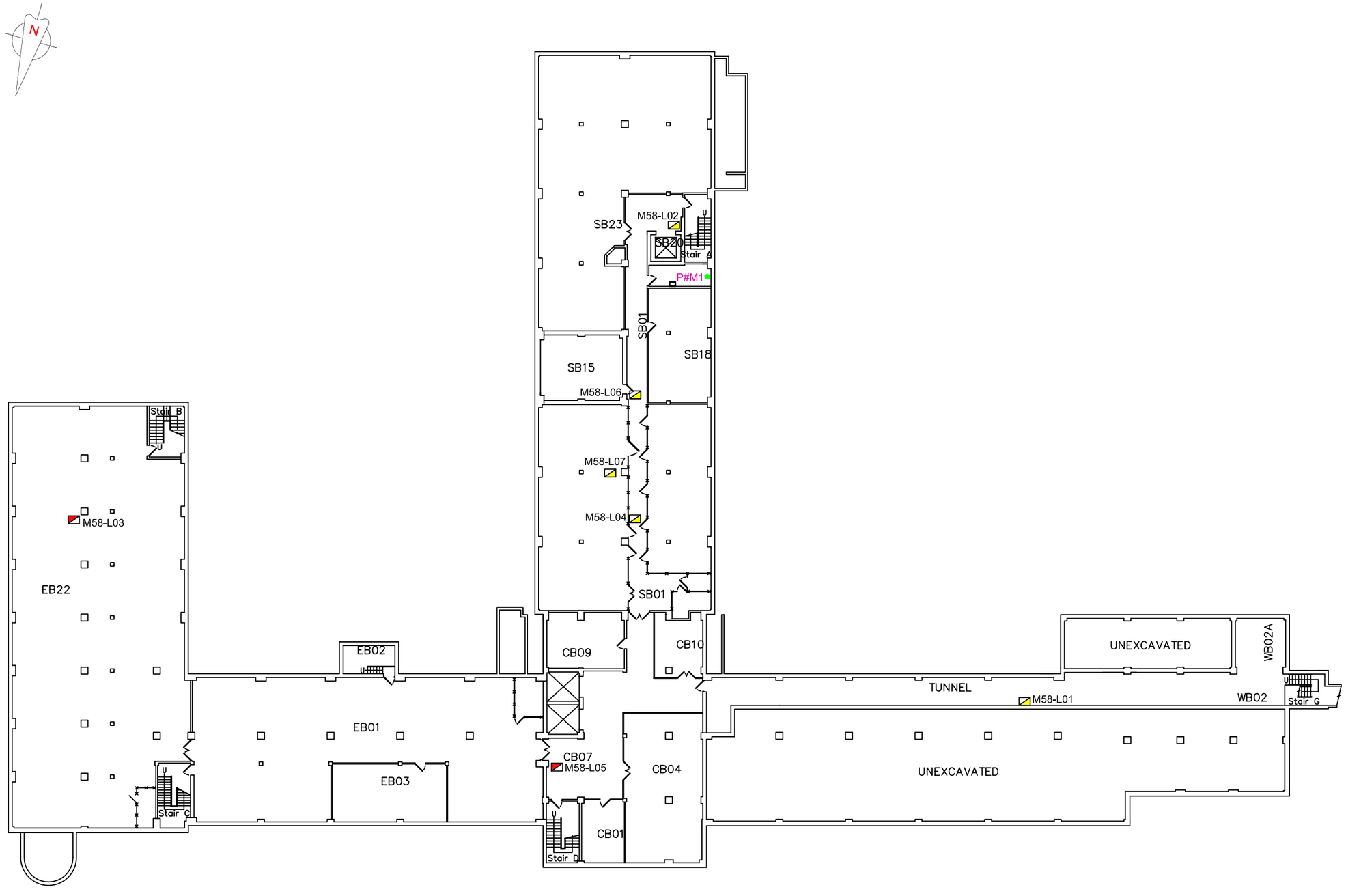
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
BASEMENT SAMPLE LOCATIONS

SHEET
B-2A



OAKHILL
ENVIRONMENTAL

LEGEND

- LEAD SAMPLE LOCATION (<5000 ppm)
- LEAD SAMPLE LOCATION (>5000 ppm)
- MOULD LOCATIONS
- P# PHOTOGRAPH #

CLIENT

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BUILDING M-58

PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE

BASEMENT LEAD SAMPLES & MOULD LOCATIONS

SHEET

B-3

OAKHILL
ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

ACM FITTING INSULATION: HW HEATING

ACM FLOOR TILE

LIMITED ACCESS AREA

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: ts, valves, ends, hangers, etc.

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PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
GROUND ASBESTOS LOCATIONS

SHEET
G-1

OAKHILL
ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

ACM FIREPROOFING

CLIENT

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DATE

MARCH 2007

SCALE

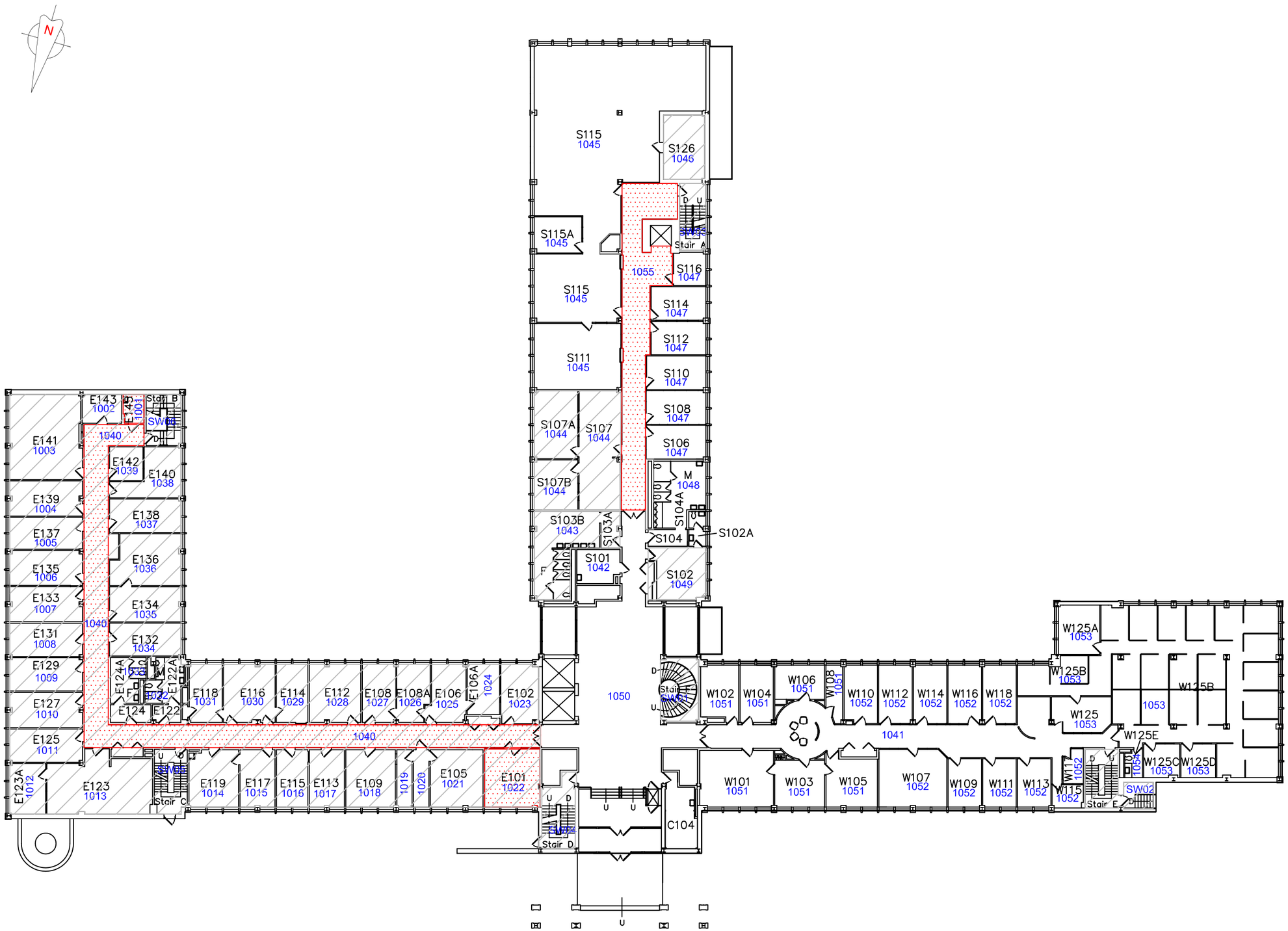
NTS

TITLE

GROUND ASBESTOS FIREPROOFING LOCATIONS

SHEET

G-2



OAKHILL ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

LIMITED ACCESS

ACM FLOOR TILE

CLIENT

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BUILDING M-58

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

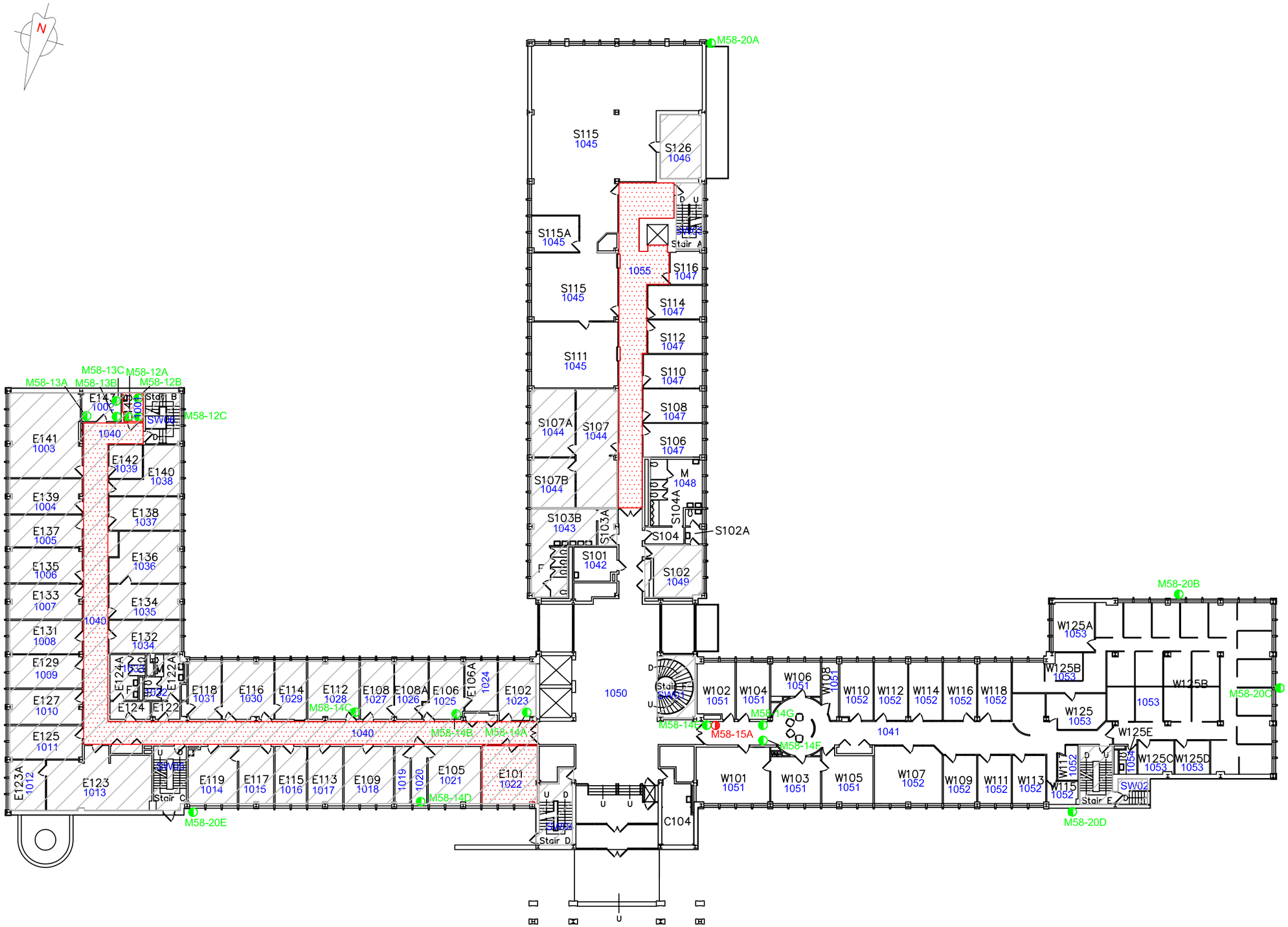
NTS

TITLE

FIRST FLOOR ASBESTOS LOCATIONS

SHEET

1-1



OAKHILL ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

SAMPLE LOCATION: NON-ACM

SAMPLE LOCATION: ACM

LIMITED ACCESS

ACM FLOOR TILE

CLIENT

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BUILDING M-58

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

NTS

TITLE

FIRST FLOOR ASBESTOS SURVEY

SHEET

1-2

OAKHILL ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

ACM FIREPROOFING

CLIENT

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DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

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PR-06-39

DATE

MARCH 2007

SCALE

NTS

TITLE

FIRST FLOOR ASBESTOS FIREPROOFING LOCATIONS

SHEET

1-3

OAKHILL
ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

LIMITED ACCESS

ACM FLOOR TILE

CLIENT

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DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
SECOND FLOOR
ASBESTOS
LOCATIONS

SHEET
2-1

OAKHILL ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

ACM FIREPROOFING

CLIENT

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DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

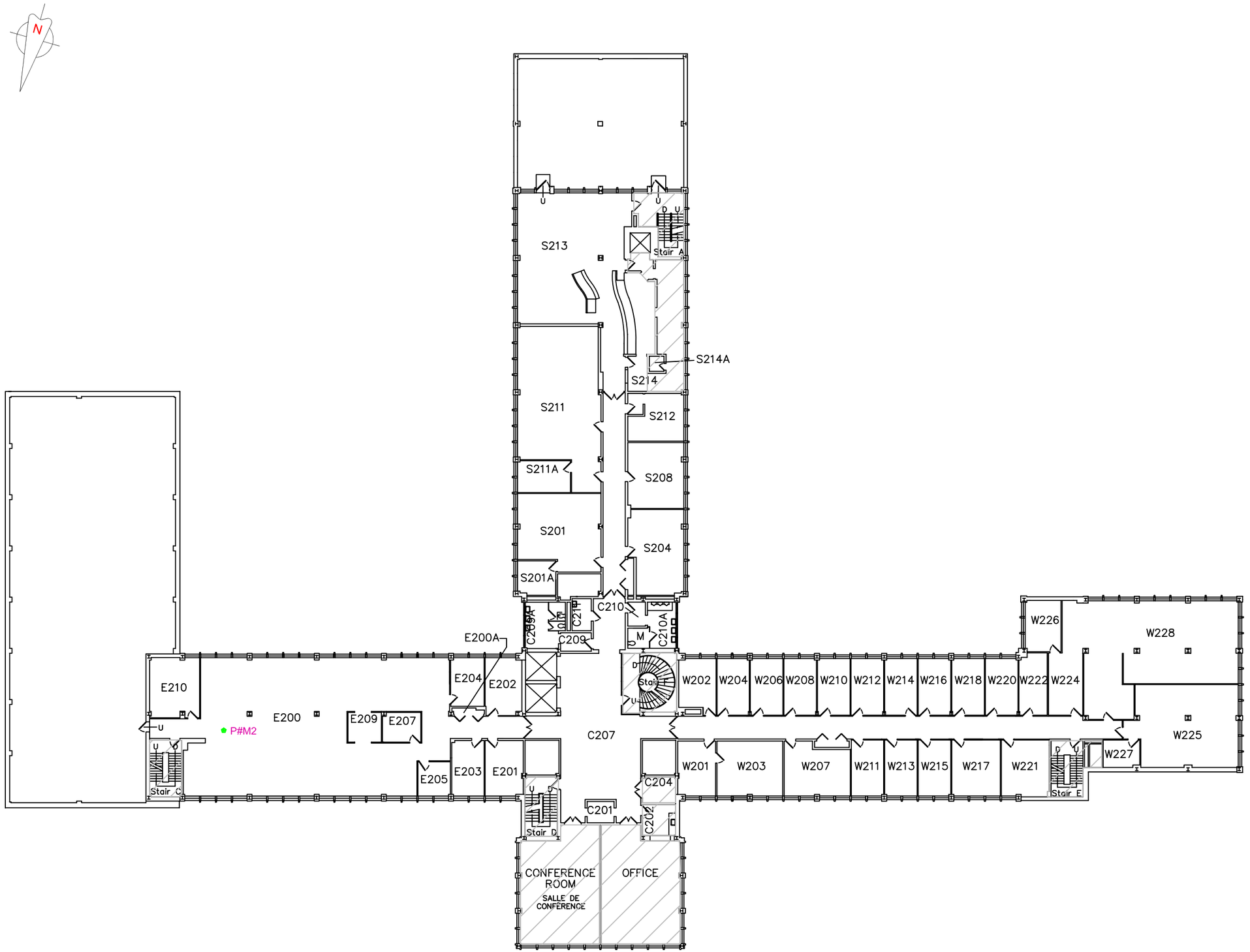
NTS

TITLE

SECOND FLOOR ASBESTOS FIREPROOFING LOCATIONS

SHEET

2-2



OAKHILL ENVIRONMENTAL

LEGEND

- MOULD LOCATION
- LIMITED ACCESS
- P# PHOTOGRAPH #

CLIENT

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PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

PROJECT NO.
PR-06-39

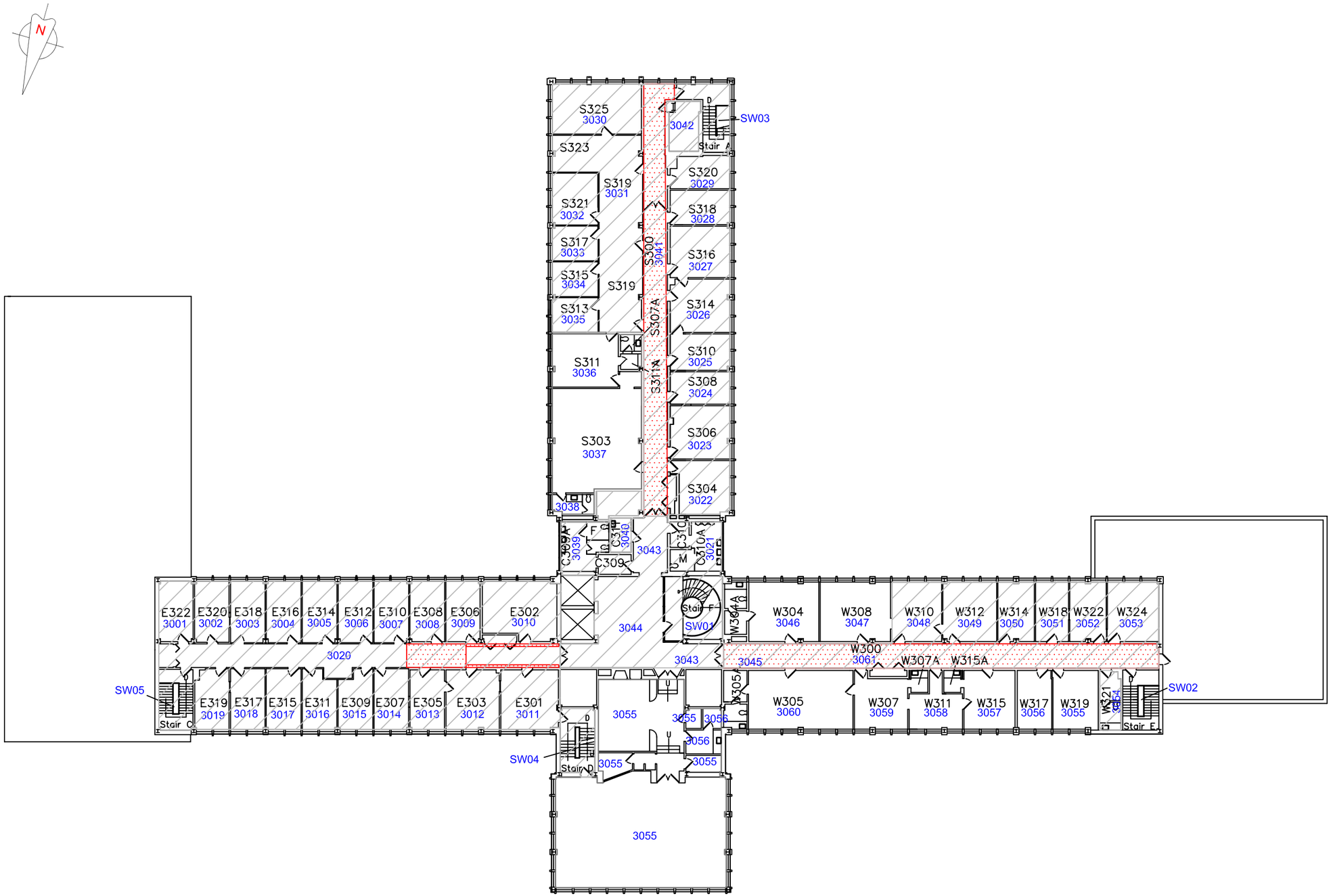
DATE
MARCH 2007

SCALE
NTS

TITLE

SECOND FLOOR
MOULD
LOCATIONS

SHEET
2-3



OAKHILL
ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

LIMITED ACCESS

ACM FLOOR TILE

CLIENT

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PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

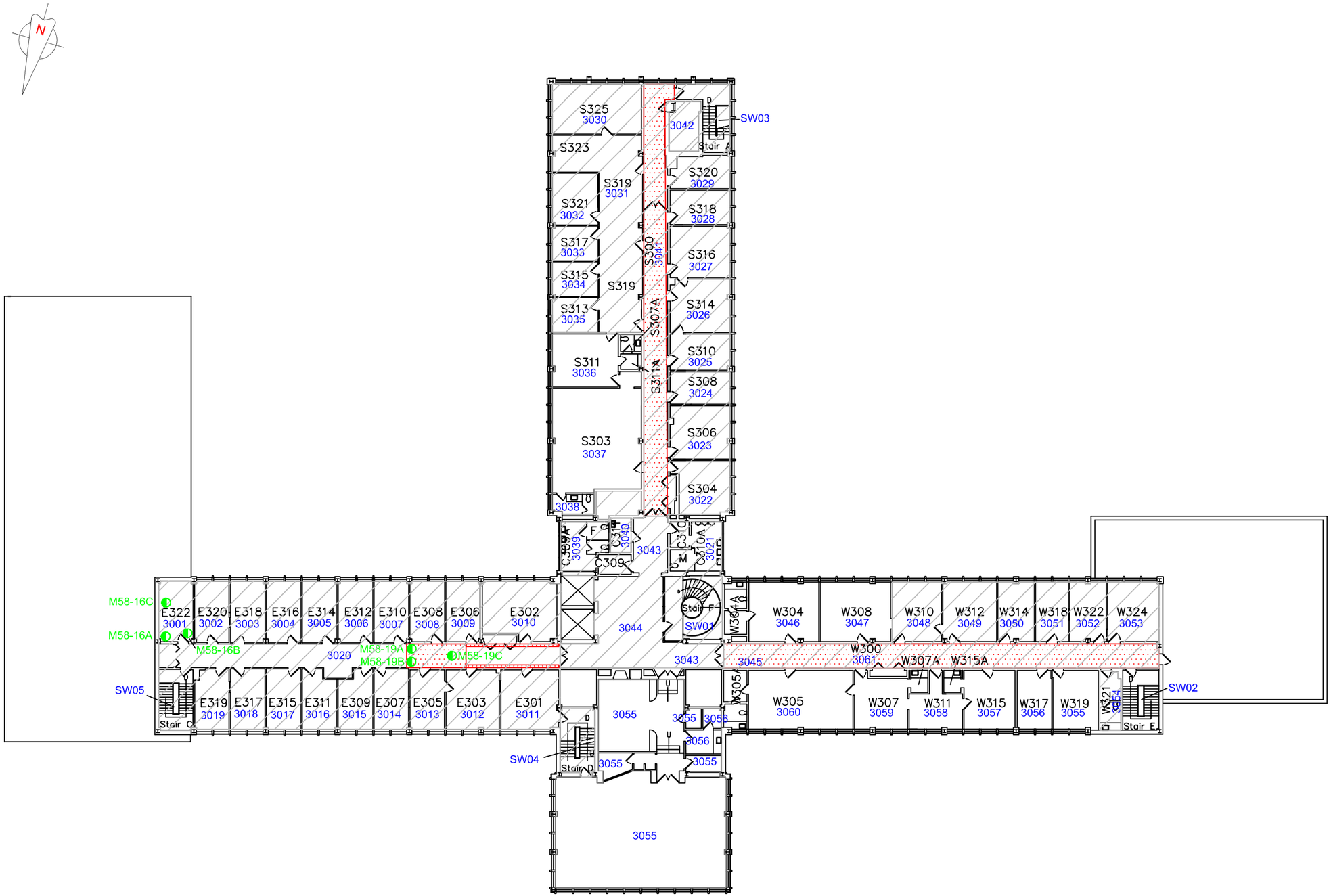
PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
THIRD FLOOR
ASBESTOS
LOCATIONS

SHEET
3-1



OAKHILL
ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

SAMPLE LOCATION: NON-ACM

LIMITED ACCESS

ACM FLOOR TILE

CLIENT

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PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

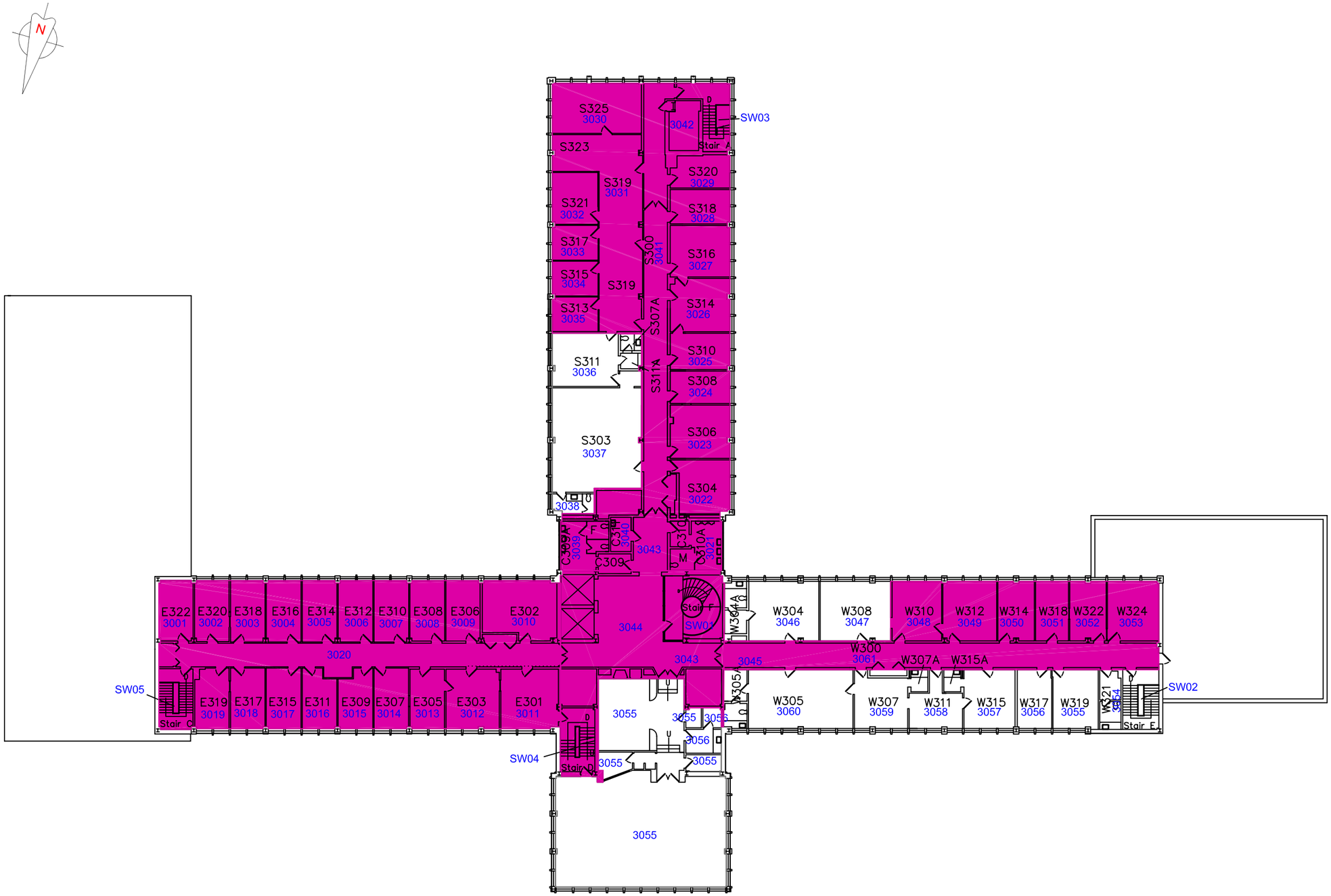
PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
THIRD FLOOR
ASBESTOS
SURVEY

SHEET
3-2



OAKHILL
ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

ACM FIREPROOFING

CLIENT

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PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

NTS

TITLE

THIRD FLOOR ASBESTOS FIREPROOFING LOCATIONS

SHEET

3-3

OAKHILL
ENVIRONMENTAL

LEGEND

1001 FUNCTIONAL SPACE #

- ACM FITTING INSULATION: CONDENSATE
- ACM FITTING INSULATION: HW HEATING
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: CHILLER
- ACM FITTING INSULATION: DRAIN
- ACM HVAC UNIT / DUCTING INSULATION

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

CLIENT

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PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
PENTHOUSE ASBESTOS LOCATIONS

SHEET
PH-1

OAKHILL ENVIRONMENTAL

LEGEND

1001	FUNCTIONAL SPACE #
	SAMPLE LOCATION: ACM
	DAMAGED ACM LOCATION
P#	PHOTOGRAPH #
	ACM FITTING INSULATION: CONDENSATE
	ACM FITTING INSULATION: HW HEATING
	ACM FITTING INSULATION: DOMESTIC CW
	ACM FITTING INSULATION: CHILLER
	ACM FITTING INSULATION: DRAIN
	ACM HVAC UNIT / DUCTING INSULATION

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

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PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-58

PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE

PENTHOUSE ASBESTOS SURVEY

SHEET

PH-2

APPENDIX F

FUNCTIONAL SPACE FORMS

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) Samples M58-10, M58-03C and M58-L01were collected here. 2) 3 encapsulations are required on the condensate tank totalling 0.7 m^2. 3) Domestic cold water: one encapsulation is required on a MJC fitting in room WB02A. 4) Domestic hot water: one encapsulation is required on a MJC fitting in the tunnel.	**Functional Space (FS) #:** B001 **FS Area:** Tunnel, WB02, WB02A **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	09	Tank Insulation	Chiller	Y	Y	12% Chrysotile	4 m^2	X	--	--	--	X	--	O&M	B-1	--
	10	Tank Insulation	Condensate	Y	Y	12% Chrysotile	6 m^2	X	--	--	--	X	--	O&M	B-1	--
	10	Tank Insulation	Condensate	Y	Y	12% Chrysotile	0.7 m^2	--	X	--	--	X	--	3 encapsulations	B-2	23, 24, 25
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	286 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	98 units	X	--	--	--	X	--	O&M	B-1	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	38 units	X	--	---	--	X	--	O&M	B-1	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	1 unit	--	X	--	--	X	--	1 encapsulation	B-2	26
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	107 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	24 units	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	1 unit	--	X	--	--	X	--	1 encapsulation	B-2	27
	N/A	Styrofoam PI	Secondary HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	Secondary HWH	Y	Y	15% Chrysotile	8 units	X	--	--	--	X	--	O&M	B-1	--
	N/A	FG PI & FI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	Condensate	Y	Y	15% Chrysotile	18 units	X	--	--	--	X	--	O&M	B-1	--
	01	Aircell PI	Condensate	Y	Y	15% Chrysotile	26 LM	X	--	--	--	X	--	O&M	B-1	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58

Date: February 13, 2007

Job #: PR-06-039

Notes:
1) Domestic Hot Water: 1 damaged MJC fitting requires an encapsulation.
2) Samples M58-03A & M58-L05 were collected here.

Functional Space (FS) #: B002

FS Area: CB07, Hall, Elevator Area

Inspector: BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Metal Panels	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	01	Aircell PI	DHW	Y	Y	15% Chrysotile	38 LM	X	--	--	--	X	--	O&M	B-1	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	68 LM	X	--	--	--	X	--	O&M	B-1	--
	N/A	FG PI & FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	10 units	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	16 units	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	1	--	X	--	--	X	--	1 encapsulation	B-2	17
	02	MJC FI	DCW	Y	Y	15% Chrysotile	3 units	X	--	--	--	X	--	O&M	B-1	--
	N/A	Styrofoam PI	Secondary HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	Secondary HWH	Y	Y	15% Chrysotile	2	--	X	--	--	X	--	2 encapsulations	B-2	16
	02	MJC FI	Secondary HWH	Y	Y	15% Chrysotile	18 units	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	1 unit	--	X	--	--	X	--	1 encapsulation	B-2	01
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	9 LM	X	--	--	--	X	--	O&M	B-1	--

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 13, 2007 **Job #:** PR-06-039	**Notes:** 1) Limited access throughout room. It is used as furniture storage and was full at the time of inspection. Therefore all evaluations were made from the entrance. 2) All ACM's are observed to be in good condition. 3) Sample M58-03B was collected here.	**Functional Space (FS) #:** B003 **FS Area:** CB04 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	01	Aircell PI	HWH	Y	Y	15% Chrysotile	45 LM	X	--	--	--	X	--	O&M		B-1	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--		--	--
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	55 LM	X	--	--	--	X	--	O&M		B-1	--
	N/A	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Styrofoam PI	Secondary HWH	N	--	--	--	--	--	--	--	--	--	--		--	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	34 LM	X	--	--	--	X	--	O&M		B-1	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	12 units	X	--	--	--	X	--	O&M		B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	20 units	X	--	--	--	X	--	O&M		B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	11 units	X	--	--	--	X	--	O&M		B-1	--
	02	MJC FI	Secondary HWH	Y	Y	15% Chrysotile	4 units	X	--	--	--	X	--	O&M		B-1	--
Above Ceiling	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 14, 2007 **Job #:** PR-06-039	**Notes:** 1) All ACM's observed in condition.	**Functional Space (FS) #:** B004 **FS Area:** CB01, storage **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	Concrete	Ceil	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	01	Aircell PI	HWH	Y	Y	15% Chrysotile	20 LM	X	--	--	--	X	--	O&M		B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	12 units	X	--	--	--	X	--	O&M		B-1	--
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	1 LM	X				X		O&M		B-1	
	N/A	FG PI & FI	DHW	N	--	--	--	--	--	--	--	--	--	--		--	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling																	

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 13, 2007 **Job #:** PR-06-039	**Notes: Sheet 1 of 2** 1) Samples M58-01, M58-02, M58-04, M58-05 (A, B), and M58-06 (A-C) were collected here. 2) Domestic hot water: 1 encapsulation is required of damaged aircell pipe insulation. 3) Domestic cold water: 1 encapsulation is required of damaged sweat wrap pipe insulation. 4) Hot water heating: 2 encapsulations are required of damaged MJC fittings. 5) Hot water heating: 1 encapsulation is required of damaged aircell pipe insulation.	**Functional Space (FS) #:** B005 **FS Area:** EB01 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	01	Aircell PI	DHW	Y	Y	15% Chrysotile	0.1 LM	--	X	--	--	X	--	1 encapsulation	B-2	02
	04	Sweat Wrap (with white paper layer) PI	DCW	Y	Y	5% Chrysotile	0.2 LM	--	X	--	--	X	--	1 encapsulation	B-2	03
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	155 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	73 units	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	2 units	--	X	--	--	X	--	2 encapsulations	B-2	04, 06
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	0.2 LM	--	--	X	--	X	--	1 encapsulation	B-2	05
	05	MJC FI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	04	Sweat Wrap (with white paper layer) PI	DCW	Y	Y	5% Chrysotile	3 LM	X	--	--	--	X	--	O&M	B-1	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	8 units	X	--	--	--	X	--	O&M	B-1	--
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	0.2LM	--	--	X	--	X	--	Removal	B-2	07
Above Ceiling	N/A															

Criteria for Access to an area containing ACM:
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***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 14, 2007 **Job #:** PR-06-039	**Notes: Sheet 2 of 2** 6) Hot water heating: 1 removal of damaged aircell pipe insulation is required.	**Functional Space (FS) #:** B005 (con't) **FS Area:** EB01 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Other	01	Aircell PI	DHW	Y	Y	15% Chrysotile	71 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	12 units	X	--	--	--	X	--	O&M	B-1	--
	N/A	FG PI	DHW	N	--	--	--	--	--	--	--	--	--	--	--	--
	05	MJC FI	DHW	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI	Roof Drain	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	Roof Drain	Y	Y	15% Chrysotile	3 units	X	--	--	--	X	--	O&M	B-1	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	72 LM	X	--	--	--	X	--	O&M	B-1	--

Criteria for Access to an area containing ACM:
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***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 14, 2007 **Job #:** PR-06-039	**Notes:** 1) All ACM observed in good condition.	**Functional Space (FS) #:** B006 **FS Area:** EB03, Record Storage **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	Drywall	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	02	MJC FI	HWH	Y	Y	15% Chrysotile	9 units	X	--	--	--	X	--	O&M		B-1	--
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	16 LM	X	--	--	--	X	--	O&M		B-1	--

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 14, 2007 **Job #:** PR-06-039	**Notes: Sheet 1 of 2** 1) Hot water heating: 2 encapsulations required on damaged MJC fittings. 2) Domestic hot water: 4 encapsulations are required totalling 0.8 metres of damaged aircell pipe insulation 3) Domestic cold water: 1 encapsulation required on damaged MJC fitting 4) Sample M58-L03 was collected here.	**Functional Space (FS) #:** B007 **FS Area:** EB22 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	02	MJC FI	Roof Drain	Y	Y	15% Chrysotile	3 units	X	--	--	--	X	--	O&M	B-1	--
	03	Sweat Wrap (with tar paper layer) PI	Roof Drain	N	--	--	--	--	--	--	--	--	--	--	--	--
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	222 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	121 units	X	--	--	--	X	--	O&M	B-1	--
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	114 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	46 units	X	--	--	--	X	--	O&M	B-1	--
	N/A	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Styrofoam PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	05	MJC FI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	34 units	X	--	--	--	X	--	O&M	B-1	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	04	Sweat Wrap (with white paper layer) PI	DCW	Y	Y	5% Chrysotile	18 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	2 units	--	X	--	--	X	--	2 encapsulations	B-2	08, 09
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	0.8LM	--	--	X	--	X	--	4 encapsulations	B-2	10, 11

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 14, 2007 **Job #:** PR-06-039	**Notes: Sheet 2 of 2**	**Functional Space (FS) #:** B007 (con't) **FS Area:** EB22 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Other continued	02	MJC FI	DCW	Y	Y	15% Chrysotile	1 unit	--	--	X	--	X	--	1 encapsulation	B-2	12
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	105 LM	X	--	--	--	X	--	O&M	B-1	--
Above Ceiling	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes: Sheet 1 of 2** 1) Duct: 1 damaged area requires an encapsulation 2) Domestic cold water: 2 encapsulations of damaged MJC fittings. 3) Domestic hot water: 1 encapsulation of damaged MJC fitting. 4) Samples M58-L02, M8-L04, M58-L06 & M58-L07 were collected here.	**Functional Space (FS) #:** B008 **FS Area:** SB01 & Hall **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete Block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Metal Panels	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	02	MJC FI	DHW	Y	Y	15% Chrysotile	1 unit	--	--	X	--	X	--	1 encapsulation	B-2	13
	02	MJC FI	DCW	Y	Y	15% Chrysotile	2 unit	--	--	X	--	X	--	2 encapsulations	B-2	13, 14
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	5 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	16 units	X	--	--	--	X	--	O&M	B-1	--
	N/A	Styrofoam PI	Secondary HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	Secondary HWH	Y	Y	15% Chrysotile	35 units	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	Storm Drain	Y		15% Chrysotile	4 units	X	--	--	--	X	--	O&M	B-1	--
	03	Sweat Wrap (with tar paper layer) PI	Storm Drain	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	13 units	X	--	--	--	X	--	O&M	B-1	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes: Sheet 2 of 2**	**Functional Space (FS) #:** B008 (con't) **FS Area:** SB01 & Hall **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Other continued	01	Aircell PI	HWH	Y	Y	15% Chrysotile	60 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	8 units	X	--	--	--	X	--	O&M	B-1	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	157 LM	X	--	--	--	X	--	O&M	B-1	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	0.5 LM	--	--	X	--	X	--	1 encapsulation	B-2	22
Above Ceiling	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM observed in this area below the ceiling. 2) No access above solid ceiling.	**Functional Space (FS) #:** B009 **FS Area:** SB15, Safe **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	N	--	--	--	--	--	--	--	--	--	--	--		--	
Walls	12	Plaster	N	--	--	--	--	--	--	--	--	--	--	--		--	
Ceiling	12	Plaster	N	--	--	--	--	--	--	--	--	--	--	--		--	
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) Domestic hot water: 3 encapsulations required of damaged MJC fittings. 2) Hot water heating: 1 encapsulation is required of a damaged MJC fitting. 3) Duct: 1 encapsulation of damaged duct insulation is required.	**Functional Space (FS) #:** B010 **FS Area:** SB23 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Metal panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	03	Sweat Wrap (with tar paper layer) PI	Secondary HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Styrofoam PI	Secondary HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	Secondary HWH	Y	Y	15% Chrysotile	30 units	X	--	--	--	X	--	O&M	B-1	--
	N/A	FG PI	DHW	N	--	--	--	--	--	--	--	--	--	--	--	--
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	55 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	14 units	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	3 units	--	--	X	--	X	--	3 encapsulation	B-2	18, 20
	02	MJC FI	HWH	Y	Y	15% Chrysotile	1 units	--	--	X	--	X	--	1 encapsulation	B-2	19
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	39 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	28 units	X	--	--	--	X	--	O&M	B-1	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	50 LM	X	--	--	--	X	--	O&M	B-1	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	0.4 LM	--	--	X	--	X	--	1 encapsulation	B-2	21
Above Ceiling																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) All ACM's were observed in good condition.	**Functional Space (FS) #:** B011 **FS Area:** SB18 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	Concrete Block	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	Concrete Deck	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	01	Aircell PI	HWH	Y	Y	15% Chrysotile	25 LM	X	--	--	--	X	--	O&M		B-1	--
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	27 LM	X	--	--	--	X	--	O&M		B-1	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--		--	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	3 units	X	--	--	--	X	--	O&M		B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	10 units	X	--	--	--	X	--	O&M		B-1	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	6 units	X	--	--	--	X	--	O&M		B-1	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	26 LM	X	--	--	--	X	--	O&M		B-1	--
	N/A	Styrofoam PI	Secondary HWH	N	--	--	--	--	--	--	--	--	--	--		--	--
	02	MJC FI	Secondary HWH	Y	Y	15% Chrysotile	8 units	X	--	--	--	X	--	O&M		B-1	--
Above Ceiling	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 14, 2007 **Job #:** PR-06-039	**Notes:** 1) All ACM's observed in good condition.	**Functional Space (FS) #:** B012 **FS Area:** CB10 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Ceil	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	02	MJC FI	HWH	Y	Y	15% Chrysotile	3 units	X	--	--	--	X	--	O&M	B-1	--
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	6 LM	X	--	--	--	X	--	O&M	B-1	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	11 LM	X	--	--	--	X	--	O&M	B-1	--
Above Ceiling	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) Hot water heating: 2 encapsulations are required of damaged Mag Block pipe insulation. 2) Samples M58-07, M58-08 (A-C) and M58-09 were collected here.	**Functional Space (FS) #:** B013 **FS Area:** CB09 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	07	9"x9" FT (white with grey streaks)	Floor	Y	N	Suspect ACM	33 m^2	X	--	--	--	X	--	O&M	B-1	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	01	Aircell PI	HWH	Y	Y	15% Chrysotile	2 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	3 units	X	--	--	--	X	--	O&M	B-1	--
	N/A	FG PI	DHW	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	3 units	X	--	--	--	X	--	O&M	B-1	--
	N/A	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	2 units	X	--	--	--	X	--	O&M	B-1	--
	08	Mag Block PI	HWH	Y	Y	4% Chrysotile & 2% Amosite	0.2 LM	--	--	X	--	X	--	2 encapsulations	B-2	15
Above Ceiling	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) All ACM observed in good condition.	**Functional Space (FS) #:** B014 **FS Area:** EB02, pump room **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	
Walls	N/A	Concrete	Walls	N	--	--	--	--	--	--	--	--	--	--	--	
Ceiling	N/A	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	
Other	01	Aircell PI	HWH	Y	Y	15% Chrysotile	7 LM	X	--	--	--	X	--	O&M	B-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	8 units	X	--	--	--	X	--	O&M	B-1	--
Above Ceiling	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) Hot water heating: remove 0.5 metres of severely damaged aircell pipe insulation. 2) Significant mould growth in backroom on ceiling.	**Functional Space (FS) #:** B015 **FS Area:** SB20 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete Block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Wood	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Styrofoam	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	01	Aircell PI	HWH	Y	Y	15% Chrysotile	15 LM	X	--	--	--	X	--	O&M	B-1	--
	01	Aircell PI	DHW	Y	Y	15% Chrysotile	2 LM	X	--	--	--	X	--	O&M	B-1	--
	03	Sweat Wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	10 units	X	--	--	--	X	--	O & M	B-1	--
	02	MJC FI	DHW	Y	Y	15% Chrysotile	1 unit	X	--	--	--	X	--	O & M	B-1	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	5 units	X	--	--	--	X	--	O & M	B-1	--
	06	DI (FG/ tar paper / parging)	Duct	Y	Y	20% Chrysotile	3 LM	X	--	--	--	X	--	O&M	B-1	--
	01	Aircell PI	HWH	Y	Y	15% Chrysotile	0.5LM	--	--	X	--	X	--	Removal	B-2	44
	N/A	Mould	Ceiling Tile	N	--	--	--	--	--	--	--	--	--	--	B-3	M1
Above Ceiling	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G001 **FS Area:** SG-01 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12"CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G002 **FS Area:** SG-01A **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12"CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G003 **FS Area:** SG-05 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling. .	**Functional Space (FS) #:** G004 **FS Area:** SG-05A **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G005 **FS Area:** SG-07 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G006 **FS Area:** Hall in east side of wing **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x 9" FT	Floor	Y	N	Suspect ACM	5 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition..	**Functional Space (FS) #:** G007 **FS Area:** SG-09A Lunch Rm. **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT	Floor	Y	N	Suspect ACM	12 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G008 **FS Area:** SG-09 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G009 **FS Area:** SG-11A **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition..	**Functional Space (FS) #:** G010 **FS Area:** SG-15A **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT	Floor	Y	N	Suspect ACM	12 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G011 **FS Area:** SG-11 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G012 **FS Area:** SG-19A Lunch Rm. **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x 9" FT	Floor	Y	N	Suspect ACM	13 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G013 **FS Area:** SG-17 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	11 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G014 **FS Area:** SG-21 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x 9" FT	Floor	Y	N	Suspect ACM	12 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G015 **FS Area:** SG-21A **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	10 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G016 **FS Area:** SG-27 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G017 **FS Area:** SG-27A **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G018 **FS Area:** SG-26A **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	Concrete Block	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling. ACM fireproofing is present above the ceiling in this area and Type II access is required. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G019 **FS Area:** SG-22 Washroom **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT White	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's observed below the suspended ceiling was in good condition.	**Functional Space (FS) #:** G020 **FS Area:** SG-26 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete Block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	01	Aircell PI	HWH	Y	Y	15% Chrysotile	2 LM	X	--	--	X	--	--	O&M	G-1	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	2 units	X	--	--	X	--	--	O&M	G-1	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling. ACM fireproofing is present above the ceiling in this area and Type II access is required. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G021 **FS Area:** SG20 & SG20A **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	4"x4" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G022 **FS Area:** South Hall **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G023 **FS Area:** SG-16 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	16 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G024 **FS Area:** SG-14 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	14 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G025 **FS Area:** SG-12 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	17 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G026 **FS Area:** SG-10 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	13 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G027 **FS Area:** SG-08 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G028 **FS Area:** SG-06 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G029 **FS Area:** SG-04 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT (green)	Floor	Y	N	Suspect ACM	14 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G030 **FS Area:** SG-04A **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT (white with green streaks)	Floor	Y	N	Suspect ACM	18 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling. ACM fireproofing is present above the ceiling in this area and Type II access is required. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G031 **FS Area:** CG-07 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Marble	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Stone panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G032 **FS Area:** EG-02 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	24 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G033 **FS Area:** EG-04 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G034 **FS Area:** EG-06A **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G035 **FS Area:** EG-06B **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G036 **FS Area:** EG-08 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x 9 FT	Floor	Y	N	Suspect ACM	17 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G037 **FS Area:** EG-10 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G038 **FS Area:** EG-12 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G039 **FS Area:** EG-14 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	15 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling. ACM fireproofing is present above the ceiling in this area and Type II access is required. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G040 **FS Area:** EG-21 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT Cream	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Plaster/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling																
Other																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G041 **FS Area:** EG-17 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT	Floor	Y	N	Suspect ACM	17 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G042 **FS Area:** EG-15 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT	Floor	Y	N	Suspect ACM	16 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G043 **FS Area:** EG-11 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT	Floor	Y	N	Suspect ACM	16 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition.	**Functional Space (FS) #:** G044 **FS Area:** EG-09 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT	Floor	Y	N	Suspect ACM	16 m^2	X	--	--	X	--	--	O&M	G-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** G045 **FS Area:** EG-07 & EG-01 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/ Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** G046 **FS Area:** EG-03 & CG-05 east & central hall **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling																	
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) Fibreglass pipe & fitting insulation present on all systems.	**Functional Space (FS) #:** G047 **FS Area:** Re-insulated part of EG-25 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	11	12"x12" FT (cream with red streaks)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fireproofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) Fibreglass pipe & fitting insulation present on all systems.	**Functional Space (FS) #:** G048 **FS Area:** EG-29 EG-27 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	11	12"x12" FT (cream with red streaks)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Other	N/A	FG PI & FI	Water	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fire proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access under carpet. 3) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** G049 **FS Area:** EG-22 & EG-20 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Vinyl panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 3) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** G050 **FS Area:** EG-25 (section with ACM fireproofing) **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	11	12" x 12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12" x 12" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling. ACM fireproofing is present above the ceiling in this area and Type II access is required. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G051 **FS Area:** CG-01,CG-01B, CG-01C **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	6"x6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling. ACM fireproofing is present above the ceiling in this area and Type II access is required. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** G052 **FS Area:** CG-02, CG-02A & CG-02B **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	6"x6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access under carpet. 2) No ACM's were observed in this area.	**Functional Space (FS) #:** G053 **FS Area:** NG-01 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fire proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area.	**Functional Space (FS) #:** G054 **FS Area:** WG-05 conference room **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Fire proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area.	**Functional Space (FS) #:** G055 **FS Area:** WG-03 WG-10 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Fire proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area.	**Functional Space (FS) #:** G056 **FS Area:** WG-22, WG-22A & WG-23 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	Concrete Block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Fire proofing	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A															
Other	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area.	**Functional Space (FS) #:** G057 **FS Area:** WG-25 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	Concrete Block	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	Fire proofing	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A																
Other	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area.	**Functional Space (FS) #:** G058 **FS Area:** WG-02, WG-04, WG-06 & WG-08 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel/Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	FG PI & FI	ALL	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fire proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition. 3) Samples M58-12 (A to C) were collected here.	**Functional Space (FS) #:** 1001 **FS Area:** Rm#145E **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	07	9" x 9" FT	Floor	Y	N	Suspect ACM	5 m^2	X	--	--	X	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling. 3) Samples M58-13 (A to C) were collected here.	**Functional Space (FS) #:** 1002 **FS Area:** Rm#143E **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12"FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1003 **FS Area:** Rm#141E **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1004 **FS Area:** Rm. # E139 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1005 **FS Area:** Rm#137E **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1006 **FS Area:** Rm#135E **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling. .	**Functional Space (FS) #:** 1007 **FS Area:** Rm. # E133 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1008 **FS Area:** Rm. # E131 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1009 **FS Area:** Rm#129E **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1010 **FS Area:** Rm#127E **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1011 **FS Area:** Rm#125E **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1012 **FS Area:** Rm#123E **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1013 **FS Area:** Rm#123E **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1014 **FS Area:** Rm#119E **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1015 **FS Area:** Rm#117E **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1016 **FS Area:** Rm#115E **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1017 **FS Area:** Rm#113E **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1018 **FS Area:** Rm#109E **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1019 **FS Area:** Rm#105E **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling. 3) Sample M58-14D was collected here.	**Functional Space (FS) #:** 1020 **FS Area:** Rm#1050E **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1021 **FS Area:** Rm. # E 105 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) All ACM's were observed in good condition. ·	**Functional Space (FS) #:** 1022 **FS Area:** Rm#101E **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT (green & grey)	Floor	Y	N	Suspect ACM	25 m^2	X	--	--	X	--	--	O&M	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4'CT (strata pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fireproofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling. 3) Sample M58-14A was collected here.	**Functional Space (FS) #:** 1023 **FS Area:** Rm#102B **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (green)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N													
					--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1024 **FS Area:** Rm#E106A **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling. 3) Sample M58-14B was collected here.	**Functional Space (FS) #:** 1025 **FS Area:** Rm#E106 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1026 **FS Area:** Rm#E108A **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1027 **FS Area:** Rm#E108 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling. 3) Sample M58-14C was collected here.	**Functional Space (FS) #:** 1028 **FS Area:** Rm#E112 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1029 **FS Area:** Rm. # E 114 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1030 **FS Area:** Rm#E116 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling		12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1031 **FS Area:** Rm#E118 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1032 **FS Area:** Rm. # E 122, E 122A, Men's WC **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls12	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	6"x6" Ceramic tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1033 **FS Area:** Rm.'s E124, E124A, Woman's WC **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls12	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	6"x6" Ceramic tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1034 **FS Area:** Rm#E132 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1035 **FS Area:** Rm#E134 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1036 **FS Area:** Rm#E136 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1037 **FS Area:** Rm#E138 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1038 **FS Area:** Rm#E140 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 15, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 1039 **FS Area:** Rm#142E **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed below the suspended ceiling. 2) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area.	**Functional Space (FS) #:** 1040 **FS Area:** Hall **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT (brown & white)	Floor	Y	--	Suspect ACM	143 m^2	X	--	--	--	X	--	O&M	1-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area. 2) Fibreglass pipe & fitting insulation on all systems. 3) Samples M58-14 (E to G) & M58-15A were collected here. 4) Terracotta tile with mortar walls were sampled in this area above the ceiling and found to contain asbestos. This material should be treated as an ACM throughout this area. This material is mostly an internal structural component of the walls and therefore the extent of its locations and the condition could not be determined.	**Functional Space (FS) #:** 1041 **FS Area:** West wing hall **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2' x 4' CT (scatter divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	13	Terracotta tile & Mortar	Wall	Y	N	2% Amosite	unknown	--	--	--	--	--	X	See notes	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area 2) Fibreglass pipe & fitting insulation on all systems. 3) The presence of ACM fireproofing is reported above the ceiling in this area along the back wall, however most of the fireproofing is non-ACM after the completion of a previous asbestos abatement project.	**Functional Space (FS) #:** 1042 **FS Area:** Rm#S-101, Janitor's Closet **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2' x 4' CT (scatter divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed below the solid ceiling. 2) No access above solid ceiling. 3) The presence of ACM fireproofing is reported above the ceiling in this area , however most of the fireproofing is non-ACM after the completion of a previous asbestos abatement project.	**Functional Space (FS) #:** 1043 **FS Area:** Rm#S-103A & S-103B, Woman's Washroom **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	6" x 6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceil	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Oakhill Environmental *Functional Space Form*

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access during time of survey	**Functional Space (FS) #:** 1044 **FS Area:** Rm#S-107, S-107A & S-107B **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			

Criteria for Access to an area containing ACM:
A*: All building occupants may have access to this area*
B*: Restricted to building staff only*
C*: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area. 2) Fibreglass pipe & fitting insulation on all systems above the solid ceiling.	**Functional Space (FS) #:** 1045 **FS Area:** Rm#S-111, S-115 & S-115A **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12" x 12" FT (green)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel / Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2' x 4' CT (scatter divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's below the solid ceiling. 2) No access above the solid ceiling.	**Functional Space (FS) #:** 1046 **FS Area:** Rm#S-126 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	11	12" x 12" FT (green)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceil	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) Fibreglass pipe & fitting insulation on all systems.	**Functional Space (FS) #:** 1047 **FS Area:** Rm#S-116, S-110, S-108, S-114, S-112, S-106 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12" x 12" FT (green)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel / Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2' x 4' CT (horizontal divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58

Date: February 19, 2007

Job #: PR-06-039

Notes:
1) No ACM's observed below the solid ceiling.
2) No access above solid ceiling.
3) The presence of ACM fireproofing is reported above the ceiling in this area , however most of the fireproofing is non-ACM after the completion of a previous asbestos abatement project.

Functional Space (FS) #: 1048

FS Area: Rm#S-104 & S-104A, Men's Washroom

Inspector: BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	6" x 6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceil	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No access during time of survey. 2) The presence of ACM fireproofing is reported above the ceiling in this area , however most of the fireproofing is non-ACM after the completion of a previous asbestos abatement project.	**Functional Space (FS) #:** 1049 **FS Area:** Rm#S-102 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			

Criteria for Access to an area containing ACM:
A*: All building occupants may have access to this area*
B*: Restricted to building staff only*
C*: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed below the solid ceiling.	**Functional Space (FS) #:** 1050 **FS Area:** Foyer **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Marble	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12" x 12" CT (FG)	Ceil	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) Fibreglass pipe & fitting insulation on all systems.	**Functional Space (FS) #:** 1051 **FS Area:** Rm#W-101, W-103, W-105, W-102, W-104, W-106 & W-108 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2' x 4' CT (scatter divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58

Date: February 19, 2007

Job #: PR-06-039

Notes:
1) No ACM's were observed in this area.
2) Fibreglass pipe & fitting insulation on all systems.

Functional Space (FS) #: 1052

FS Area: Rm#W-105, W-107, W-109, W-111, W-113, W-110, W-112, W-114, W-116 & W-118

Inspector: BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel / Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2' x 4' CT (scatter divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58

Date: February 20, 2007

Job #: PR-06-039

Notes:
1) No ACM's were observed in this area.
2) Fibreglass pipe & fitting insulation on all systems.

Functional Space (FS) #: 1053

FS Area: Rm#W-125, W-125A, W-125B, W-125C, W-125D, Cubicle Area & Offices

Inspector: BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
		Fabric Partitions														
Ceiling	N/A	2' x 4' CT (scatter divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) Fibreglass pipe & fitting insulation on all systems.	**Functional Space (FS) #:** 1054 **FS Area:** Washroom **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	12" x 12" FT (white with grey)	Floor	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2' x 4' CT (scatter divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) Fibreglass pipe & fitting insulation on all systems.	**Functional Space (FS) #:** 1055 **FS Area:** Hall **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	07	9" x 9" FT	Floor	Y	N	Suspect ACM	78 m^2	X	--	--	--	X	--	O&M	1-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2' x 4' CT (scatter divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No access during time of survey	**Functional Space (FS) #:** 2001 **FS Area:** Conference Room **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			

Criteria for Access to an area containing ACM:
A*: All building occupants may have access to this area*
B*: Restricted to building staff only*
C*: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) No access under carpet. 3) No access above solid ceiling.	**Functional Space (FS) #:** 2002 **FS Area:** Office Cubicles **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fabric Partition	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12" x 12" CT (FG)	Ceil	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Ceil	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No access during time of survey	**Functional Space (FS) #:** 2003 **FS Area:** Rm. #C-202 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				

Criteria for Access to an area containing ACM:
A*: All building occupants may have access to this area*
B*: Restricted to building staff only*
C*: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No access during time of survey	**Functional Space (FS) #:** 2004 **FS Area:** Rm#C-204 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				

Criteria for Access to an area containing ACM:
A*: All building occupants may have access to this area*
B*: Restricted to building staff only*
C*: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area.	**Functional Space (FS) #:** 2005 **FS Area:** Foyer **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Marble	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x2' CT (FG)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area. 2) The presence of ACM fireproofing is reported above the ceiling in this area , however most of the fireproofing is non-ACM after the completion of a previous asbestos abatement project.	**Functional Space (FS) #:** 2006 **FS Area:** C210 & C210A, Men's **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	6" X 6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	FG PI & FI	Duct	N	--	--	--	--	--	--	--	--	--	--		--	--
Other																	

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area.	**Functional Space (FS) #:** 2007 **FS Area:** C209- C209A, Woman's WC **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	6" x 6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	FG PI & FI	Duct	N	--	--	--	--	--	--	--	--	--	--		--	--
Other																	

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM was observed in this area.	**Functional Space (FS) #:** 2008 **FS Area:** S201, S201A, S211, S211A, S208 & S204 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12”x12” FT (white)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fabric Partition	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2’x4’ CT (scattered divot pattern)	Ceil	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	12	Plaster		N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 2009 **FS Area:** S213 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	12	Plaster		N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Drywall		N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling. Due to the presence of ACM fireproofing Type II access is required above the ceiling for this area.	**Functional Space (FS) #:** 2010 **FS Area:** Kitchen **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	6"x6" Ceramic Tile	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	4"x4" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A	Metal wrap PI & FI	DCW	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Metal wrap PI & FI	DHW	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 19, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 2011 **FS Area:** S212 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	6"x6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
Other																	

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area.	**Functional Space (FS) #:** 2012 **FS Area:** C21, Janitor's Closet **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Other																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 21, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area.	**Functional Space (FS) #:** 2013 **FS Area:** South Hall **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor		Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9" x 9" FT cream	Floor	Y	N	Suspect ACM	38 m^2	--	--	--	--	--	--	O & M	2-1	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 21 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) Mould was observed on a ceiling tile in the east side of the room.	**Functional Space (FS) #:** 2014 **FS Area:** E200, E200A, E201, E202, E203, E204, E205, E207, E209 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fabric Partition	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A	Mould	Ceiling	N	--	--	--	--	--	--	--	--	--	--	2-3	M-2

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 2015 **FS Area:** E210 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Dark grey Linoleum	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fireproofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI		N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 2016 **FS Area:** West Wing **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Fabric Partition	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed in this area. 3) Samples M58-16 (A to C) were collected here.	**Functional Space (FS) #:** 3001 **FS Area:** E322, storage **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	11	12"x12" FT green	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
					--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed in this area.	**Functional Space (FS) #:** 3002 **FS Area:** E320 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed in this area.	**Functional Space (FS) #:** 3003 **FS Area:** E318 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3004 **FS Area:** E316 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3005 **FS Area:** E314 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3006 **FS Area:** E312 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3007 **FS Area:** E310 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3008 **FS Area:** E308 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3009 **FS Area:** E306 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3010 **FS Area:** E302 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3011 **FS Area:** E301 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3012 **FS Area:** E303 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3013 **FS Area:** E305 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3014 **FS Area:** E307 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3015 **FS Area:** E309 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3016 **FS Area:** E311 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3017 **FS Area:** E315 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling..	**Functional Space (FS) #:** 3018 **FS Area:** E317 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling.	**Functional Space (FS) #:** 3019 **FS Area:** E319 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the solid ceiling. 3) Samples M58-19 (A to C) were collected here.	**Functional Space (FS) #:** 3020 **FS Area:** East Hall **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet		N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	9"x9" FT (white & grey)	Floor	Y	N	Suspect ACM	14 m^2	X	--	--	--	X	--	O&M	3-1	--
	11	12"x12" FT (cream)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3021 **FS Area:** C310, C310A, washroom **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	6"x6" Ceramic tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3022 **FS Area:** S304 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) Type II access required due to ACM fire proofing above the suspended ceiling. 2) No access above Ceiling tile.	**Functional Space (FS) #:** 3023 **FS Area:** S306 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12”x24” CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3024 **FS Area:** S308 **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3025 **FS Area:** S310 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3026 **FS Area:** S314 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3027 **FS Area:** S316 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3028 **FS Area:** S318 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3029 **FS Area:** S320 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3030 **FS Area:** S325 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12"x12" FT (tan)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3031 **FS Area:** S319 & S323 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
		Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
		Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24"CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3032 **FS Area:** S321 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
		Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
		Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3033 **FS Area:** S317 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
		Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
		Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3034 **FS Area:** S315 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
		Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
		Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3035 **FS Area:** S313 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
		Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
		Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 3036 **FS Area:** S311 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Wall Paper	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 3037 **FS Area:** S303 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Wall Paper	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scattered divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 3038 **FS Area:** Washroom **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Ceramic Tile	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	6”x6” Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2’x4’ CT (strata pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3039 **FS Area:** C309 & C309A, Woman's washroom **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	N/A	6"x6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3040 **FS Area:** C311, janitors closet **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) All ACM's were observed in good condition below the ceiling.	**Functional Space (FS) #:** 3041 **FS Area:** South Hall **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	07	9"x9" FT (green & cream)	Floor	Y	N	15% Chrysotile	71 m^2	X	--	--	--	--	X	O & M	3-1	--
	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3042 **FS Area:** Elevator Mechanical Room **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3043 **FS Area:** Hall's around foyer **Inspector:** BM & RT

Building Materials				**ACM Assessment**												**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (strata)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling																	
Other																	

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's were observed below the ceiling.	**Functional Space (FS) #:** 3044 **FS Area:** Main Foyer **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	Marble	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	12"x12" CT (FG)	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling																	
Other																	

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area.	**Functional Space (FS) #:** 3045 **FS Area:** Rm. W304A, washroom **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	12"x12" FT (grey)	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	1" Ceramic Tile	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	N/A	6"x6" Ceramic Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (strata)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access under carpet. 2) Metal duct with no insulation. 3) No ACM's were observed in this area.	**Functional Space (FS) #:** 3046 **FS Area:** W304 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (strata)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access under carpet. 2) Metal duct with no insulation. 3) No ACM's were observed in this area.	**Functional Space (FS) #:** 3047 **FS Area:** W308 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (strata)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 3048 **FS Area:** W310 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12" x 12" FT (green)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12" x 24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 3049 **FS Area:** W312 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12" x 12" FT (green)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12" x 24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 3050 **FS Area:** W314 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12" x 12" FT (green)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12" x 24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 3051 **FS Area:** W318 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12" x 24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) No ACM's observed below the suspended ceiling.	**Functional Space (FS) #:** 3052 **FS Area:** W322 **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	12" x 12" FT (green)	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12" x 24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58

Date: February 16, 2007

Job #: PR-06-039

Notes:
1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area.
2) No ACM's were observed below the ceiling.

Functional Space (FS) #: 3053

FS Area: W324

Inspector: BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
		Vinyl Panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12"x24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 16, 2007 **Job #:** PR-06-039	**Notes:** 1) No access.	**Functional Space (FS) #:** 3054 **FS Area:** W321 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor																	
Walls																	
Ceiling																	
Above Ceiling																	
Other																	

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No access under carpet. 2) No access above solid ceiling. 3) No ACM's were observed in this area.	**Functional Space (FS) #:** 3055 **FS Area:** Council Chamber **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Marble	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Wood	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	12"x12" CT (FG)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 21, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 3056 **FS Area:** Council Kitchen **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	8" x 8" Ceramic Tile	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (scatter divot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Terra Cotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 21, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 3057 **FS Area:** W315 **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	2'x4' CT (strata pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A															

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 21, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area.	**Functional Space (FS) #:** 3058 **FS Area:** W311 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (strata)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 21, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 3059 **FS Area:** W307 **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (strata)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 21, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's were observed in this area. 2) All systems have fibreglass pipe & fitting insulation.	**Functional Space (FS) #:** 3060 **FS Area:** W305 & W305A **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	N/A	2'x4' CT (strata)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
Above Ceiling	N/A	Fire Proofing	Deck	N	--	--	--	--	--	--	--	--	--	Post 1986		--	--
	N/A	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	Terracotta Tile	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
	N/A	FG PI & FI	All	N	--	--	--	--	--	--	--	--	--	--		--	--
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 21, 2007 **Job #:** PR-06-039	**Notes:** 1) No access above solid ceiling due to the presence of ACM fireproofing. Type II access is required above the ceiling for this area. 2) ACM's were observed in good condition below the ceiling.	**Functional Space (FS) #:** 3061 **FS Area:** W300, West Hall **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	07	9"x 9" FT	Floor	Y	N	15% Chrysotile	77 m^2	X	--	--	X	--	--	O & M	3-1	--
	N/A	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	12" x 24" CT (metal)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM observed in this area below the ceiling. 2) No access above solid ceiling. The presence of ACM fireproofing is reported above the ceiling in this area. Type II access is required above the ceiling.	**Functional Space (FS) #:** SW01 **FS Area:** Stairwell 'F' **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	Glass	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	12"x12" CT (FG)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area below the ceiling. 2) No access above solid ceiling. The presence of ACM fireproofing is reported above the ceiling in this area. Type II access is required above the ceiling.	**Functional Space (FS) #:** SW02 **FS Area:** Stairwell 'E' **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area below the ceiling. 2) No access above solid ceiling. The presence of ACM fireproofing is reported above the ceiling in this area. Type II access is required above the ceiling.	**Functional Space (FS) #:** SW03 **FS Area:** Stairwell 'A' **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area below the ceiling. 2) No access above solid ceiling. The presence of ACM fireproofing is reported above the ceiling in this area. Type II access is required above the ceiling.	**Functional Space (FS) #:** SW04 **FS Area:** Stairwell 'D' **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area below the ceiling. 2) No access above solid ceiling. The presence of ACM fireproofing is reported above the ceiling in this area. Type II access is required above the ceiling.	**Functional Space (FS) #:** SW05 **FS Area:** Stairwell 'C' **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area below the ceiling. 2) No access above solid ceiling. The presence of ACM fireproofing is reported above the ceiling in this area. Type II access is required above the ceiling.	**Functional Space (FS) #:** SW06 **FS Area:** Stairwell 'B' **Inspector:** BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	N/A															
Other	N/A															

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** February 20, 2007 **Job #:** PR-06-039	**Notes:** 1) No ACM's observed in this area below the ceiling. 2) No access above solid ceiling. The presence of ACM fireproofing is reported above the ceiling in this area. Type II access is required above the ceiling.	**Functional Space (FS) #:** SW07 **FS Area:** Stairwell 'G' **Inspector:** BM & RT

Building Materials				ACM Assessment												Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments		Dwg. #	Photo #
								G	F	P	A	B	C				
Floor	N/A	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--		--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--		--	--
Ceiling	12	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--		--	--
Above Ceiling	N/A																
Other	N/A																

Criteria for <u>Access</u> to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for <u>Condition</u> of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58

Date: February 19, 2007

Job #: PR-06-039

Notes:
1) ACM debris (MJC elbow) is lying on the floor next to the HVAC unit. It is in intact. Remove the debris.
2) There are 12 units on the hot water heating system that require encapsulations.
3) There is 1 unit on the chiller system that requires removal.
4) There are 6 areas on the HVAC system insulation that require encapsulations.
5) Samples M58-17, M58-18 were collected here.

Functional Space (FS) #: PH01

FS Area: Penthouse

Inspector: BM & RT

Building Materials				ACM Assessment											Report Reference	
Location	Homg. Material #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	N/A	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	12	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	N/A	Concrete	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	N/A	FG PI	HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	N/A	FG PI	Roof Drain	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	MJC FI	HWH	Y	Y	15% Chrysotile	125 units	X	--	--	--	X	--	O & M	PH-01	--
	15	MJC FI	Chiller	Y	Y	15% Chrysotile	35 units	X	--	--	--	X	--	O & M	PH-01	--
	02	MJC FI	DCW	Y	Y	15% Chrysotile	21 units	X	--	--	--	X	--	O & M	PH-01	--
	02	MJC FI	Roof Drain	Y	Y	15% Chrysotile	6 units	X	--	--	--	X	--	O & M	PH-01	--
	14	DI (Styrofoam/ FG/Parging)	HVAC	Y	Y	15% Chrysotile	65 m^2	X	--	--	--	X	--	O & M	PH-01	--
	N/A	FG DI	HVAC	N	--	--	--	--	--	--	--	--	--	Re-insulated areas	--	--
	14	DI (Styrofoam/ FG/Parging)	HVAC	Y	Y	15% Chrysotile	0.9 m^2	--	--	X	--	X	--	6 encapsulations	PH-02	37, 38, 39, 40, 41, 42
	02	MJC FI	HWH	Y	Y	15% Chrysotile	12 units	--	--	X	--	X	--	12 encapsulations	PH-02	28, 29, 30, 31, 32, 33, 34, 35
	15	MJC FI	Chiller	Y	Y	15% Chrysotile	1 unit	--	--	X	--	X	--	Removal	PH-02	37
	02	ACM Debris (MJC)	Floor	Y	Y	15% Chrysotile	0.5 units	--	--	X	--	X	--	Clean-up	PH-02	43

Criteria for Access to an area containing ACM:
***A**: All building occupants may have access to this area*
***B**: Restricted to building staff only*
***C**: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Building: M-58 **Date:** March 29, 2007 **Job #:** PR-06-039	**Notes:** 1) The roof area was not inspected. 2) The exterior finish for this building is mostly newer stone finish with stucco finish in some areas. 3) Samples M58-20 (A to E) were collected in this area.	**Functional Space (FS) #:** EX01 **FS Area:** Exterior **Inspector:** BM & RT

Building Materials				**ACM Assessment**											**Report Reference**	
Location	Homg. Material #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Wall	16	Exterior Finish	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A*: All building occupants may have access to this area*
B*: Restricted to building staff only*
C*: Areas of the building behind walls or ceiling system*

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
PI: Pipe Insulation
FI: Fitting Insulation
FG: Fibreglass
DI: Duct Insulation

Functional Space Forms

The functional space form provides a general guide of information collected in each room or area of the facility and is considerate of but is not limited to the following:

(a) ***Building Materials*** - Each building material is given a description as to the location, homogenous material number, location and system;
(b) ***ACM Assessment*** - Each building material that is found to contain ACM is assessed as to friability, ACM type, quantity, condition, access and appropriate response;
(c) ***Report Reference*** - Report references to building materials with respect to drawings and photographs numbers is made available for convenience. Drawings and photographs are located in the Appendices section of this report.

Each functional space is assigned a four digit number beginning with 1001 for the first floor, 2001 for the second floor, 3001 for the third floor, and so on. Functional spaces are determined on a room-to-room or area-to-area basis Also, included on each form is: building, date, Oakhill job number, functional space area name, inspector and notes. In the notes section important additional comments are made regarding ACM found in this area, samples collected and any areas within this functional space that were considered inaccessible at the time of inspection.

The functional space form is a useful tool for the collection of survey data and communication of such data for your record keeping purposes.

Criteria for Assessing Condition of ACM

The following criteria were used for evaluating the condition of ACM:

GOOD (G): The building material has no evidence of exposed ACM and exhibits no signs of damage or deterioration

FAIR (F)**:** The building material has minor damage (less than 2%) and the potential for an airborne release of asbestos is low to moderate.

POOR (P): The building material has moderate to major damage (greater than 2%) and the potential for an airborne release of asbestos is moderate to moderate to high.

The evaluation of the potential for an airborne release of asbestos from an ACM is also considerate of fibre generating mechanisms. This involves any form of action that can cause deterioration of the ACM resulting in the generation of airborne asbestos fibres. Typical fibre generating mechanisms may include: water damage, grinding, vibration, air movement, etc. This determination is made based on the best professional judgement of the experienced inspector.

Criteria for Assessing Access to ACM

The accessibility of ACM identified was rated as:

Access A: All building occupants may have access to this area.

***Access B*:** Restricted to building staff only.

Access C: Areas of the building located behind walls or ceiling systems.

Response

Each ACM material, after all considerations, is given an appropriate response. The following is an explanation of each response that may be given:

Removal: For extensively damaged materials that cannot sustain encapsulation or materials that pose a significant potential for an airborne release and exposure to building occupants (i.e. debris). Requires immediate attention and encapsulation is not an option.

Encapsulation: Encapsulation involves the repair of damaged materials (i.e. canvas and lagging of damaged ACM pipe insulation). Materials that require encapsulation pose a potential risk of an airborne release ranging from low to high but restoration of the ACM is still a viable option. Encapsulation is not applicable if the material is severely deteriorated.

O & M Operations & Maintenance: These materials were found in good condition and should be periodically inspected.

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National Research Council
Ottawa, Ontario

September 15, 2015

Attention: Derek Foot, Construction Project Manager
Via e-mail: Derek.Foot@nrc-cnrc.gc.ca

RE: Summary Report – Project-Specific Designated Substances Survey
Ground Floor, South Wing, Building M-58, National Research Council

DST File No.: BE-OT-021545

1.0 INTRODUCTION

DST Consulting Engineers Inc. (DST) was retained by the National Research Council (NRC) to conduct a Project-Specific Designated Substances Survey (DSS) for the ground floor south wing of Building M-58, prior to planned renovation work.

The Designated Substances Report is required under the Ontario Occupational Health and Safety Act in order to identify designated substances that may be present within the project area. The Canada Labour Code also stipulates under Part II, Section 124 that every employer shall ensure that the health and safety at work of every person employed by the employer is protected. By having a DSS conducted, NRC will be able to inform his or her employees, contractors, and tenants of any designated substances that may be present and possibly disturbed throughout the planned renovation work.

DST staff completed a visual inspection of building materials for the presence of suspected designated substances and select hazardous materials in the project area on July 23, 2015.

2.0 SCOPE OF WORK

The survey implemented by DST included the 11 designated substances listed in Section 30 of the Occupational Health and Safety Act, R.S.O. 1990, Chapter 0.1. Designated Substances, as identified under the Ontario Occupational Health and Safety Act, are as follows:

- Acrylonitrile;
- Arsenic;
- Asbestos-Containing Materials (ACMs) - both friable and non-friable;
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Lead;
- Mercury;
- Silica; and
- Vinyl Chloride.

Other Hazardous Materials which are not classified as Designated Substances, but were included as part of the survey and considered pertinent due to applicable regulations, best practice guidelines and/or potential risks to human health and/or the environment, are:

- Polychlorinated Biphenyls (PCBs);
- Mould;
- Ozone-depleting substances; and
- Other hazardous materials, as deemed pertinent.

3.0 METHODOLOGY

The field program for this survey was completed by DST on July 23, 2015. The survey was limited to the ground floor south wing of M-58. The project area did not include the freight elevator, or the stairwell (the stairwell ceiling cavity was however included). Furthermore, no other areas of the building were included as part of this project-specific DSS.

A previous consultant report (referenced below) reported that asbestos-containing spray-on fireproofing is present in the building. As a precaution, DST performed all ceiling entries during the DSS using Type 2 asbestos precautions. Ambient air sampling was also performed during the DSS. A summary of the DSS and air sampling analytical results were then provided to the NRC via e-mail[1].

Materials suspected of containing designated substances were visually identified, based on the surveyor's knowledge of the historical composition of building products. Equipment that may contain polychlorinated biphenyls (e.g. electrical transformers and fluorescent light ballasts) can often be identified by examining manufacturer's labels. For safety reasons, DST personnel do not remove the ballast shields from fluorescent light fixtures to examine the ballast codes unless the electrical circuit for the lighting has been tagged and locked out by a qualified electrician. Visual identification of materials suspected to contain asbestos or lead (in paint) was supported by the collection and analysis of a limited number of representative samples, where applicable. Materials suspected of containing designated substances other than asbestos or lead (in paint) were identified by appearance, age, and knowledge of historical applications.

In Ontario, a material is defined as an Asbestos-Containing Material (ACM) if the material has a minimum asbestos content of 0.5 per cent (%) by dry weight, as O. Reg. 278/05, as amended. ACMs can be divided into two categories: friable and non-friable material. A friable ACM is a material that can be crumbled, powdered, or pulverized by hand pressure and can readily release fibres when disturbed. Common applications of friable ACMs are sprayed or trowelled surfacing materials (e.g. sprayed fireproofing and textured coatings) as well as mechanical and thermal insulation. Non-friable materials are materials that will generally release fibres only when cut or shaped. Common non-friable ACMs include vinyl floor products, caulking applications, asbestos textile products and asbestos cement products (transite). Some of these products may become friable with time or when disturbed.

Representative bulk samples of suspected ACMs were collected by DST during the site investigation. Samples were collected in order to meet the bulk sampling requirements stipulated in O.Reg. 278/05, as amended. The bulk samples were submitted to and analyzed by Steve Moody Micro Services (SMMS), LLC. SMMS is certified under the National Institute of Science

[1] E-mail to NRC Project Manager from DST, subject: BEOT021545 - M-58 Ground Floor South Wing - Summary of Project-Specific DSS and Air Monitoring Certificate of Analysis. Dated July 27, 2015.

and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) to perform asbestos bulk sample analysis (NVLAP No. 102056-0). One (1) further bulk sample, collected on August 4, 2015 by DST, was submitted to and analyzed by Paracel Laboratories Ltd. (Paracel). Paracel is an accredited laboratory through the Canadian Association for Laboratory Accreditation (CALA) and the NVLAP.

All bulk samples were analyzed using a combination of dispersion staining and polarised light microscopy (PLM). This analytical method complies with the United States Environmental Protection Agency (U.S. EPA) Method 600/R-93/116 dated July 1993, which is the regulatory approved protocol for bulk asbestos analysis in Ontario.

No paint samples were collected by DST for lead content analysis during the site investigation, as paints encountered in the project area were in good condition and sampling without matrix interference (i.e. removing the paint without the substrate material) would have proved difficult.

Selected photographs are included in Appendix A. Bulk asbestos analytical results are included in Appendix B.

4.0 BACKGROUND REPORT REVIEW

Prior to the DSS, the NRC provided DST with the following document:

- Designated Substances Survey, Building M-58, March 2007, Oakhill Environmental Inc.

DST also referenced applicable sampling results from the following report for the same building, prepared by DST:

- Summary Report – Project-Specific Designated Substances Survey, 3rd Floor Lobby Area, Building M-58, National Research Council. Dated August 4, 2015.

DST referenced any previously identified confirmed or assumed asbestos-containing materials or other designated substances as they pertained to the scope of work for this project.

5.0 FINDINGS

5.1. Asbestos

Based on previous sampling, visual observations and bulk sampling analytical results for samples collected by DST, the following materials were identified as containing regulated concentrations of asbestos in the project area:

- Approximately 1,500 square metres of friable spray-applied fireproofing, containing 90% Amosite asbestos (visually similar to previous DST sample 02A), was observed on the following:
    - Upper ceiling deck and structural beams throughout the entire project area, (project area footprint of approximately 900 m^2); and
    - As overspray on all surfaces within the project area ceiling cavities, including but not limited to, ducting, insulated piping, upper walls, electrical conduit, etc.
- Approximately 900 square metres of friable Amosite-containing fireproofing debris on the following non-asbestos ceiling materials (with associated percentage of project footprint):

plaster (25%), 1'x1' metal tiles with fibreglass backings mounted on metal tracks (70%), and 1'x1' acoustic ceiling tiles mounted on metal tracks (5%).

- Approximately 5 square metres of friable fireproofing debris was also observed on the floor of the north vertical pipe and duct chase.
- Friable Aircell pipe insulation containing 15% Chrysotile asbestos and Sweatwrap pipe insulation containing 5% Chrysotile asbestos (visually similar to previous Oakhill samples M-58-01 and M-58-04, respectively) were observed in the following areas:
    - Approximately 175 linear metres of Aircell and Sweatwrap pipe insulation were observed on piping in the ceiling cavities and risers throughout the work area.
    - Note that approximately 25 linear metres of piping with asbestos-containing insulation is assumed to be within terracotta enclosed pipe risers that were not accessible at the time of the survey.
- Pipe fittings, insulated with friable parging (also called parged fittings herein, visually similar to previous consultant sample M-58-02) containing 15% Chrysotile asbestos, were observed in the following areas:
    - Approximately 100 parged fittings were observed on piping in the ceiling cavities and risers throughout the work area.
    - Note that approximately 30 fittings are assumed to be within terracotta enclosed pipe risers that were not accessible at the time of the survey.
- Non-friable black tar, applied to the fibreglass insulation of piping and ductwork containing 3% Chrysotile asbestos (DST sample 05A), was observed in the following areas:
    - Approximately 180 square metres of tar on square rigid ductwork in the ceiling cavities of the work area.
    - Approximately 200 linear metres (total) of tar on circular fibreglass-insulated ductwork, that are located in the ceiling cavities throughout the work area.
- Non-friable floor tile mastic containing 3% Chrysotile asbestos (DST sample 03A) was noted as follows:
    - Approximately 175 square metres of remnant mastic (i.e., floor tiles removed).;
    - Approximately 475 square metres of mastic beneath carpet tiles; and
    - Approximately 60 square metres of mastic beneath non-ACM 12"x12" vinyl tiles.
- Approximately 20 square metres of non-friable green 9"x9" vinyl floor tile and associated mastic (assumed asbestos-containing) observed in office SG-04.
- Approximately 20 square metres of a non-friable smooth cementious finishing material (not stipple textured), containing 1% Chrysotile asbestos (DST sample 07A) was observed on the outer walls of the loading dock.
- Approximately 25 square metres of a concealed, non-friable mastic, tar or adhesive material, associated with cork panels within the cavity walls of the former walk-in freezer (room SG-20A), is suspected to be present and is assumed asbestos-containing unless laboratory analysis proves otherwise. This suspected ACM was not accessible without extensive demolitions.
- Non-friable cast iron drainpipe joint caulking (suspect ACM), throughout the project area.

Bulk sampling has confirmed that the following materials do not contain regulated concentrations of asbestos in the project area:

- Mortar associated with terra cotta wall tile throughout the project area (DST samples 01A-C);
- White duct sealant on foil-over-fibreglass-insulated ductwork in the far north pipe chase (DST samples 02A-C);
- Remnant vinyl sheet flooring mastic in rooms SG-26B and SG-22 (DST samples 04A-C);
- Exterior stipple textured finish on loading dock outer walls (DST samples 06A-C);
- Window and exterior wall joint caulking (DST samples 08A-C);
- Wall plaster materials (ceiling plaster is considered contaminated by fireproofing debris) (previous consultant samples M-58 14A-G and DST sample 09);
- 12”x12” Vinyl floor tiles (previous consultant samples M-58 13A-C and M-58-16A-C); and
- Exterior quartz-embedded wall finish (previous consultant samples M-58 20-A-C);

5.2. Lead

None of the paints that have been previously sampled were observed in the project area.

No paint samples were collected by DST for lead content analysis during the site investigation, as paints encountered in the project area were in good condition and sampling without matrix interference (i.e. removing the paint without the substrate material) would have proved difficult. As such, all older interior wall and ceiling paint finishes are suspected to contain lead.

Lead is suspected to be present in the following materials:

- Solder on the joints of copper pipes;
- Cast iron drain pipe joint caulking; and
- Ceramic tile glazing.

5.3. Mercury

Mercury is suspected to be present in the following equipment:

- Fluorescent light fixtures containing fluorescent light tubes were observed. Fluorescent light tubes contain mercury in a vapour form and in the phosphor coating on the lamp tube; and
- Approximately 10 tilt switches within thermostats.

5.4. Silica

Based on the historical composition of building materials, silica is expected to be present in:

- 1’x1’ ceiling tiles;
- Drywall;
- Terracotta brick and mortar;
- Plaster;
- Ceramic tiles, mortars, and grout;
- Brick and mortar; and

- Concrete materials.

5.5. Polychlorinated Biphenyls (PCBs)

Polychlorinated Biphenyls (PCBs) are hazardous chemicals which were used in the manufacturing of a variety of equipment, such as electrical equipment, heat exchangers, hydraulic systems, and for several other specialized applications. PCBs are commonly found within electrical ballasts manufactured prior to 1981, found within fluorescent light fixtures and high intensity discharge lamps.

Light fixtures with T12 lamps are more likely to contain ballasts that were manufactured prior to 1981. T8 lamps are associated with light fixtures that were manufactured after the phase-out of PCB-containing ballasts. The letter "T" denotes the shape of the light fixture (e.g. tubular) and the number which follows indicates the diameter in eights of an inch.

DST did not disassemble light fixtures in the project area. Based on limited visual observations, the fluorescent light fixtures throughout the project area were observed to contain T12 lamps, which are suspected to contain PCB-containing ballasts.

5.6. Ozone-Depleting Substances (ODSs)

A floor-mounted compressor, located in room SG-20 and associated with the former walk-in freezer, contains Refrigerant 20 (R-20, quantity could not be verified as tags were corroded.)

5.7. Other Designated Substances and Hazardous Materials

The following Designated Substances and Hazardous Materials were neither observed, nor suspected of being present, in forms or quantities that would impact the renovation work:

- Acrylonitrile;
- Arsenic;
- Benzene;
- Coke Oven Emissions;
- Ethylene Oxide;
- Isocyanates;
- Vinyl Chloride; and
- Mould

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the site investigation, sampling and analysis, the following Designated Substances are present in forms and quantities expected to have a measurable impact on the ground floor south wing renovation project at Building M-58:

- Asbestos;
- Lead;
- Mercury;
- Silica;
- PCBs; and

- ODSs.

DST's recommendations for each material, which are based upon both regulatory compliance and best practice guidelines, are included in the following sections below.

6.1. Asbestos

The disturbance of asbestos-containing materials on construction and demolition projects in the province of Ontario is governed by *O. Reg. 278/05, Asbestos on Construction Projects and in Buildings and Repair Operations* enabled under the *Occupational Health and Safety Act (R.S.O. 1990, Chapter 0.1),* as amended. This regulation classifies all asbestos disturbances as either Low Risk (Type 1), Moderate Risk (Type 2), or High Risk (Type 3), each of which has defined precautionary measures. All asbestos materials are subject to specific handling and disposal precautions, and must be removed prior to demolition or renovation. The Ontario Ministry of Labour (MOL) must be notified of any project involving removal of more than a minor amount (e.g. typically one square metre) of friable asbestos material.

The removal or disturbance of 1 square metre or less of friable asbestos-containing material must be conducted using a minimum of Type 2 asbestos precautionary measures. The removal or disturbance of greater than 1 square metre of friable ACMs must be conducted using Type 3 asbestos precautionary measures. It should be noted that:

- Porous materials or any material which cannot or have not been satisfactorily decontaminated that is contaminated in any way by asbestos-containing fireproofing, overspray, debris or otherwise, whether itself confirmed asbestos-containing or not, must be considered as containing Amosite asbestos, and be handled and disposed of accordingly; and
- Pipe fitting insulation can be removed using Type 2 glove bag procedures, provided the pipe fittings are in good condition, and the work is performed in accordance with the requirements of O.Reg 278/05, as amended. Note that a proper seal must be maintained and that glove bag procedures cannot be used for piping that is covered in asbestos-containing fireproofing overspray.

Type 3 asbestos abatement precautionary measures will be required during any disturbance, removal and replacement of the ducting in the project area, due to the presence of asbestos-containing fireproofing within the building and project area.

The removal or disturbance of non-friable asbestos-containing materials can be completed using Type 1 asbestos precautionary measures, provided the material is wetted and only non-powered hand-held tools are used. If these conditions cannot be met, than more stringent (Type 2 or Type 3) procedures are required.

The time weight average exposure limit (TWAEL) for airborne asbestos is prescribed by Ontario Regulation 490/09 *Designated Substances*, as amended. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne asbestos levels that exceed this TWAEL.

The following recommendations apply to ACMs:

1. In general, materials must be maintained in good condition;

2. The condition of material(s) identified in this report must be inspected at least annually, and this record must be updated accordingly;
3. Appropriate work procedures and precautionary measures must be used, as outlined in O. Reg. 278/05, as amended, when performing work that may disturb ACMs or suspected ACMs, including prior to building demolition;
4. If ACMs or suspected ACMs become damaged and worker exposure to the material is likely to occur, the damaged material must be repaired or removed following work procedures outlined in O. Reg. 278/05, as amended; and
5. Disposal of asbestos waste is controlled by the Ontario Environmental Protection Act, R.R.O., 1990, Regulation 347, *General – Waste Management,* as amended. This regulation requires that asbestos waste be sealed in double containers resistant to puncture and tears, and appropriately labelled. The waste must be disposed at a licensed waste disposal site. Proper notification must be issued to the site representative prior to transportation of waste. The transport of the waste to the disposal site is controlled by the federal *Transportation of Dangerous Goods Act*, 1992 (TDGA).

Although every attempt was made to look above false ceilings and into wall cavity hatches, some ACMs may be concealed and thus not observed at the time of the survey. Should any previously unidentified suspect ACMs be encountered as part of future work, these materials are to be treated as ACMs and handled accordingly, unless sampling proves otherwise.

Although every attempt was made to look beneath existing floor finishes, old floor finishes may exist under current finishes that may not have been accessible or visible at the time of the site visit. If additional old floor finishes are encountered during future work, these materials should be assumed to contain asbestos, unless laboratory sampling proves otherwise.

Materials that have not been analyzed, but are visibly similar to other materials identified as asbestos-containing, must be considered asbestos-containing unless proven otherwise by laboratory analysis.

6.2. Lead

The Occupational Health and Safety Branch of the Ontario MoL has published *Guideline: Lead on Construction Projects*. This document classifies all lead disturbances as Type 1, Type 2a, Type 2b, Type 3a or Type 3b work, and assigns different levels of respiratory protection and work procedures for each classification. In the absence of specific legislation for lead on construction projects, this guideline should be followed when disturbing lead-containing materials.

Paints containing elevated concentrations of lead can pose a health risk to humans if ingested or inhaled. Such lead paints are also a risk to the environment with the potential to contaminate soil and groundwater. Paints with elevated lead content can also pose a health risk to workers while completing renovations within the building.

Although the Federal Canada Consumer Product Safety Act's *Surface Coating Materials Regulations SOR/2005-109*, as amended, has set a limit of 90 ppm for surface coating materials, there may be a potential for exposure to high levels of lead depending on the activities performed that disturb the lead-containing materials, even at low lead concentrations. Conducting a risk assessment to assess the potential for exposure should be performed to determine the need to follow procedures such as those in the MoL guideline referenced above.

The TWAEL for airborne lead is prescribed by Ontario Regulation 490/09 *Designated Substances*, as amended. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne lead levels that exceed this TWAEL.

DST recommends that any future disturbance of lead-containing materials avoid operations that generate high levels of dust (e.g. sanding, grinding) and that should these operations be required, appropriate precautionary measures be implemented for worker exposure.

The disposal of construction waste containing lead is governed by O. Reg. 347/90 - General – Waste Management, as amended. The transport of the waste to the disposal site is controlled by the federal Transportation of Dangerous Goods Act (TDGA), 1992.

If required at some future date to accommodate work, the following procedures are appropriate for other materials containing lead:

- Copper piping and cast iron joint caulking can be cut a small distance (e.g. 50 mm) from the joints to avoid direct disturbance of suspected lead solder and caulking; and
- Ceramic tiles can be removed using Type 1 work procedures and respiratory protection provided that only non-powered hand tools are used.

6.3. Mercury

There are no regulations that specifically govern the disturbance of mercury on construction projects. However, the Occupational Health and Safety Division of the Ontario MoL has published *The Safe Handling of Mercury: A Guide for the Construction Industry*. This document provides advice on how to reduce the risk of mercury exposure, and outlines clean-up methods for spills. In the absence of specific legislation for mercury on construction projects, this guideline would serve as a reasonable, peer reviewed standard for work procedures.

When the removal of fluorescent light tubes is required, the tubes should be removed intact from the fixtures. This prevents worker exposure to mercury vapour, particularly if the tube was energized shortly before removal. Thermostats containing liquid mercury can be removed in the same fashion.

The TWAEL for mercury is prescribed by Ontario Regulation 490/09 *Designated Substances*, as amended. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne mercury levels that exceed this exposure limit.

Liquid mercury is classified as a hazardous waste under O. Reg. 347/90, as amended. The transport of the waste to a disposal site is controlled by O. Reg. 347/90 and by the federal TDGA. It is now common practice to recycle fluorescent light tubes and avoiding the generation of hazardous waste.

6.4. Silica

The Occupational Health and Safety Branch of the Ontario Ministry of Labour have published *Guideline: Silica on Construction Projects*. This document classifies all silica disturbances as Type 1, Type 2 or Type 3 work, and assigns different levels of respiratory protection and work procedures for each classification.

The TWAEL for airborne silica is prescribed by Ontario Regulation 490/09 *Designated Substances*, as amended. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne silica levels that exceed this exposure limit.

As a general rule, it is preferable to use more stringent dust suppression techniques and engineering controls as opposed to relying on respiratory protection to control worker exposure. Respiratory protection should only be relied on as a last resort when dust suppression techniques and engineering controls fail to control worker.

6.5. Polychlorinated Biphenyls (PCBs)

Ballasts that may be encountered in the building are suspected to contain PCBs. Prior to removal or disposal, the PCB content of equipment must be confirmed to determine proper procedures to be followed. When the light fixtures are taken out of service, the ballasts should be examined to determine whether they contain PCBs. This can be done by comparing the manufacturer date codes stamped on the ballasts to information contained in the document titled Identification of Lamp Ballasts Containing PCBs, published by Environment Canada. Ballasts that contain PCBs must be packaged, transported and disposed of in accordance with all appropriate provincial and federal regulations.

O. Reg. 347, General – Waste Management, as amended, is regulated under the Environmental Protection Act to regulate the handling, storage and transportation of hazardous substances and waste dangerous goods. The transport of PCB waste to the disposal site is controlled by the federal Transportation of Dangerous Goods Act, 1992. Proper notification must be issued to the site representative prior to transportation of waste. Use, storage, labelling, and reporting requirements are also outlined within the federal PCB Regulation under the Canadian Environmental Protection Act (CEPA).

6.6. Ozone-Depleting Substances (ODSs)

The handling, transport and disposal of ODSs is governed by the following:

- *Ozone-depleting Substances Regulations, 1998, as amended;*
- *O.Reg 463/10, Ozone Depleting Substances and Other Halocarbons;*
- *O.Reg 238/01, Refrigerants; and*
- *Federal Halocarbon Regulations, 2003 (FHR).*

Suspect ODS were observed in the following equipment:

- A floor-mounted compressor, located in room SG-20 and associated with the former walk-in freezer, contains Refrigerant 20.

When this unit is taken out of service, the ODS refrigerants must be captured and reclaimed by a licensed technician. Appropriate records of equipment decommissioning must be maintained in accordance with requirements of the FHR.

7.0 CLOSURE

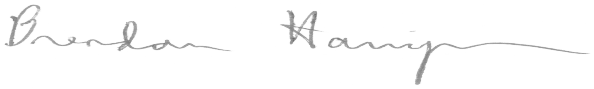
A Limitations of Report section, which forms an integral part of this report, is attached.

We trust that the information contained herein meets your needs. Should you have any questions or comments, please do not hesitate to contact us.

DST CONSULTING ENGINEERS INC.

for

Nicolas Strang, C.Tech.
Project Manager
nstrang@dstgroup.com



Brendan Harrigan, P.Eng.
Senior Principal
bharrigan@dstgroup.com

LIMITATIONS OF REPORT

This report is intended for client use only. Any use of this document by a third party, or any reliance on or decisions made based on the findings described in this report, are the sole responsibility of such third parties, and DST Consulting Engineers Inc. accepts no responsibility for damages, suffered by any third party as a result of decisions made or actions conducted based on this report. No other warranties are implied or expressed.

The data, conclusions and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by the client. The sampling program included asbestos bulk sampling in select representative areas for laboratory analysis. There is a practical limitation on the number of intrusive test cuts that can be made and the number of samples that can be collected in an occupied building. This requires the investigator to extrapolate observations and analytical results between test cut locations. The uncertainty, and inherent risk, associated with this necessity increases with the distance between sampling locations. Note, however, that no scope of work, no matter how exhaustive, can guarantee to identify all contaminants. This report therefore cannot warranty that all building conditions are represented by those identified at specific locations.

Recommendations, when included, are made in good faith and are based on several successful experiences.

Any recommendations and conclusions provided that are based on conditions or assumptions reported herein will inherently include any uncertainty associated with those conditions or assumptions.

Note also that standards, guidelines and practices related to environmental investigations may change with time. Those which were applied at the time of this investigation may be obsolete or unacceptable at a later date.

Any comments given in this report on potential remediation problems and possible methods are intended only for the guidance of the designer. The scope of work may not be sufficient to determine all of the factors that may affect construction, clean-up methods and/or costs. Contractors bidding on this project or undertaking clean-ups should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the conditions may affect their work.

Any results from an analytical laboratory or other subcontractor reported herein have been carried out by others, and DST Consulting Engineers Inc. cannot warranty their accuracy. Similarly, DST cannot warranty the accuracy of information supplied by the client.

APPENDIX A

Select Photographs

Photo 1: Pipe runs insulated with asbestos-containing Sweatwrap and parged fittings were observed in a pipe chase, accessible via a wall hatch in office G-002.

Photo 2: Pipe runs insulated with asbestos-containing Aircell and Sweatwrap, with parged fittings were observed throughout the ceiling cavity of the loading dock.

Photo 3: Spray-applied fireproofing was observed on the ceiling deck and structural beams throughout the ground floor south wing. Overspray and debris were also observed throughout.

Photo 4: Spray-applied fireproofing was observed on the ceiling deck and structural beams throughout the ground floor south wing. Overspray and debris were also observed throughout.

Photo 5: Spray-applied fireproofing was observed on the ceiling deck and structural beams throughout the ground floor south wing. Overspray and debris were also observed throughout.

Photo 6: Spray-applied fireproofing was observed on the ceiling deck and structural beams throughout the ground floor south wing. Overspray and debris were also observed throughout.

Photo 7: Black tar, observed on pipe straights, fittings and ducting, was identified as containing 3% Chrysotile asbestos.

Photo 8: Approximately 20 square metres of a non-friable smooth cementious finishing material (not stipple textured), containing 1% Chrysotile asbestos (DST sample 07A) was observed on the outer walls of the loading dock.

APPENDIX B

Laboratory Certificate of Analysis – Asbestos
Samples Collected by DST, 2015

PLM Summary Report

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

NVLAP Lab Code 102056-0
TDSHS License No. 30-0084

Client :	DST Consulting Engineers Inc - Ottawa, ON	Lab Job No. :	15B-09592
Project :	M-58 Ground Floor, South Wing Project - Specific DSS	Report Date :	08/03/2015
Project # :	BE-OT-021545	Sample Date :	07/23/2015
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA Method 600 / R-93 / 116		

On 7/28/2015, twenty four (24) bulk material samples were submitted by Nick Strang of DST Consulting Engineers Inc - Ottawa, ON for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

Sample Number	Client Sample Description / Location	Asbestos Content
01A	Terra Cotta Mortar	None Detected - Mortar
01B	Terra Cotta Mortar	None Detected - Mortar
01C	Terra Cotta Mortar	None Detected - Mortar
02A	Sealant (White), Foil-Covered Fiberglass Duct	None Detected - Sealant
02B	Sealant (White), Foil-Covered Fiberglass Duct	None Detected - Sealant
02C	Sealant (White), Foil-Covered Fiberglass Duct	None Detected - Sealant
03A	Remnant Vinyl Floor Tile Mastic, Offices	<0.5% Chrysotile - Black Mastic
03B	Remnant Vinyl Floor Tile Mastic, Offices	3% Chrysotile - Black Mastic
03C	Remnant Vinyl Floor Tile Mastic, Offices	Not Analyzed - Positive Stop
04A	Remnant Vinyl Sheet Flooring Mastic, Loading Dock Offices	None Detected - Clear Mastic None Detected - Leveling Compound None Detected - Floor Material None Detected - Black Mastic
04B	Remnant Vinyl Sheet Flooring Mastic, Loading Dock Offices	None Detected - Clear Mastic None Detected - Floor Material None Detected - Black Mastic
04C	Remnant Vinyl Sheet Flooring Mastic, Loading Dock Offices	None Detected - Clear Mastic None Detected - Floor Material None Detected - Black Mastic
05A	Tar on Fiberglass Piping	None Detected - Thermal Insulation None Detected - Paper Wrap None Detected - Glass Fiber Mesh 3% Chrysotile - Black Mastic
05B	Tar on Fiberglass Piping	None Detected - Thermal Insulation None Detected - Paper Wrap Layer Not Analyzed - Positive Stop

PLM Summary Report

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

NVLAP Lab Code 102056-0
TDSHS License No. 30-0084

Client :	DST Consulting Engineers Inc - Ottawa, ON	Lab Job No. :	15B-09592
Project :	M-58 Ground Floor, South Wing Project - Specific DSS	Report Date :	08/03/2015
Project # :	BE-OT-021545	Sample Date :	07/23/2015
Identification :	Asbestos, Bulk Sample Analysis		
Test Method :	Polarized Light Microscopy / Dispersion Staining (PLM/DS) EPA Method 600 / R-93 / 116		

On 7/28/2015, twenty four (24) bulk material samples were submitted by Nick Strang of DST Consulting Engineers Inc - Ottawa, ON for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

Sample Number	Client Sample Description / Location	Asbestos Content
05C	Tar on Fiberglass Piping	None Detected - Thermal Insulation None Detected - Paper Wrap None Detected - Glass Fiber Mesh Layer Not Analyzed - Positive Stop
06A	Exterior Finish (Stippled), Loading Dock Wall	None Detected - Lower Plaster None Detected - Upper Plaster
06B	Exterior Finish (Stippled), Loading Dock Wall	None Detected - Lower Plaster None Detected - Upper Plaster
06C	Exterior Finish (Stippled), Loading Dock Wall	None Detected - Lower Plaster None Detected - Upper Plaster
07A	Exterior Finish (Smooth Parged), Loading Dock Wall	1% Chrysotile - Plaster
07B	Exterior Finish (Smooth Parged), Loading Dock Wall	Not Analyzed - Positive Stop
07C	Exterior Finish (Smooth Parged), Loading Dock Wall	Not Analyzed - Positive Stop
08A	Exterior Window and Wall Joint Caulking	None Detected - Caulking
08B	Exterior Window and Wall Joint Caulking	None Detected - Caulking
08C	Exterior Window and Wall Joint Caulking	None Detected - Caulking

NVLAP LAB #102056-0

Analyst(s): Beverly Lorenzana

Lab Manager : Heather Lopez — Approved Signatory : Heather Lopez

Lab Director : Bruce Crabb — Approved Signatory : Bruce Crabb

Moody Labs
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

PLM Detail Report

Supplement to PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 30-0084

Client : DST Consulting Engineers Inc - Ottawa, ON
Project : M-58 Ground Floor, South Wing Project - Specific DSS
Project # : BE-OT-021545

Lab Job No. : 15B-09592
Report Date : 08/03/2015

Sample Number	Layer	% Of Sample	Components	% of Layer	Analysis Date	Analyst
01A	Mortar (Light Grey)	100%	Aggregate	65%	08/03	BL
			Cement Binders	35%		
01B	Mortar (Light Grey)	100%	Aggregate	65%	08/03	BL
			Cement Binders	35%		
01C	Mortar (Light Grey)	100%	Aggregate	65%	08/03	BL
			Cement Binders	35%		
02A	Sealant (White)	100%	Calcite	50%	08/03	BL
			Binders / Fillers	50%		
02B	Sealant (White)	100%	Calcite	50%	08/03	BL
			Binders / Fillers	50%		
02C	Sealant (White)	100%	Calcite	50%	08/03	BL
			Binders / Fillers	50%		
03A	Black Mastic (Black)	100%	Chrysotile	<0.5 %	08/03	BL
			Glue / Tar Binders	100%		
03B	Black Mastic (Black)	100%	Chrysotile	3%	08/03	BL
			Glue / Tar Binders	97%		
03C	Not Analyzed - Positive Stop	100%			08/03	BL
04A	Clear Mastic (Clear)	20%	Glue Binders	100%	08/03	BL
	Leveling Compound (Grey)	58%	Cellulose Fibers	5%		
			Calcite / Binders	95%		
	Floor Material (Grey)	20%	Vinyl Binders	100%		
	Black Mastic (Black)	2%	Tar Binders	100%		
04B	Clear Mastic (Clear)	25%	Glue Binders	100%	08/03	BL
	Floor Material (Grey)	70%	Vinyl Binders	100%		
	Black Mastic (Black)	5%	Tar Binders	100%		
04C	Clear Mastic (Clear)	25%	Glue Binders	100%	08/03	BL
	Floor Material (Grey)	70%	Vinyl Binders	100%		
	Black Mastic (Black)	5%	Tar Binders	100%		

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PLM Detail Report

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Client : DST Consulting Engineers Inc - Ottawa, ON
Project : M-58 Ground Floor, South Wing Project - Specific DSS
Project # : BE-OT-021545

Lab Job No. : 15B-09592
Report Date : 08/03/2015

Sample Number	Layer	% Of Sample	Components	% of Layer	Analysis Date	Analyst
05A	Thermal Insulation (Yellow)	25%	Mineral Wool Fibers	95%	08/03	BL
			Resin Binders	5%		
	Paper Wrap (Tan)	25%	Cellulose Fibers	100%		
	Glass Fiber Mesh (White)	25%	Glass Wool Fibers	100%		
	Black Mastic (Black)	25%	Chrysotile	3%		
			Mineral Grains	30%		
			Tar Binders	67%		
05B	Thermal Insulation (Yellow)	25%	Mineral Wool Fibers	95%	08/03	BL
			Resin Binders	5%		
	Paper Wrap (Tan)	25%	Cellulose Fibers	100%		
	Layer Not Analyzed - Positive Stop	50%				
05C	Thermal Insulation (Yellow)	25%	Mineral Wool Fibers	95%	08/03	BL
			Resin Binders	5%		
	Paper Wrap (Tan)	25%	Cellulose Fibers	100%		
	Glass Fiber Mesh (White)	25%	Glass Wool Fibers	100%		
	Layer Not Analyzed - Positive Stop	25%				
06A	Lower Plaster (Grey)	5%	Aggregate	65%	08/03	BL
			Calcite / Binders	35%		
	Upper Plaster (White)	95%	Aggregate	65%		
			Calcite / Binders	35%		
06B	Lower Plaster (Grey)	15%	Aggregate	65%	08/03	BL
			Calcite / Binders	35%		
	Upper Plaster (White)	85%	Aggregate	65%		
			Calcite / Binders	35%		
06C	Lower Plaster (Grey)	15%	Aggregate	65%	08/03	BL
			Calcite / Binders	35%		
	Upper Plaster (White)	85%	Aggregate	65%		
			Calcite / Binders	35%		

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Farmers Branch, TX 75234 Phone: (972) 241-8460

PLM Detail Report

Supplement to PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 30-0084

Client : DST Consulting Engineers Inc - Ottawa, ON
Project : M-58 Ground Floor, South Wing Project - Specific DSS
Project # : BE-OT-021545

Lab Job No. : 15B-09592
Report Date : 08/03/2015

Sample Number	Layer	% Of Sample	Components	% of Layer	Analysis Date	Analyst
07A	Plaster (Grey)	100%	Chrysotile	1%	08/03	BL
			Aggregate	64%		
			Calcite / Binders	35%		
07B	Not Analyzed - Positive Stop	100%			08/03	BL
07C	Not Analyzed - Positive Stop	100%			08/03	BL
08A	Caulking (Light Grey)	100%	Calcite	40%	08/03	BL
			Binders / Fillers	60%		
08B	Caulking (Light Grey)	100%	Calcite	40%	08/03	BL
			Binders / Fillers	60%		
08C	Caulking (Light Grey)	100%	Calcite	40%	08/03	BL
			Binders / Fillers	60%		

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Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)

203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Nicolas Strang

Phone: (613) 748-1415
Fax: (613) 748-1356

Client PO:
Project: BE OT 021545
Custody:

Report Date: 7-Aug-2015
Order Date: 4-Aug-2015

Order #: 1532129

This Certificate of Analysis contains analytical data applicable to the following samples as submitted :

Paracel ID	Client ID
1532129-01	09

Approved By:

Heather S.H. McGregor, BSc
Laboratory Director - Microbiology

PARACEL LABORATORIES LTD.

Client:	DST Consulting Engineers Inc. (Ottawa) 203-2150 Thurston Dr. Ottawa, ON K1G 5T9	**Attn:**	Nicolas Strang Tel: (613) 748-1415 Fax: (613) 748-1356
Project:	BE OT 021545	**Received Date:**	04-Aug-15
Paracel Report No.:	1532129	**Report Date:**	07-Aug-15

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Paracel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1532129-01	04-Aug-15	sample homogenized	White/Grey	Plaster	No	Client ID: 09 [ASLYR, AS-PRE]	
						Non-Fibers	99
						Other fibers	1

MMVF: Man Made Vitreous Fibers: Fiberglass, Mineral Wool, Rockwool, Glasswool

Analytes in bold indicate asbestos content which may include:

Actinolite, Amosite, Anthophyllite, Chrysotile, Crocidolite and/or Tremolite.

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	Ottawa West Lab	200812-0	5-Aug-15

** Reference to the NVLAP term does not permit the user of this report to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government*

Report Notes

ASLYR	Layers were noted for this sample, however, the entire sample was homogenized per client request.
AS-PRE	Due to the difficult nature of the bulk sample (interfering fibers/binders), additional NOB preparation was required prior to analysis

Work Order Revisions / Comments

None

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Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name: DST Consulting Engineers	Project Reference: BEG021545
Contact Name: Nick Strang	Quote #:
Address: 2150 Thurston Drive, Ottawa, ON	PO #:
Telephone: 613 748 1415	Email Address: nstrang@dstgroup.com

TAT: ☑ Regular ☐ 3 Day ☐ 2 Day ☐ 1 Day ☐ Same Day
Date Required: _____

ASBESTOS ANALYSIS

Matrix: ☐ Air ☑ Other Regulatory Guideline: _____

Required Analyses: ☐ PCM ☑ PLM ☐ PLM 400PC ☐ PLM 1000PC ☐ Chatfield ☐ TEM

Paracel Order Number: 1532129

	Sample ID	Matrix Description	Sampling Date	Air Volume (L)	Positive Stop? (Y/N)	Is the Sample Layered? (Y/N)	If layered, Describe Layer(s) to be Analyzed Separately* or Homogenize all **
1	09	Plaster	4/8/15	N/A	N	N	Homogenize
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

* Each layer is charged as a separate analysis ** Homogenize = Sample is combined to a uniform mixture

Comments:

Method of Delivery: Walk in

Relinquished By (Sign):	Received at Depot:	Received at Lab:	Verified By:
Relinquished By (Print): N. Strang		Kaun Gill	Kaun Gill
Date/Time: 4/8/15	Date/Time: Aug 4, 15 2:19	Date/Time: Aug 5/15 9:00	Date/Time: Aug 5/15 9:31

TP1 Amount Payable – General

1.1 Subject to any other provisions of the contract, Her Majesty shall pay the Contractor, at the times and in the manner hereinafter set out, the amount by which

1.1.1 the aggregate of the amounts described in TP2 exceeds

1.1.2 the aggregate of the amounts described in TP3

and the Contractor shall accept that amount as payment in full satisfaction for everything furnished and done by him in respect of the work to which the payment relates.

TP2 Amounts Payable to the Contractor

2.1 The amounts referred to in TP1.1.1 are the aggregate of

2.1.1 the amounts referred to in the Articles of Agreement, and

2.1.2 the amounts, if any, that are payable to the Contractor pursuant to the General Conditions.

TP3 Amounts Payable to Her Majesty

3.1 The amounts referred to in TP1.1.2 are the aggregate of the amounts, in any, that the Contractor is liable to pay Her Majesty pursuant to the contract.

3.2 When making any payments to the Contractor, the failure of Her Majesty to deduct an amount referred to in TP3.1 from an amount referred to in TP2 shall not be constitute a waiver of the right to do so, or an admission of lack of entitlement to do so in any subsequent payment to the Contractor.

TP4 Time of Payment

4.1 In these Terms of Payment

4.1.1 The "payment period" means a period of 30 consecutive days or such other longer period as is agreed between the Contractor and the Departmental Representative.

4.1.2 An amount is "due and payable" when it is due and payable by Her Majesty to the Contractor according to TP4.4, TP4.7 or TP4.10.

4.1.3 An amount is overdue when it is unpaid on the first day following the day upon which it is due and payable.

4.1.4 The "date of payment" means the date of the negotiable instrument of an amount due and payable by the Receiver General for Canada and given for payment.

4.1.5 The "Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the opening of business on the date of payment.

4.2 The Contractor shall, on the expiration of a payment period, deliver to the Departmental Representative in respect of that payment period a written progress claim that fully describes any part of the work that has been completed, and any material that was delivered to the work site but not incorporated into the work during that payment period.

4.3 The Departmental Representative shall, not later than ten days after receipt by him of a progress claim referred to in TP4.2,

4.3.1 inspect the part of the work and the material described in the progress claim; and

4.3.2 issue a progress report, a copy of which the Departmental Representative will give to the Contractor, that indicates the value of the part of the work and the material described in the progress claim that, in the opinion of the Departmental Representative,

4.3.2.1 is in accordance with the contract, and

4.3.2.2 was not included in any other progress report relating to the contract.

4.4 Subject to TP1 and TP4.5 Her Majesty shall, not later than 30 days after receipt by the Departmental Representative of a progress claim referred to in TP4.2, pay the Contractor

4.4.1 an amount that is equal to 95% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has been furnished by the Contractor, or

4.4.2 an amount that is equal to 90% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has not been furnished by the Contractor.

4.5 It is a condition precedent to Her Majesty's obligation under TP4.4 that the Contractor has made and delivered to the Departmental Representative,

4.5.1 a statutory declaration described in TP4.6 in respect of a progress claim referred to in TP4.2,

4.5.2 in the case of the Contractor's first progress claim, a construction schedule in accordance with the relevant sections of the Specifications, and

4.5.3 if the requirement for a schedule is specified, an update of the said schedule at the times identified in the relevant sections of the Specifications.

4.6 A statutory declaration referred to in TP4.5 shall contain a deposition by the Contractor that

4.6.1 up to the date of the Contractor's progress claim, the Contractor has complied with all his lawful obligations with respect to the Labour Conditions; and

4.6.2 up to the date of the Contractor's immediately preceding progress claim, all lawful obligations of the Contractor to subcontractors and suppliers of material in respect of the

work under the contract have been fully discharged.

4.7 Subject to TP1 and TP4.8, Her Majesty shall, not later than 30 days after the date of issue of an Interim Certificate of Completion referred to in GC44.2, pay the Contractor the amount referred to in TP1 less the aggregate of

4.7.1 the sum of all payments that were made pursuant to TP4.4;

4.7.2 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty or rectifying defects described in the Interim Certificate of Completion; and

4.7.3 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty of completing the parts of the work described in the Interim Certificate of Completion other than the defects referred to in TP4.7.2.

4.8 It is a condition precedent to Her Majesty's obligation under TP4.7 that the Contractor has made and delivered to the Departmental Representative,

4.8.1 a statutory declaration described in TP4.9 in respect of an Interim Certificate of Completion referred to in GC44.2, and

4.8.2 if so specified in the relevant sections of the Specifications, and update of the construction schedule referred to in TP4.5.2 and the updated schedule shall, in addition to the specified requirements, clearly show a detailed timetable that is acceptable to the Departmental Representative for the completion of any unfinished work and the correction of all defects.

4.9 A statutory declaration referred to in TP4.8 shall contain a deposition by the contractor that up to the date of the Interim Certificate of Completion the Contractor has

4.9.1 complied with all of the Contractor's lawful obligations with respect to the Labour Conditions;

4.9.2 discharged all of the Contractor's lawful obligations to the subcontractors and suppliers of material in respect of the work under the contract; and

4.9.3 discharged the Contractor's lawful obligations referred to in GC14.6.

4.10 Subject to TP1 and TP4.11, Her Majesty shall, not later than 60 days after the date of issue of a Final Certificate of Completion referred to in GC44.1, pay the Contractor the amount referred to in TP1 less the aggregate of

4.10.1 the sum of all payments that were made pursuant to TP4.4; and

4.10.2 the sum of all payments that were made pursuant to TP4.7.

4.11 It is a condition precedent to Her Majesty's obligation under TP4.10 that the Contractor has made and delivered a statutory declaration described in TP4.12 to the Departmental Representative.

4.12 A statutory declaration referred to in TP4.11 shall, in addition to the depositions described in TP4.9, contain a deposition by the Contractor that all of the Contractor's lawful obligations and any lawful claims against the Contractor that arose out of the performance of the contract have been discharged and satisfied.

TP5 Progress Report and Payment Thereunder Not Binding on Her Majesty

5.1 Neither a progress report referred to in TP4.3 nor any payment made by Her Majesty pursuant to these Terms of Payment shall be construed as an admission by Her Majesty that the work, material or any part thereof is complete, is satisfactory or is in accordance with the contract.

TP6 Delay in Making Payment

6.1 Nothwithstanding GC7 any delay by Her Majesty in making any payment when it is due pursuant to these Terms of Payment shall not be a breach of the contract by Her Majesty.

6.2 Her Majesty shall pay, without demand from the Contractor, simple interest at the Bank Rate plus 1 -1/4 per centum on any amount which is overdue pursuant to TP4.1.3, and the interest shall apply from and include the day such amount became overdue until the day prior to the date of payment except that

6.2.1 interest shall not be payable or paid unless the amount referred to in TP6.2 has been overdue for more that 15 days following

6.2.1.1 the date the said amount became due and payable, or

6.2.1.2 the receipt by the Departmental Representative of the Statutory Declaration referred to in TP4.5, TP4.8 or TP4.11,

whichever is the later, and

6.6.2 interest shall not be payable or paid on overdue advance payments if any.

TP7 Right of Set-off

7.1 Without limiting any right of set-off or deduction given or implied by law or elsewhere in the contract, Her Majesty may set off any amount payable to Her Majesty by the Contractor under this contract or under any current contract against any amount payable to the Contractor under this contract.

7.2 For the purposes of TP7.1, "current contract" means a contract between Her Majesty and the Contractor

7.2.1 under which the Contractor has an undischarged obligation to perform or supply work, labour or material, or

7.2.2 in respect of which Her Majesty has, since the date of which the Articles of Agreement were made, exercised any right to take the work that is the subject of the contract out of the Contractor's hands.

TP8 Payment in Event of Termination

8.1 If the contract is terminated pursuant to GC41, Her Majesty shall pay the Contractor any amount that is lawfully due and payable to the Contractor as soon as is practicable under the circumstances.

TP9 Interest on Settled Claims

9.1 Her Majesty shall pay to the Contractor simple interest on the amount of a settled claim at an average Bank Rate plus 1 ¼ per centum from the date the settled claim was outstanding until the day prior to the date of payment.

9.2 For the purposes of TP9.1,

9.2.1 a claim is deemed to have been settled when an agreement in writing is signed by the Departmental Representative and the Contractor setting out the amount of the claim to be paid by Her Majesty and the items or work for which the said amount is to be paid.

9.2.2 an "average Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the end of each calendar month averaged over the period the settled claim was outstanding.

9.2.3 a settled claim is deemed to be outstanding from the day immediately following the date the said claim would have been due and payable under the contract had it not been disputed.

9.3 For the purposes of TP9 a claim means a disputed amount subject to negotiation between Her Majesty and the Contractor under the contract.

GC1 Interpretation

1.1 In the contract

1.1.1 where reference is made to a part of the contract by means of numbers preceded by letters, the reference shall be construed to be a reference to the particular part of the contract that is identified by that combination of letters and numbers and to any other part of the contract referred to therein;

1.1.2 "contract" means the contract document referred to in the Articles of Agreement;

1.1.3 "contract security" means any security given by the Contractor to Her Majesty in accordance with the contract;

1.1.4 "Departmental Representative" means the officer or employee or Her Majesty who is designated pursuant to the Articles of Agreement and includes a person specially authorized by him to perform, on his behalf, any of his functions under the contract and is so designated in writing to the Contractor;

1.1.5 "material" includes all commodities, articles and things required to be furnished by or for the Contractor under the contract for incorporation into the work;

1.1.6 "Minister" includes a person acting for, or if the office is vacant, in place of the Minister and his successors in the office, and his or their lawful deputy and any of his or their representatives appointed for the purposes of the contract;

1.1.7 "person" includes, unless the context otherwise requires, a partnership, proprietorship, firm, joint venture, consortium and a corporation;

1.1.8 "plant" includes all animals, tools, implements, machinery, vehicles, buildings, structures, equipment and commodities, articles and things other than material, that are necessary for the due performance of the contract;

1.1.9 "subcontractor' means a person to whom the Contractor has, subject to GC4, subcontracted the whole or any part of the work;

1.1.10 "superintendant" means the employee of the Contractor who is designated by the Contractor to act pursuant to GC19;

1.1.11 "work includes, subject only to any express stipulation in the contract to the contrary, everything that is necessary to be done, furnished or delivered by the Contractor to perform the contract.

1.2 The headings in the contract documents, other than in the Plans and Specifications, form no part of the contract but are inserted for convenience of reference only.

1.3 In interpreting the contract, in the event of discrepancies or conflicts between anything in the Plans and Specifications and the General Conditions, the General Conditions govern.

1.4 In interpreting the Plans and Specifications, in the event of discrepancies or conflicts between

1.4.1 the Plans and Specifications, the Specifications govern;

1.4.2 the Plans, the Plans drawn with the largest scale govern; and

1.4.3 figured dimensions and scaled dimensions, the figured dimensions govern.

GC2 Successors and Assigns

2.1 The contract shall inure to the benefit of and be binding upon the parties hereto and their lawful heirs, executors, administrators, successors and assigns.

GC3 Assignment of Contract

3.1 The contract may not be assigned by the Contractor, either in whole or in part, without the written consent of the Minister.

GC4 Subcontracting by Contractor

4.1 Subject to this General Condition, the Contractor may subcontract any part of the work.

4.2 The Contractor shall notify the Departmental Representative in writing of his intention to subcontract.

4.3 A notification referred to in GC4.2 shall identify the part of the work, and the subcontractor with whom it is intended to subcontract.

4.4 The Departmental Representative may object to the intended subcontracting by notifying the Contractor in writing within six days of receipt by the Departmental Representative of a notification referred to in GC4.2.

4.5 If the Departmental Representative objects to a subcontracting pursuant to GC4.4, the Contractor shall not enter into the intended subcontract.

4.6 The contractor shall not, without the written consent of the Departmental Representative, change a subcontractor who has been engaged by him in accordance with this General Condition.

4.7 Every subcontract entered into by the Contractor shall adopt all of the terms and conditions of ths contract that are of general application.

4.8 Neither a subcontracting nor the Departmental Representative's consent to a subcontracting by the Contractor shall be construed to relieve the Contractor from any obligation under the contract or to impose any liability upon Her Majesty.

GC5 Amendments

5.1 No amendment or change in any of the provisions of the contract shall have any force or effect until it is reduced to writing.

GC6 No Implied Obligations

6.1 No implied terms or obligations of any kind by or on behalf of Her Majesty shall arise from anything in the contract and the express covenants and agreements therein contained and made by Her Majesty are the only covenants and agreements upon which any rights against Her Majesty are to be founded.

6.2 The contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work that were made prior to the date of the contract.

GC7 Time of Essence

7.1 Time is of the essence of the contract.

GC8 Indemnification by Contractor

8.1 The Contractor shall indemnify and save Her Majesty harmless from and against all claims, demand, losses, costs, damages, actions, suits, or proceedings by whomever made, brought or prosecuted and in any manner based upon, arising out of, related to, occasioned by or attributable to the activities of the Contractor, his servants, agents, subcontractors and sub-subcontractors in performing the work including an infringement or an alleged infringement of a patent of invention or any other kind of intellectual property.

8.2 For the purpose of GC8.1, "activities" includes any act improperly carried out, any omission to carry out an act and any delay in carrying out an act.

GC9 Indemnification by Her Majesty

9.1 Her Majesty shall, subject to the Crown Liability Act, the Patent Act, and any other law that affects Her Majesty's rights, powers, privileges or obligations, indemnify and save the Contractor harmless from and against all claims, demands, losses, costs, damage, actions, suits or proceedings arising out of his activities under the contract that are directly attributable to

9.1.1 lack of or a defect in Her Majesty's title to the work site whether real or alleged; or

9.1.2 an infringement or an alleged infringement by the Contractor of any patent of invention or any other kind of intellectual property occurring while the Contractor was performing any act for the purposes of the contract employing a model, plan or design or any other thing related to the work that was supplied by Her Majesty to the Contractor.

GC10 Members of House of Commons Not to Benefit

10.1 As required by the Parliament of Canada Act, it is an express condition of the contract that no member of the House of Commons shall be admitted to any share of part of the contract or to any benefit arising therefrom.

GC11 Notices

11.1 Any notice, consent, order, decision, direction or other communication, other than a notice referred to in GC11.4, that may be given to the Contractor pursuant to the contract may be given in any manner.

11.2 Any notice, consent, order, decision, direction or other communication required to be given in writing, to any party pursuant to the contract shall, subject to GC11.4, be deemed to have been effectively given

11.2.1 to the Contractor, if delivered personally to the Contractor or the Contractor's superintendent, or forwarded by mail, telex or facsimile to the Contractor at the address set out in A4.1, or

11.2.2 to Her Majesty, if delivered personally to the Departmental Representative, or forwarded by mail, telex or facsimile to the Departmental Representative at the address set out in A1.2.1.

11.3 Any such notice, consent, order, decision, direction or other communication given in accordance with GC11.2 shall be deemed to have been received by either party

11.3.1 if delivered personally, on the day that it was delivered,

11.3.2 if forwarded by mail, on the earlier of the day it was received and the sixth day after it was mailed, and

11.3.3 if forwarded by telex or facsimile, 24 hours after it was transmitted.

11.4 A notice given under GC38.1.1, GC40 and GC41, if delivered personally, shall be delivered to the Contractor if the Contractor is doing business as sole proprietor or, if the Contractor is a partnership or corporation, to an officer thereof.

GC12 Material, Plant and Real Property Supplied by Her Majesty

12.1 Subject to GC12.2, the Contractor is liable to Her Majesty for any loss of or damage to material, plant or real property that is supplied or placed in the care, custody and control of the Contractor by Her Majesty for use in connection with the contract, whether or not that loss or damage is attributable to causes beyond the Contractor's control.

12.2 The Contractor is not liable to Her Majesty for any loss or damage to material, plant or real property referred to in GC12.1 if that loss or damage results from and is directly attributable to reasonable wear and tear.

12.3 The Contractor shall not use any material, plant or real property referred to in GC12.1 except for

the purpose of performing this contract.

12.4 When the Contractor fails to make good any loss or damage for which he is liable under GC12.1 within a reasonable time after being required to do so by the Departmental Representative, the Departmental Representative may cause the loss or damage to be made good at the Contractor's expense, and the Contractor shall thereupon be liable to Her Majesty for the cost thereof and shall, on demand, pay to Her Majesty an amount equal to that cost.

12.5 The Contractor shall keep such records of all material, plant and real property referred to in GC12.1 as the Departmental Representative from time to time requires and shall satisfy the Departmental Representative, when requested, that such material, plant and real property are at the place and in the condition which they ought to be.

GC13 Material, Plant and Real Property Become Property of Her Majesty

13.1 Subject to GC14.7 all material and plant and the interest of the Contractor in all real property, licenses, powers and privileges purchased, used or consumed by the Contractor for the contract shall, after the time of their purchase, use or consumption be the property of Her Majesty for the purposes of the work and they shall continue to be the property of Her Majesty.

13.1.1 in the case of material, until the Departmental Representative indicates that he is satisfied that it will not be required for the work, and

13.1.2 in the case of plant, real property, licenses, powers and privileges, until the Departmental Representative indicates that he is satisfied that the interest vested in Her Majesty therein is no longer required for the purposes of the work.

13.2 Material or plant that is the property of Her Majesty by virtue of GC13.1 shall not be taken away from the work site or used or disposed of except for the purposes of the work without the written consent of the Departmental Representative.

13.3 Her Majesty is not liable for loss of or damage from any cause to the material or plant referred to in GC13.1 and the Contractor is liable for such loss or damage notwithstanding that the material or plant is the property of Her Majesty.

GC14 Permits and Taxes Payable

14.1 The Contractor shall, within 30 days after the date of the contract, tender to a municipal authority an amount equal to all fees and charges that would be lawfully payable to that municipal authority in respect of building permits as if the work were being performed for a person other than Her Majesty.

14.2 Within 10 days of making a tender pursuant to GC14.1, the Contractor shall notify the Departmental Representative of his action and of the amount tendered and whether or not the municipal authority has accepted that amount.

14.3 If the municipal authority does not accept the amount tendered pursuant to GC14.1 the Contractor shall pay that amount to Her Majesty within 6 days after the time stipulated in GC14.2.

14.4 For the purposes of GC14.1 to GC14.3 "municipal authority" means any authority that would have jurisdiction respecting permission to perform the work if the owner were not Her Majesty.

14.5 Notwithstanding the residency of the Contractor, the Contractor shall pay any applicable tax arising from or related to the performance of the work under the contract.

14.6 In accordance with the Statutory Declaration referred to in TP4.9, a Contractor who has neither residence nor place of business in the province in which work under the contract is being performed shall provide Her Majesty with proof of registration with the provincial sales tax authorities in the said province.

14.7 For the purpose of the payment of any applicable tax or the furnishing of security for the payment of any applicable tax arising from or related to the performance of the work under the contract, the Contractor shall, notwithstanding the fact that all material, plant and interest of the Contractor in all real property, licenses, powers and privileges, have become the property of Her Majesty after the time of purchase, be liable, as a user or consumer, for the payment or for the furnishing of security for the payment of any applicable tax payable, at the time of the use or consumption of that material, plant or interest of the Contractor in accordance with the relevant legislation.

GC15 Performance of Work under Direction of Departmental Representative

15.1 The Contractor shall

15.1.1 permit the Departmental Representative to have access to the work and its site at all times during the performance of the contract;

15.1.2 furnish the Departmental Representative with such information respecting the performance of the contract as he may require; and

15.1.3 give the Departmental Representative every possible assistance to enable the Departmental Representative to carry out his duty to see that the work is performed in accordance with the contract and to carry out any other duties and exercise any powers specially imposed or conferred on the Departmental Representative under the contract.

CG16 Cooperation with Other Contractors

16.1 Where, in the opinion of the Departmental Representative, it is necessary that other contractors or workers with or without plant and material, be sent onto the work or its site, the Contractor shall, to the satisfaction of the Departmental Representative, allow them access and cooperate with them in the carrying out of their duties and obligation.

16.2 If

16.2.1 the sending onto the work or its site of other contractors or workers pursuant to GC16.1 could not have been reasonably foreseen or anticipated by the Contractor when entering into the contract, and

16.2.2 the Contractor incurs, in the opinion of the Departmental Representative, extra expense in complying with GC16.1, and

16.2.3 The Contractor has given the Departmental Representative written notice of his claim for the extra expense referred to in GC16.2.2 within 30 days of the date that the other contractors or workers were sent onto the work or its site,

Her Majesty shall pay the Contractor the cost, calculated in accordance with GC48 to GC50, of the extra labour, plant and material that was necessarily incurred.

GC17 Examination of Work

17.1 If, at any time after the commencement of the work but prior to the expiry of the warranty or guarantee period, the Departmental Representative has reason to believe that the work or any part thereof has not been performed in accordance with the contract, the Departmental Representative may have that work examined by an expert of his choice.

17.2 If, as a result of an examination of the work referred to in GC17.1, it is established that the work was not performed in accordance with the contract, then, in addition to and without limiting or otherwise affecting any of Her Majesty's rights and remedies under the contract either at law or in equity, the Contractor shall pay Her Majesty, on demand, all reasonable costs and expenses that were incurred by Her Majesty in having that examination performed.

GC18 Clearing of Site

18.1 The Contractor shall maintain the work and its site in a tidy condition and free from the accumulation of waste material and debris, in accordance with any directions of the Departmental Representative.

18.2 Before the issue of an interim certificate referred to in GC44.2, the Contractor shall remove all the plant and material not required for the performance of the remaining work, and all waste material and other debris, and shall cause the work and its site to be clean and suitable for occupancy by Her Majesty's servants, unless otherwise stipulated in the contract.

18.3 Before the issue of a final certificate referred to in GC44.1, the Contractor, shall remove from the work and its site all of the surplus plant and material and any waste material and other debris.

18.4 The Contractor's obligations described in GC18.1 to GC18.3 do not extend to waste material and other debris caused by Her Majesty's servants or contractors and workers referred to in GC16.1.

GC19 Contractor's Superintendent

19.1 The Contractor shall, forthwith upon the award of the contract, designate a superintendent.

19.2 The Contractor shall forthwith notify the Departmental Representative of the name, address and telephone number of a superintendent designate pursuant to GC19.1.

19.3 A superintendent designated pursuant to GC19.1 shall be in full charge of the operations of the Contractor in the performance of the work and is authorized to accept any notice, consent, order, direction, decision or other communication on behalf of the Contractor that may be given to the superintendent under the contract.

19.4 The Contractor shall, until the work has been completed, keep a competent superintendent at the work site during working hours.

19.5 The Contractor shall, upon the request of the Departmental Representative, remove any superintendent who, in the opinion of the Departmental Representative, is incompetent or has been conducting himself improperly and shall forthwith designate another superintendent who is acceptable to the Departmental Representative.

19.6 Subject to GC19.5, the Contractor shall not substitute a superintendent without the written consent of the Departmental Representative.

19.7 A breach by the Contractor of GC19.6 entitles the Departmental Representative to refuse to issue any certificate referred to in GC44 until the superintendent has returned to the work site or another superintendent who is acceptable to the Departmental Representative has been substituted.

GC20 National Security

20.1 If the Minister is of the opinion that the work is of a class or kind that involves the national security, he may order the Contractor

20.1.1 to provide him with any information concerning persons employed or to be employed by him for purposes of the contract; and

20.1.2 to remove any person from the work and its site if, in the opinion of the Minister, that person may be a risk to the national security.

20.2 The Contractor shall, in all contracts with persons who are to be employed in the performance of the contract, make provision for his performance of any obligation that may be imposed upon him under GC19 to GC21.

20.3 The Contractor shall comply with an order of the Minister under GC20.1

GC21 Unsuitable Workers

21.1 The Contractor shall, upon the request of the Departmental Representative, remove any person employed by him for purposes of the contract who, in the opinion of the Departmental Representative, is incompetent or has conducted himself improperly, and the Contractor shall not permit a person who has been removed to return to the work site.

GC22 Increased or Decreased Costs

22.1 The amount set out in the Articles of Agreement shall not be increased or decreased by reason of any increase or decrease in the cost of the work that is brought about by an increase or decrease in the cost of labour, plant or material or any wage adjustment arising pursuant to the Labour Conditions.

22.2 Notwithstanding GC22.1 and GC35, an amount set out in the Articles of Agreement shall be adjusted in the manner provided in GC22.3, if any change in a tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property

22.2.1 occurs after the date of the submission by the Contractor of his tender for the contract,

22.2.2 applies to material, and

22.2.3 affects the cost to the Contractor of that material.

22.3 If a change referred to in GC22.2 occurs, the appropriate amount set out in the Articles of Agreement shall be increased or decreased by an amount equal to the amount that is established by an examination of the relevant records of the Contractor referred to in GC51 to be the increase or decrease in the cost incurred that is directly attributable to that change.

22.4 For the purpose of GC22.2, where a tax is changed after the date of submission of the tender but public notice of the change has been given by the Minister of Finance before that date, the change shall be deemed to have occurred before the date of submission of the tender.

GC23 Canadian Labour and Material

23.1 The Contractor shall use Canadian labour and material in the performance of the work to the full extent to which they are procurable, consistent with proper economy and expeditious carrying out of the work.

23.2 Subject to GC23.1, the Contractor shall, in the performance of the work, employ labour from the locality where the work is being performed to the extent to which it is available, and shall use the offices of the Canada Employment Centres for the recruitment of workers wherever practicable.

23.3 Subject to GC23.1 and GC23.2, the Contractor shall, in the performance of the work, employ a reasonable proportion of persons who have been on active service with the armed forces of Canada and have been honourably discharged therefrom.

GC24 Protection of Work and Documents

24.1 The Contractor shall guard or otherwise protect the work and its site, and protect the contract, specifications, plans, drawings, information, material, plant and real property, whether or not they are supplied by Her Majesty to the Contractor, against loss or damage from any cause, and he shall not use, issue, disclose or dispose of them without the written consent of the Minister, except as may be essential for the performance of the work.

24.2 If any document or information given or disclosed to the Contractor is assigned a security rating by the person who gave or disclosed it, the Contractor shall take all measures directed by the Departmental Representative to be taken to ensure the maintenance of the degree of security that is ascribed to that rating.

24.3 The Contractor shall provide all facilities necessary for the purpose of maintaining security, and shall assist any person authorized by the Minister to inspect or to take security measures in respect of the work and its site.

24.4 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure compliance with or to remedy a breach of GC24.1 to GC24.3.

GC25 Public Ceremonies and Signs

25.1 The Contractor shall not permit any public ceremony in connection with the work without the prior consent of the Minister.

25.2 The Contractor shall not erect or permit the erection of any sign or advertising on the work or its site without the prior consent of the Departmental Representative.

GC26 Precautions against Damage, Infringement of Rights, Fire, and Other Hazards

26.1 The Contractor shall, at his own expense, do whatever is necessary to ensure that

26.1.1 no person, property, right, easement or privilege is injured, damaged or infringed by reasons of the Contractor's activities in performing the contract;

26.1.2 pedestrian and other traffic on any public or private road or waterway is not unduly impeded, interrupted or endangered by the performance or existence of the work or plant;

26.1.3 fire hazards in or about the work or its site are eliminated and, subject to any direction that may be given by the Departmental Representative, any fire is promptly extinguished;

26.1.4 the health and safety of all persons employed in the performance of the work is not endangered by the method or means of its performance;

26.1.5 adequate medical services are available to all persons employed on the work or its site at all times during the performance of the work;

26.1.6 adequate sanitation measures are taken in respect of the work and its site; and

26.1.7 all stakes, buoys and marks placed on the work or its site by or under the authority of the Departmental Representative are protected and are not removed, defaced, altered or destroyed.

26.2 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure

compliance with or to remedy a breach of GC26.1.

26.3 The Contractor shall, at his own expense, comply with a direction of the Departmental Representative made under GC26.2.

GC27 Insurance

27.1 The Contractor shall, at his own expense, obtain and maintain insurance contracts in respect of the work and shall provide evidence thereof to the Departmental Representative in accordance with the requirements of the Insurance Conditions "E".

27.2 The insurance contracts referred to in GC27.1 shall

27.2.1 be in a form, of the nature, in the amounts, for the periods and containing the terms and conditions specified in Insurance Conditions "E", and

27.2.2 provide for the payment of claims under such insurance contracts in accordance with GC28.

GC28 Insurance Proceeds

28.1 In the case of a claim payable under a Builders Risk/Installation (All Risks) insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid directly to Her Majesty, and

28.1.1 the monies so paid shall be held by Her Majesty for the purposes of the contract, or

28.1.2 if Her Majesty elects, shall be retained by Her Majesty, in which event they vest in Her Majesty absolutely.

28.2 In the case of a claim payable under a General Liability insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid by the insurer directly to the claimant.

28.3 If an election is made pursuant to GC28.1, the Minister may cause an audit to be made of the accounts of the Contractor and of Her Majesty in respect of the part of the work that was lost, damaged or destroyed for the purpose of establishing the difference, if any, between

28.3.1 the aggregate of the amount of the loss or damage suffered or sustained by Her Majesty, including any cost incurred in respect of the clearing and cleaning of the work and its site and any other amount that is payable by the Contractor to Her Majesty under the contract, minus any monies retained pursuant to GC28.12, and

28.3.2 the aggregate of the amounts payable by Her Majesty to the Contractor pursuant to the contract up to the date of the loss or damage.

28.4 A difference that is established pursuant to GC28.3 shall be paid forthwith by the party who is determined by the audit to be the debtor to the party who is determined by the audit to be the

creditor.

28.5 When payment of a deficiency has been made pursuant to GC28.4, all rights and obligations of Her Majesty and the Contractor under the contract shall, with respect only to the part of the work that was the subject of the audit referred to in GC28.3, be deemed to have been expended and discharged.

28.6 If an election is not made pursuant to GC28.1.2 the Contractor shall, subject to GC28.7, clear and clean the work and its site and restore and replace the part of the work that was lost, damaged or destroyed at his own expense as if that part of the work had not yet been performed.

28.7 When the Contractor clears and cleans the work and its site and restores and replaces the work referred to in GC 28.6, Her Majesty shall pay him out of the monies referred to in GC28.1 so far as they will thereunto extend.

28.8 Subject to GC28.7, payment by Her Majesty pursuant to GC28.7 shall be made in accordance with the contract but the amount of each payment shall be 100% of the amount claimed notwithstanding TP4.4.1 and TP4.4.2.

GC29 Contract Security

29.1 The Contractor shall obtain and deliver contract security to the Departmental Representative in accordance with the provisions of the Contract Security Conditions.

29.2 If the whole or a part of the contract security referred to in GC29.1 is in the form of a security deposit, it shall be held and disposed of in accordance with GC43 and GC45.

29.3 If a part of the contract security referred to in GC29.1 is in the form of a labour and material payment bond, the Contractor shall post a copy of that bond on the work site.

GC30 Changes in the Work

30.1 Subject o GC5, the Departmental Representative may, at any time before he issues his Final Certificate of Completion,

30.1.1 order work or material in addition to that provided for in the Plans and Specifications; and

30.1.2 delete or change the dimensions, character, quantity, quality, description, location or position of the whole or any part of the work or material proved for in the Plans and Specifications or in any order made pursuant to GC30.1.1,

if that additional work or material, deletion, or change is, in his opinion, consistent with the general intent of the original contract.

30.2 The Contractor shall perform the work in accordance with such orders, deletions and changes that are made by the Departmental Representative pursuant to GC30.1 from time to time as if they had appeared in and been part of the Plans and Specifications.

30.3 The Departmental Representative shall determine whether or not anything done or omitted by the Contractor pursuant to an order, deletion or change referred to in GC30.1 increased or decreased the cost of the work to the Contractor.

30.4 If the Departmental Representative determines pursuant to GC30.3 that the cost of the work to the Contractor has been increased, Her Majesty shall pay the Contractor the increased cost that the Contractor necessarily incurred for the additional work calculated in accordance with GC49 or GC50.

30.5 If the Departmental Representative determines pursuant to GC303.3 that the cost of the work to the Contractor has been decreased, Her Majesty shall reduce the amount payable to the Contractor under the contract by an amount equal to the decrease in the cost caused by the deletion or change referred to in GC30.1.2 and calculated in accordance with GC49.

30.6 GC30.3 to GC30.5 are applicable only to a contract or a portion of a contract for which a Fixed Price Arrangement is stipulated in the contract.

30.7 An order, deletion or change referred to in GC30.1 shall be in writing, signed by the Departmental Representative and given to the Contractor in accordance with GC11.

GC31 Interpretation of Contract by Departmental Representative

31.1 If, ar any time before the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, any question arises between the parties about whether anything has been done as required by the contract or about what the Contractor is required by the contract to do, and, in particular but without limiting the generality of the foregoing, about

31.1.1 the meaning of anything in the Plans and Specification,

31.1.2 the meaning to be given to the Plans and Specifications in case of any error therein, omission therefrom, or obscurity or discrepancy in their working or intention,

31.1.3 whether or not the quality or quantity of any material or workmanship supplied or proposed to be supplied by the Contractor meets the requirements of the contract,

31.1.4 whether or not the labour, plant or material provided by the Contractor for performing the work and carrying out the contract are adequate to ensure that the work will be performed in accordance with the contract and that the contract will be carried out in accordance with its terms,

31.1.5 what quantity of any kind of work has been completed by the Contractor, or

31.1.6 the timing and scheduling of the various phases of the performance of the work,

the question shall be decided by the Departmental Representative whose decision shall be final and conclusive in respect of the work.

31.2 The Contractor shall perform the work in accordance with any decisions of the Departmental

Representative that are made under GC31.1 and in accordance with any consequential directions given by the Departmental Representative.

GC32 Warranty and Rectification of Defects in Work

32.1 Without restricting any warranty or guarantee implied or imposed by law or contained in the contract documents, the Contractor shall, at his own expense,

32.1.1 rectify and make good any defect or fault that appears in the work or comes to the attention of the Minister with respect to those parts of the work accepted in connection with the Interim Certificate of Completion referred to GC44.2 within 12 months from the date of the Interim Certificate of Completion;

32.1.2 rectify and make good any defect or fault that appears in or comes to the attention of the Minister in connection with those parts of the work described in the Interim Certificate of Completion referred to in GC44.2 within 12 months from the date of the Final Certificate of Completion referred to in GC44.1.

32.2 The Departmental Representative may direct the Contractor to rectify and make good any defect or fault referred to in GC32.1 or covered by any other expressed or implied warranty or guarantee.

32.3 A direction referred to in GC32.2 shall be in writing, may include a stipulation in respect of the time within which a defect or fault is required to be rectified and made good by the Contractor, and shall be given to the Contractor in accordance with GC11.

32.4 The Contractor shall rectify and make good any defect or fault described in a direction given pursuant to GC32.2 within the time stipulated therein.

GC33 Non-Compliance by Contractor

33.1 If the Contractor fails to comply with any decision or direction given by the Departmental Representative pursuant to GC18, GC24, GC26, GC31 or GC32, the Departmental Representative may employ such methods as he deems advisable to do that which the Contractor failed to do.

33.2 The Contractor shall, on demand, pay Her Majesty an amount that is equal to the aggregate of all cost, expenses and damage incurred or sustained by Her Majesty by reason of the Contractor's failure to comply with any decision or direction referred to in GC33.1, including the cost of any methods employed by the Departmental Representative pursuant to GC33.1.

GC34 Protesting Departmental Representative's Decisions

34.1 The Contractor may, within ten days after the communication to him of any decision or direction referred to in GC30.3 or GC33.1, protest that decision or direction.

34.2 A protest referred to in GC34.1 shall be in writing, contain full reasons for the protest, be signed

by the Contractor and be given to Her Majesty by delivery to the Departmental Representative.

34.3 If the Contractor gives a protest pursuant to GC34.2, any compliance by the Contractor with the decision or direction that was protested shall not be construed as an admission by the Contractor of the correctness of that decision or direction, or prevent the Contractor from taking whatever action he considers appropriate in the circumstances.

34.4 The giving of a protest by the Contractor pursuant to GC34.2 shall not relieve him from complying with the decision or direction that is the subject of the protest.

34.5 Subject to GC34.6, the Contractor shall take any action referred to in GC34.3 within three months after the date that a Final Certificate of Completion is issued under GC44.1 and not afterwards.

34.6 The Contractor shall take any action referred to in GC34.3 resulting from a direction under GC32 within three months after the expiry of a warranty or guarantee period and not afterwards.

34.7 Subject to GC34.8, if Her Majesty determines that the Contractor's protest is justified, Her Majesty shall pay the Contractor the cost of the additional labour, plant and material necessarily incurred by the Contractor in carrying out the protested decision or direction.

34.8 Costs referred to in GC34.7 shall be calculated in accordance with GC48 to GC50.

GC35 Changes in Soil Conditions and Neglect or Delay by Her Majesty

35.1 Subject to GC35.2 no payment, other than a payment that is expressly stipulated in the contract, shall be made by Her Majesty to the Contractor for any extra expense or any loss or damage incurred or sustained by the Contractor.

35.2 If the Contractor incurs or sustains any extra expense or any loss or damage that is directly attributable to

35.2.1 a substantial difference between the information relating to soil conditions at the work site that is contained in the Plans and Specifications or other documents supplied to the Contractor for his use in preparing his tender or a reasonable assumption of fact based thereon made by the Contractor, and the actual soil conditions encountered by the Contractor at the work site during the performance of the contract, or

35.2.2 any neglect or delay that occurs after the date of the contract on the part of Her Majesty in providing any information or in doing any act that the contract either expressly requires Her Majesty to do or that would ordinarily be done by an owner in accordance with the usage of the trade,

he shall, within ten days of the date the actual soil conditions described in GC35.2.1 were encountered or the neglect or delay described in GC35.2.2 occurred, give the Departmental Representative written notice of his intention to claim for that extra expense or that loss or damage.

35.3 When the Contractor has given a notice referred to in GC35.2, he shall give the Departmental Representative a written claim for extra expense or loss or damage within 30 days of the date that

a Final Certificate of Completion referred to in GC44.1 is issued and not afterwards.

35.4 A written claim referred to in GC35.3 shall contain a sufficient description of the facts and circumstances of the occurrence that is the subject of the claim to enable the Departmental Representative to determine whether or not the claim is justified and the Contractor shall supply such further and other information for that purpose as the Departmental Representative requires from time to time.

35.5 If the Departmental Representative determines that a claim referred to in GC35.3 is justified, Her Majesty shall make an extra payment to the Contractor in an amount that is calculated in accordance with GC47 to GC50.

35.6 If, in the opinion of the Departmental Representative, an occurrence described in GC35.2.1 results in a savings of expenditure by the Contractor in performing the contract, the amount set out in the Articles of Agreement shall, subject to GC35.7, be reduced by an amount that is equal to the saving.

35.7 The amount of the saving referred to in GC35.6 shall be determined in accordance with GC47 to GC49.

35.8 If the Contractor fails to give a notice referred to in GC35.2 and a claim referred to in GC35.3 within the times stipulated, an extra payment shall not be made to him in respect of the occurrence.

GC36 Extension of Time

36.1 Subject to GC36.2, the Departmental Representative may, on the application of the Contractor made before the day fixed by the Articles of Agreement for completion of the work or before any other date previously fixed under this General Condition, extend the time for its completion by fixing a new date if, in the opinion of the Departmental Representative, causes beyond the control of the Contractor have delayed its completion.

36.2 An application referred to in GC36.1 shall be accompanied by the written consent of the bonding company whose bond forms part of the contract security.

GC37 Assessments and Damages for Late Completion

37.1 For the purposes of this General Condition

37.1.1 the work shall be deemed to be completed on the date that an Interim Certificate of Completion referred to in GC44.2 is issued, and

37.1.2 "period of delay" means the number of days commencing on the day fixed by the Articles of Agreement for completion of the work and ending on the day immediately preceding the day on which the work is completed but does not include any day within a period of extension granted pursuant to GC36.1, and any other day on which, in the opinion of the Departmental Representative, completion of the work was delayed for reasons beyond the control of the Contractor.

37.2 If the Contractor does not complete the work by the day fixed for its completion by the Articles of Agreement but completes it thereafter, the Contractor shall pay Her Majesty an amount equal to the aggregate of

37.2.1 all salaries, wages and travelling expenses incurred by Her Majesty in respect of persons overseeing the performance of the work during the period of delay;

37.2.2 the cost incurred by Her Majesty as a result of the inability to use the completed work for the period of delay; and

37.2.3 all other expenses and damages incurred or sustained by Her Majesty during the period of delay as a result of the work not being completed by the day fixed for its completion.

37.3 The Minister may waive the right of Her Majesty to the whole or any part of the amount payable by the Contractor pursuant to GC37.2 I , in the opinion of the Minister, it is in the public interest to do so.

GC38 Taking the Work Out of the Contractor's Hands

38.1 The Minister may, at his sole discretion, by giving a notice in writing to the Contractor in accordance with GC11, take all or any part of the work out of the Contractor's hands, and may employ such means as he sees fit to have the work completed if the Contractor

38.1.1 Has not, within six days of the Minister or the Departmental Representative giving notice to the Contractor in writing in accordance with GC11, remedied any delay in the commencement or any default in the diligent performance of the work to the satisfaction of the Departmental Representative;

38.1.2 has defaulted in the completion of any part of the work within the time fixed for its completion by the contract;

38.1.3 has become insolvent;

38.1.4 has committed an act of bankruptcy;

38.1.5 has abandoned the work;

38.1.6 has made an assignment of the contract without the consent required by GC3.1; or

38.1.7 has otherwise failed to observe or perform any of the provisions of the contract.

38.2 If the whole or any part of the work is taken out of the Contractor's hands pursuant to GC38.1,

38.2.1 the Contractor's right to any further payment that is due or accruing due under the contract is, subject only to GC38.4, extinguished, and

38.2.2 the Contractor is liable to pay Her Majesty, upon demand, an amount that is equal to the amount of all loss and damage incurred or sustained by Her Majesty in respect of the

Contractor's failure to complete the work.

38.3 If the whole or any part of the work that is taken out of the Contractor's hands pursuant to GC38.1 is completed by Her Majesty, the Departmental Representative shall determine the amount, if any, of the holdback or a progress claim that had accrued and was due prior to the date on which the work was taken out of the Contractor's hands and that is not required for the purposes of having the work performed or of compensating Her Majesty for any other loss or damage incurred or sustained by reason of the Contractor's default.

38.4 Her Majesty may pay the Contractor the amount determined not to be required pursuant to GC38.3.

GC39 Effect of Taking the Work Out of the Contractor's Hands

39.1 The taking of the work or any part thereof out of the Contractor's hands pursuant to GC38 does not operate so as to relieve or discharge him from any obligation under the contract or imposed upon him by law except the obligation to complete the performance of that part of the work that was taken out of his hands.

39.2 If the work or any part thereof is taken out of the Contractor's hands pursuant to GC38, all plant and material and the interest of the Contractor is all real property, licenses, powers and privileges acquired, used or provided by the Contractor under the contract shall continue to be the property of Her Majesty without compensation to the Contractor.

39.3 When the Departmental Representative certifies that any plant, material, or any interest of the Contractor referred to in GC39.2 is no longer required for the purposes of the work, or that it is not in the interest of Her Majesty to retain that plant, material or interest, it shall revert to the Contractor.

G40 Suspension of Work by Minister

40.1 The Minister may, when in his opinion it is in the public interest to do so, require the Contractor to suspend performance of the work either for a specified or an unspecified period by giving a notice of suspension in wiring to the Contractor in accordance with GC11.

40.2 When a notice referred to in GC40.1 is received by the Contractor in accordance with GC11, he shall suspend all operations in respect of the work except those that, in the opinion of the Departmental Representative, are necessary for the care and preservation of the work, plant and material.

40.3 The Contractor shall not, during a period of suspension, remove any part of the work, plant or material from its site without the consent of the Departmental Representative.

40.4 If a period of suspension is 30 days or less, the Contractor shall, upon the expiration of that period, resume the performance of the work and he is entitled to be paid the extra cost, calculated in accordance with GC48 to GC50, of any labour, plant and material necessarily incurred by him as a result of the suspension.

40.5 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor agree that the performance of the work will be continued by the Contractor, the Contractor shall resume performance of the work subject to any terms and conditions agreed upon by the Minister and the Contractor.

40.6 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor do not agree that performance of the work will be continued by the Contractor or upon the terms and conditions under which the Contractor will continue the work, the notice of suspension shall be deemed to be a notice of termination pursuant to GC41.

GC41 Termination of Contract

41.1 The Minister may terminate the contract at any time by giving a notice of termination in writing to the Contractor in accordance with GC11.

41.2 When a notice referred to in GC41.1 is received by the Contractor in accordance with GC11, he shall, subject to any conditions stipulated in the notice, forthwith cease all operations in performance of the contract.

41.3 If the contract is terminated pursuant to GC41.1, Her Majesty shall pay the Contractor, subject to GC41.4, an amount equal to

41.3.1 the cost to the contractor of all labour, plant and material supplied by him under the contract up to the date of termination in respect of a contract or part thereof for which a Unit Price Arrangement is stipulated in the contract, or

41.3.2 the lesser of

41.3.2.1 an amount, calculated in accordance with the Terms and Payment, that would have been payable to the Contractor had he completed the work, and

41.3.2.2 an amount that is determined to be due to the Contractor pursuant to GC49 in respect of a contract or part thereof for which a Fixed Price Arrangement is stipulated in the contract

less the aggregate of all amounts that were paid to the Contractor by Her Majesty and all amounts that are due to Her Majesty from the Contractor pursuant to the contract.

41.4 If Her Majesty and the Contractor are unable to agree about an amount referred to in GC41.3 that amount shall be determined by the method referred to in GC50.

GC42 Claims Against and Obligations of the Contractor or Subcontractor

42.1 Her Majesty may, in order to discharge lawful obligations of and satisfy claims against the Contractor or a subcontractor arising out of the performance of the contract, pay any amount that is due and payable to the Contractor pursuant to the contract directly to the obligees of and the claimants against the Contractor or the subcontractor but such amount if any, as is paid by Her Majesty, shall not exceed that amount which the Contractor would have been obliged to pay to

such claimant had the provisions of the Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, been applicable to the work. Any such claimant need not comply with the provisions of such legislation setting out the steps by way of notice, registration or otherwise as might have been necessary to preserve or perfect any claim for lien or privilege which claimant might have had;

42.2 Her Majesty will not make any payment as described in GC42.1 unless and until that claimant shall have delivered to Her Majesty:

42.2.1 a binding and enforceable Judgment or Order of a court of competent jurisdiction setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or

42.2.2 a final and enforceable award of an arbitrator setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or

42.2.3 the consent of the Contractor authorizing a payment.

For the purposes of determining the entitlement of a claimant pursuant to GC42.2.1 and GC42.2.2, the notice required by GC42.8 shall be deemed to replace the registration or provision of notice after the performance of work as required by any applicable legislation and no claim shall be deemed to have expired, become void or unenforceable by reason of the claimant not commencing any action within the time prescribed by any applicable legislation.

42.3 The Contractor shall, by the execution of his contract, be deemed to have consented to submit to binding arbitration at the request of any claimant those questions that need be answered to establish the entitlement of the claimant to payment pursuant to the provisions of GC42.1 and such arbitration shall have as parties to it any subcontractor to whom the claimant supplied material, performed work or rented equipment should such subcontractor wish to be adjoined and the Crown shall not be a party to such arbitration and, subject to any agreement between the Contractor and the claimant to the contrary, the arbitration shall be conducted in accordance with the Provincial or Territorial legislation governing arbitration applicable in the Province or Territory in which the work is located.

42.4 A payment made pursuant to GC42.1 is, to the extent of the payment, a discharge of Her Majesty's liability to the Contractor under the contract and may be deducted from any amount payable to the Contractor under the contract.

42.5 To the extent that the circumstances of the work being performed for Her Majesty permit, the Contractor shall comply with all laws in force in the Province or Territory where the work is being performed relating to payment period, mandatory holdbacks, and creation and enforcement of mechanics' liens, builders' liens or similar legislation or in the Province of Quebec, the law relating to privileges.

42.6 The Contractor shall discharge all his lawful obligations and shall satisfy all lawful claims against him arising out of the performance of the work at least as often as the contract requires Her

Majesty to pay the Contractor.

42.7 The Contractor shall, whenever requested to do so by the Departmental Representative, make a statutory declaration deposing to the existence and condition of any obligations and claims referred to in GC42.6.

42.8 GC42.1 shall only apply to claims and obligations

42.8.1 the notification of which has been received by the Departmental Representative in writing before payment is made to the Contractor pursuant to TP4.10 and within 120 days of the date on which the claimant

42.8.1.1 should have been paid in full under the claimant's contract with the Contractor or subcontractor where the claim is for money that was lawfully required to be held back from the claimant; or

42.8.1.2 performed the last of the services, work or labour, or furnished the last of the material pursuant to the claimant's contract with the Contractor or subcontractor where the claim is not for money referred to in GC42.8.1.1, and

42.8.2 the proceedings to determine the right to payment of which, pursuant to GC42.2. shall have commenced within one year from the date that the notice referred to in GC42.8.1 was received by the Departmental Representative, and

the notification required by GC42.8.1 shall set forth the amount claimed to be owing and the person who by contract is primarily liable.

42.9 Her Majesty may, upon receipt of a notice of claim under GC42.8.1, withhold from any amount that is due and payable to the Contractor pursuant to the contract the full amount of the claim or any portion thereof.

42.10 The Departmental Representative shall notify the Contractor in writing of receipt of any claim referred to in GC42.8.1 and of the intention of Her Majesty to withhold funds pursuant to GC42.9 and the Contractor may, at any time thereafter and until payment is made to the claimant, be entitled to post, with Her Majesty, security in a form acceptable to Her Majesty in an amount equal to the value of the claim, the notice of which is received by the Departmental Representative and upon receipt of such security Her Majesty shall release to the Contractor any funds which would be otherwise payable to the Contractor, that were withheld pursuant to the provisions of GC42.9 in respect of the claim of any claimant for whom the security stands.

GC43 Security Deposit – Forfeiture or Return

43.1 If

43.1.1 the work is taken out of the Contractor's hands pursuant to GC38,

43.1.2 the contract is terminated pursuant to GC41, or

43.1.3 the Contractor is in breach of or in default under the contract,

Her Majesty may convert the security deposit, if any, to Her own use.

43.2 If Her Majesty converts the contract security pursuant to GC43.1, the amount realized shall be deemed to be an amount due from Her Majesty to the Contractor under the contract.

43.3 Any balance of an amount referred to in GC43.2 that remains after payment of all losses, damage and claims of Her Majesty and others shall be paid by Her Majesty to the Contractor if, in the opinion of the Departmental Representative, it is not required for the purposes of the contract.

GC44 Departmental Representative's Certificates

44.1 On the date that

44.1.1 the work has been completed, and

44.1.2 the Contractor has complied with the contract and all orders and directions made pursuant thereto,

both to the satisfaction of the Departmental Representative, the Departmental Representative shall issue a Final Certificate of Completion to the Contractor.

44.2 If the Departmental Representative is satisfied that the work is substantially complete he shall, at any time before he issues a certificate referred to in GC44.1, issue an Interim Certificate of Completion to the Contractor, and

44.2.1 for the purposes of GC44.2 the work will be considered to be substantially complete,

44.2.1.1 when the work under the contract or a substantial part thereof is, in the opinion of the Departmental Representative, ready for use by Her Majesty or is being used for the purpose intended; and

44.2.1.2 when the work remaining to be done under the contract is, in the opinion of the Departmental Representative, capable of completion or correction at accost of not more that

44.2.1.2.1 -3% of the first $500,000, and

44.2.1.2.2 -2% of the next $500,000, and

44.2.1.2.3 -1% of the balance

of the value of the contract at the time this cost is calculated.

44.3 For the sole purpose of GC44.2.1.2, where the work or a substantial part thereof is ready for use or is being used for the purposes intended and the remainder of the work or a part thereof cannot be completed by the time specified in A2.1, or as amended pursuant to GC36, for reasons beyond the control of the Contractor or where the Departmental Representative and the Contractor agree not to complete a part of the work within the specified time, the cost of that part of the work

which was either beyond the control of the Contractor to complete or the Departmental Representative and the Contractor have agreed not to complete by the time specified shall be deducted from the value of the contract referred to GC44.2.1.2 and the said cost shall not form part of the cost of the work remaining to be done in determining substantial completion.

44.4 An Interim Certificate of Completion referred to in GC44.2 shall describe the parts of the work not completed to the satisfaction of the Departmental Representative and all things that must be done by the Contractor

44.4.1 before a Final Certificate of Completion referred to in GC44.1 will be issued, and

44.4.2 before the 12-month period referred to in GC32.1.2 shall commence for the said parts and all the said things.

44.5 The Departmental Representative may, in addition to the parts of the work described in an Interim Certificate of Completion referred to in GC44.2, require the Contractor to rectify any other parts of the work not completed to his satisfaction and to do any other things that are necessary for the satisfactory completion of the work.

44.6 If the contract or a part thereof is subject to a Unit Price Arrangement, the Departmental Representative shall measure and record the quantities of labour, plant and material, performed, used and supplied by the Contractor in performing the work and shall, at the request of the Contractor, inform him of those measurements.

44.7 The Contractor shall assist and co-operate with the Departmental Representative in the performance of his duties referred to in GC44.6 and shall be entitled to inspect any record made by the Departmental Representative pursuant to GC44.6.

44.8 After the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, he shall, if GC44.6 applies, issue a Final Certificate of Measurement.

44.9 A Final Certificate of Measurement referred to in GC44.8 shall

44.9.1 contain the aggregate of all measurements of quantities referred to in GC44.6, and

44.9.2 be binding upon and conclusive between Her Majesty and the Contractor as to the quantities referred to therein.

GC45 Return of Security Deposit

45.1 After an Interim Certificate of Completion referred to in GC44.2 has been issued, Her Majesty shall, if the Contractor is not in breach of or in default under the contract, return to the Contractor all or any part of the security deposit that, in the opinion of the Departmental Representative, is not required for the purposes of the contract.

45.2 After a Final Certificate of Completion referred to in GC44.1 has been issued, Her Majesty shall return to the Contractor the remainder of any security deposit unless the contract stipulates otherwise.

45.3 If the security deposit was paid into the Consolidated Revenue Fund of Canada, Her Majesty shall pay interest thereon to the Contractor at a rate established from time to time pursuant to section 21(2) of the Financial Administration Act.

GC46 Clarification of Terms in GC47 to GC50

46.1 For the purposes of GC47 to GC50,

46.1.1 "Unit Price Table" means the table set out in the Articles of Agreement, and

46.1.2 "plant" does not include tools customarily provided by a tradesman in practicing his trade.

GC47 Additions or Amendments to Unit Price Table

47.1 Where a Unit Price Arrangement applies to the contract or a part thereof the Departmental Representative and the Contractor may, by an agreement in writing,

47.1.1 add classes of labour or material, and units of measurement, prices per unit and estimated quantities to the Unit Price Table if any labour, plant or material that is to be included in the Final Certificate of Measurement referred to in GC44.8 is not included in any class of labour, plant or material set out in the Unit Price Table; or

47.1.2 subject to GC47.2 and GC47.3, amend a price set out in the Unit Price Table for any class of labour, plant or material included therein if the Final Certificate of Measurement referred to in GC44.8 shows or is expected to show that the total quantity of that class of labour, plant or material actually performed, used or supplied by the Contractor in performing the work is

47.1.2.1 less than 85% of that estimated total quantity, or

47.1.2.2 in excess of 115% of that estimated total quantity.

47.2 In no event shall the total cost of an item set out in the Unit Price Table that has been amended pursuant to GC47.1.2.1 exceed the amount that would have been payable to the Contractor had the estimated total quantity actually been performed, used or supplied.

47.3 An amendment that is made necessary by GC47.1.2.2 shall apply only to the quantities that are in excess of 115%.

47.4 If the Departmental Representative and the Contractor do not agree as contemplated in GC47.1, the Departmental Representative shall determine the class and the unit of measurement of the labour, plant or material and, subject to GC47.2 and GC47.3, the price per unit therefore shall be determined in accordance with GC50.

GC48 Determination of Cost – Unit Price Table

48.1 Whenever, for the purposes of the contract, it is necessary to determine the cost of labour, plant or material, it shall be determined by multiplying the quantity of that labour, plant or material expressed in the unit set out in column 3 of the Unit Price Table by the price of that unit set out in column 5 of the Unit Price Table.

GC49 Determination of Cost – Negotiation

49.1 If the method described in GC48 cannot be used because the labour, plant or material is of a kind or class that is not set out in the Unit Price Table, the cost of that labour, plant or material for the purposes of the contract shall be the amount agreed upon from time to time by the Contractor and the Departmental Representative.

49.2 For the purposes of GC49.1, the Contractor shall submit to the Departmental Representative any necessary cost information requested by the Departmental Representative in respect of the labour, plant and material referred to in GC49.1

GC50 Determination of Cost – Failing Negotiation

50.1 If the methods described in GC47, GC48 or GC49 fail for any reason to achieve a determination of the cost of labour, plant and material for the purposes referred to therein, that cost shall be equal to the aggregate of

50.1.1 all reasonable and proper amounts actually expended or legally payable by the Contractor in respect of the labour, plant and material that falls within one of the classes of expenditure described in GC50.2 that are directly attributable to the performance of the contract,

50.1.2 an allowance for profit and all other expenditures or costs, including overhead, general administration cost, financing and interest charges, and every other cost, charge and expenses, but not including those referred to in GC50.1.1 or GC50.1.3 or a class referred to in GC50.2, in an amount that is equal to 10% of the sum of the expenses referred to in GC50.1.1, and

50.1.3 interest on the cost determined under GC50.1.1 and GC50.1.2, which interest shall be calculated in accordance with TP9,

provide that the total cost of an item set out n the Unit Price Table that is subject to the provisions of GC47.1.2.1 does not exceed the amount that would have been payable to the Contractor had the estimated total quantity of the said item actually be performed, used or supplied.

50.2 For purposes of GC50.1.1 the classes of expenditure that may be taken into account in determining the cost of labour, plant and material are,

50.2.1 payments to subcontractors;

50.2.2 wages, salaries and travelling expenses of employees of the Contractor while they are actually and properly engaged on the work, other than wages, salaries, bonuses, living

and travelling expenses of personnel of the Contractor generally employed at the head office or at a general office of the Contractor unless they are engaged at the work site with the approval of the Departmental Representative,

50.2.3 assessments payable under any statutory authority relating to workmen's compensation, unemployment insurance, pension plan or holidays with pay;

50.2.4 rent that is paid for plant or an amount equivalent of the said rent if the plant is owned by the Contractor that is necessary for and used in the performance of the work, if the rent of the equivalent amount is reasonable and use of that plant has been approved by the Departmental Representative;

50.2.5 payments for maintaining and operating plant necessary for and used in the performance of the work, and payments for effecting such repairs thereto as, in the opinion of the Departmental Representative, are necessary to the proper performance of the contract other than payments for any repairs to the plant arising out of defects existing before its allocation to the work;

50.2.6 payments for material that is necessary for and incorporated in the work, or that is necessary for and consumed in the performance of the contract;

50.2.7 payments for preparation, delivery, handling, erection, installation, inspection protection and removal of the plant and material necessary for and used in the performance of the contract; and

50.2.8 any other payments made by the Contractor with the approval of the Departmental Representative that are necessary for the performance of the contract.

GC51 Records to be kept by Contractor

51.1 The Contractor shall

51.1.1 maintain full records of his estimated and actual cost of the work together with all tender calls, quotations, contracts, correspondence, invoices, receipts and vouchers relating thereto.

51.1.2 make all records and material referred to in GC5.1.1 available to audit and inspection by the Minister and the Deputy Receiver General for Canada or by persons acting on behalf of either of both of them, when requested;

51.1.3 allow any of the person referred to in GC51.1.2 to make copies of and to take extracts from any of the records and material referred to in GC51.1.1; and

51.1.4 furnish any person referred to in GC51.1.2 with any information he may require from time to time in connection with such records and material.

51.2 The records maintained by the Contractor pursuant to GC51.1.1 shall be kept intact by the Contractor until the expiration of two years after the date that a Final Certificate of Completion referred to in GC44.1 was issued or until the expiration of such other period of time as the

Minister may direct.

51.3 The Contractor shall cause all subcontractors and all other persons directly or indirectly controlled by or affiliated with the Contractor and all persons directly or indirectly having control of the Contractor to comply with GC51.1 and GC51.2 as if they were the Contractor.

GC52 Conflict of Interest

52.1 It is a term of this contract that no former public office holder who is not in compliance with the Conflict of Interest and Post-Employment Code for Public Office Holders shall derive a direct benefit from this contract.

GC53 Contractor Status

53.1 The Contractor shall be engaged under the contract as an independent contractor.

53.2 The Contractor and any employee of the said Contractor is not engaged by the contract as an employee, servant or agent of Her Majesty.

53.3 For the purposes of GC53.1 and GC53.2 the Contractor shall be solely responsible for any and all payments and deductions required to be made by law including those required for Canada or Quebec Pension Plans, Unemployment Insurance, Worker's Compensation or Income Tax.

GENERAL CONDITONS

IC 1 Proof of Insurance
IC 2 Risk Management
IC 3 Payment of Deductible
IC 4 Insurance Coverage

GENERAL INSUANCE COVERAGES

GCI 1 Insured
GIC 2 Period of Insurance
GIC 3 Proof of Insurance
GIC 4 Notification

COMMERCIAL GENERAL LIABILITY

CGL 1 Scope of Policy
CGL 2 Coverages/Provisions
CGL 3 Additional Exposures
CGL 4 Insurance Proceeds
CGL 5 Deductible

BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS

BR 1 Scope of Policy
BR 2 Property Insured
BR 3 Insurance Proceeds
BR 4 Amount of Insurance
BR 5 Deductible
BR 6 Subrogation
BR 7 Exclusion Qualifications

INSURER'S CERTIFICATE OF INSURANCE

General Conditions

IC 1 Proof of Insurance
(02/12/03)

Within thirty (30) days after acceptance of the Contractor's tender, the Contractor shall, unless otherwise directed in writing by the Contracting Officer, deposit with the Contracting Officer an Insurer's Certificate of Insurance in the form displayed in this document and, if requested by the Contracting Officer, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Insurance Coverage Requirements shown hereunder.

IC 2 Risk Management
(01/10/94)

The provisions of the Insurance Coverage Requirements contained hereunder are not intended to cover all of the Contractor's obligations under GC8 of the General Conditions "C" of the contract. Any additional risk management measures or additional insurance coverages the Contractor may deem necessary to fulfill its obligations under GC8 shall be at its own discretion and expense.

IC 3 Payment of Deductible
(01/10/94)

The payment of monies up to the deductible amount made in satisfaction of a claim shall be borne by the Contactor.

IC 4 Insurance Coverage
(02/12/03)

The Contractor has represented that it has in place and effect the appropriate and usual liability insurance coverage as required by these Insurance Conditions and the Contractor has warranted that it shall obtain, in a timely manner and prior to commencement of the Work, the appropriate and usual property insurance coverage as required by these Insurance Conditions and, further, that it shall maintain all required insurance policies in place and effect as required by these Insurance Conditions.

INSURANCE COVERAGE REQUIREMENTS

PART I
GENERAL INSUANCE COVERAGES (GIC)

GCI 1 Insured
(02/12/03)

Each insurance policy shall insure the Contractor, and shall include, as an Additional Named Insured, Her Majesty the Queen in right of Canada, represented by the National Research Council Canada.

GIC 2 Period of Insurance
(02/12/03)

Unless otherwise directed in writing by the Contracting Officer or otherwise stipulated elsewhere in these Insurance Conditions, the policies required hereunder shall be in force and be maintained from the date of the contract award until the day of issue of the Departmental Representative's Final Certificate of Completion.

GIC 3 Proof of Insurance
(01/10/94)

Within twenty five (25) days after acceptance of the Contractor's tender, the Insurer shall, unless otherwise directed by the Contractor, deposit with the Contractor an Insurer's Certificate of Insurance in the form displayed in the document and, if requested, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the requirements of these Insurance Coverages.

GIC 4 Notification
(01/10/94)

Each Insurance policy shall contain a provision that (30) days prior written notice shall be given by the Insurer to Her Majesty in the event of any material change in or cancellation of coverage. Any such notice received by the Contractor shall be transmitted forthwith to Her Majesty.

PART II
COMMERCIAL GENERAL LIABILITY

CGL 1 Scope of Policy
(01/10/94)

The policy shall be written on a form similar to that known and referred to in the insurance industry as IBC 2100 – Commercial General Liability policy (Occurrence form) and shall provide for limit of liability of not less than $2,000,000 inclusive for Bodily Injury and Property Damage for any one occurrence or series of occurrences arising out of one cause. Legal or defence cost incurred in respect of a claim or claims shall not operate to decrease the limit of liability.

CGL 2 Coverages/Provisions
(01/10/94)

The policy shall include but not necessarily be limited to the following coverages/provisions.

2.1 Liability arising out of or resulting from the ownership, existence, maintenance or use of premises by the Contractor and operations necessary or incidental to the performance of this contract.

2.2 "Broad Form" Property Damage including the loss of use of property.

2.3 Removal or weakening of support of any building or land whether such support be natural or otherwise.

2.4 Elevator liability (including escalators, hoists and similar devices).

2.5 Contractor's Protective Liability

2.6 Contractual and Assumed Liabilities un this contact.

2.7 Completed Operations Liability – The insurance, including all aspects of this Part II of these Insurance Conditions shall continue for a period of at least one (1) year beyond the date of the Departmental Representative's Final Certificate of Completion for the Completed Operations.

2.8 Cross Liability – The Clause shall be written as follows:

Cross Liability – The insurance as is afforded by this policy shall apply in respect to any claim or action brought against any one Insured by any other Insured. The coverage shall apply in the same manner and to the same extent as though a separate policy had been issued to each Insured. The inclusion herein of more than one Insured shall not increase the limit of the Insurer's liability.

2.9 Severability of Interests – The Clause shall be written as follows:

Severability of Interests – This policy, subject to the limits of liability stated herein, shall apply separately to each Insured in the same manner and to the same extent as if a separate policy had been issued to each. The inclusion herein of more than one insured shall not increase the limit of the Insurer's liability.

CGL 3 Additional Exposures
(02/12/03)

The policy shall either include or be endorsed to include the following exposures of hazards if the Work is subject thereto:

3.1 Blasting

3.2 Pile driving and calsson work

3.3 Underpinning

3.4 Risks associated with the activities of the Contractor on an active airport

3.5 Radioactive contamination resulting from the use of commercial isotopes

3.6 Damage to the portion of an existing building beyond that directly associated with an addition, renovation or installation contract.

3.7 Marine risks associated with the contraction of piers, wharves and docks.

CGL 4 Insurance Proceeds
(01/10/94)

Insurance Proceeds from this policy are usually payable directly to a Claimant/Third Party.

CGL 5 Deductible
(02/12/03)

This policy shall be issued with a deductible amount of not more than $10,000 per occurrence applying to Property Damage claims only.

PART III
BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS

BR 1 Scope of Policy
(01/10/94)

The policy shall be written on an "All Risks" basis granting coverages similar to those provided by the forms known and referred to in the insurance industry as "Builder's Risk Comprehensive Form" or "Installation Floater – All Risks".

BR 2 Property Insured
(01/10/94)

The property insured shall include:

2.1 The Work and all property, equipment and materials intended to become part of the finished Work at the site of the project while awaiting, during and after installation, erection or construction including testing.

2.2 Expenses incurred in the removal from the construction site of debris of the property insured, including demolition of damaged property, de-icing and dewatering, occasioned by loss, destruction or damage to such property and in respect of which insurance is provided by this policy.

BR 3 Insurance Proceeds
(01/10/94)

3.1 Insurance proceeds from this policy are payable in accordance with GC28 of the General Conditions "C" of the contract.

3.2 This policy shall provide that the proceeds thereof are payable to Her Majesty or as the Minister may direct.

3.3 The Contractor shall do such things and execute such documents as are necessary to effect payment of the proceeds.

BR 4 Amount of Insurance
(01/10/94)

The amount of insurance shall not be less than the sum of the contract value plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Her Majesty at the site of the project to be incorporated into and form part of the finished Work.

BR 5 Deductible
(02/12/03)

The Policy shall be issued with a deductible amount of not more than $10,000.

BR 6 Subrogation
(01/10/94)

The following Clause shall be included in the policy:

"All rights of subrogation or transfer of rights are hereby waived against any corporation, firm, individual or other interest, with respect to which, insurance is provided by this policy".

BR 7 Exclusion Qualifications
(01/10/94)

The policy may be subject to the standard exclusions but the following qualifications shall apply:

7.1 Faulty materials, workmanship or design may be excluded only to the extent of the cost of making good thereof and shall not apply to loss or damage resulting therefrom.

7.2 Loss or damage caused by contamination by radioactive material may be excluded except for loss or damage resulting from commercial isotopes used for industrial measurements, inspection, quality control radiographic or photographic use.

7.3 Use and occupancy of the project or any part of section thereof shall be permitted where such use and occupancy is for the purpose for which the project is intended upon completion.

INSURER'S CERTIFICATE OF INSURANCE

(TO BE COMPLETED BY INSURER (NOT BOKER) AND DELIVERD TO NATIONAL RESEARCH COUNCIL CANADA WITH 30 DAYS FOLLOWING ACCEPTANCE OF TENDER)

CONTRACT

DESCRIPTION OF WORK	CONTRACT NUMBER	AWARD DATE
LOCATION		

INSURER

NAME
ADDRESS

BROKER

NAME
ADDRESS

INSURED

NAME OF CONTRACTOR
ADDRESS

ADDITIONAL INSURED

HER MAJESTY THE QUEEN IN RIGHT OF CANADA AS REPRESENTED BY THE NATIONAL RESEARCH COUNCIL CANADA

THIS DOCUENT CERTIFIES THAT THE FOLLOWING POLICES OF INSURANCE ARE AT PRESENT IN FORCE COVERING ALL OPERATIONS OF THE INSURE IN CONNECTION WITH THE CONTRACT MADE BETWEEN THE NAMED INSURED AND THE NATIONAL RESEARCH COUNCIL CANADA AND IN ACCORDANCE WITH THE INSURANCE CONDITIONS "E"

POLICY					
TYPE	NUMBER	INCEPTION DATE	EXPIRY DATE	LIMITS OF LIABILITY	DEDUCTIBLE
COMMERCIAL GENERAL LIABILITY					
BUILDERS RISK "AL RISKS"					
INSTALLATION FLOATER "ALL RISKS"					

THE INSURER AGREES TO NOTIFY THE NATIONAL RESEARCH COUNCIL CANADA IN WRITING 30 DAYS PRIOR TO ANY MATERIAL CHANGE IN OR CANCELLATION OF ANY POLICY OR COVERAGE SPECIFICALLY RELATED TO THE CONTRACT

NAME OF INSURER'S OFFICER OR AUTHORIZED EMPLOYEE	SIGNATURE	DATE:
		TELEPHONE NUMBER:

ISSUANCE OF THIS CERTIFIATE SHALL NOT LIMIT OR RESTRICT THE RIGHT OF THE NATIONAL RESEARCH COUNCIL CANADA TO REQUEST AT ANY TIME DUPLICATE COPIES OF SAID INSURANCE POLICIES

CS1 Obligation to provide Contract Security

1.1 The Contractor shall, at the Contractor's own expense, provide one or more of the forms of contract security prescribed in CS2.

1.2 The Contractor shall deliver to the Departmental Representative the contract security referred to in CS1.1 within 14 days after the date that the Contractor receives notice that the Contractor's tender or offer was accepted by Her Majesty.

CS2 Prescribed Types and Amounts of Contract Security

2.1 The Contractor shall deliver to the Departmental Representative pursuant to CS1

2.1.1 a performance bond and a labour and material payment bond each in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, or

2.1.2 a labour and material payment bond in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, and a security deposit in an amount that is equal to

2.1.2.1 not less than 10% of the contract amount referred to in the Articles of Agreement where that amount does not exceed $250,000, or

2.1.2.2 $25,000 plus 5% of the part of the contract amount referred to in the Articles of Agreement that exceeds $250,000, or

2.1.3 a security deposit in an amount prescribed by CS2.12 plus an additional amount that is equal to 10% of the contract amount referred to in the Articles of Agreement.

2.2 A performance bond and a labour and material payment bond referred to in CS2.1 shall be in a form and be issued by a bonding or surety company that is approved by Her Majesty.

2.3 The amount of a security deposit referred to in CS2.1.2 shall not exceed $250,000 regardless of the contract amount referred to in the Articles of Agreement.

2.4 A security deposit referred to in CS2.1.2 and CS2.1.3 shall be in the form of

2.4.1 a bill of exchange made payable to the Receiver General of Canada and certified by an approved financial institution or drawn by an approved financial institution on itself, or

2.4.2 bonds of or unconditionally guaranteed as to principal and interest by the Government of Canada.

2.5 For the purposes of CS2.4

2.5.1 a bill of exchange is an unconditional order in writing signed by the Contractor and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed or determinable future time a sum certain of money to, or to the order

of, the Receiver General for Canada, and

2.5.2 If a bill of exchange is certified by a financial institution other than a chartered bank then it must be accompanied by a letter or stamped certification confirming that the financial institution is in a t least one of the categories referred to in CS2.5.3

2.5.3 an approved financial institution is

2.5.3.1 any corporation or institution that is a member of the Canadian Payments Association,

2.5.3.2 a corporation that accepts deposits that are insured by the Canada Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec to the maximum permitted by law,

2.5.3.3 a credit union as defined in paragraph 137(6)(b) of the *Income Tax Act*,

2.5.3.4 a corporation that accepts deposits from the public, if repayment of the deposit is guaranteed by Her Majesty in right of a province, or

2.5.3.5 The Canada Post Corporation.

2.5.4 the bonds referred to in CS2.4.2 shall be

2.5.4.1 made payable to bearer, or

2.5.4.2 accompanied by a duly executed instrument of transfer of the bonds to the Receiver General for Canada in the form prescribed by the Domestic Bonds of Canada Regulations, or

2.5.4.3 registered, as to principal or as to principal and interest in the name of the Receiver General for Canada pursuant to the Domestic Bonds of Canada Regulations, and

2.5.4.4 provided on the basis of their market value current at the date of the contract.

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat	
Security Classification / Classification de sécurité	

SECURITY REQUIREMENTS CHECK LIST (SRCL)
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine	2. Branch or Directorate / Direction générale ou Direction
National Research Council	ASPM/SAGI
3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant

4. Brief Description of Work / Brève description du travail
Renovation at M-58 Ground floor East and West wing.

5. a) Will the supplier require access to Controlled Goods? Le fournisseur aura-t-il accès à des marchandises contrôlées?	☒ No Non	☐ Yes Oui
5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?	☒ No Non	☐ Yes Oui
6. Indicate the type of access required / Indiquer le type d'accès requis		
6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c)	☒ No Non	☐ Yes Oui
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.	☐ No Non	☒ Yes Oui
6. c) Is this a commercial courier or delivery requirement with **no** overnight storage? S'agit-il d'un contrat de messagerie ou de livraison commerciale **sans** entreposage de nuit?	☒ No Non	☐ Yes Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada ☒	NATO / OTAN ☐	Foreign / Étranger ☐
7. b) Release restrictions / Restrictions relatives à la diffusion		
No release restrictions / Aucune restriction relative à la diffusion ☒	All NATO countries / Tous les pays de l'OTAN ☐	No release restrictions / Aucune restriction relative à la diffusion ☐
Not releasable / À ne pas diffuser ■		
Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ■	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐
7. c) Level of information / Niveau d'information		
PROTECTED A / PROTÉGÉ A ☐	NATO UNCLASSIFIED / NATO NON CLASSIFIÉ ☐	PROTECTED A / PROTÉGÉ A ☐
PROTECTED B / PROTÉGÉ B ☐	NATO RESTRICTED / NATO DIFFUSION RESTREINTE ☐	PROTECTED B / PROTÉGÉ B ☐
PROTECTED C / PROTÉGÉ C ☐	NATO CONFIDENTIAL / NATO CONFIDENTIEL ☐	PROTECTED C / PROTÉGÉ C ☐
CONFIDENTIAL / CONFIDENTIEL ☐	NATO SECRET / NATO SECRET ☐	CONFIDENTIAL / CONFIDENTIEL ☐
SECRET / SECRET ☐	COSMIC TOP SECRET / COSMIC TRÈS SECRET ☐	SECRET / SECRET ☐
TOP SECRET / TRÈS SECRET ☐		TOP SECRET / TRÈS SECRET ☐
TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) ☐		TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) ☐

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PART A *(continued)* / PARTIE A *(suite)*

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS?
If Yes, indicate the level of sensitivity:
Dans l'affirmative, indiquer le niveau de sensibilité : ☒ No / Non ☐ Yes / Oui

9. Will the supplier require access to extremely sensitive INFOSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate? ☒ No / Non ☐ Yes / Oui

Short Title(s) of material / Titre(s) abrégé(s) du matériel :
Document Number / Numéro du document :

PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

☒ RELIABILITY STATUS / COTE DE FIABILITÉ	☐ CONFIDENTIAL / CONFIDENTIEL	☐ SECRET / SECRET	☐ TOP SECRET / TRÈS SECRET
☐ TOP SECRET– SIGINT / TRÈS SECRET – SIGINT	☐ NATO CONFIDENTIAL / NATO CONFIDENTIEL	☐ NATO SECRET / NATO SECRET	☐ COSMIC TOP SECRET / COSMIC TRÈS SECRET
☐ SITE ACCESS / ACCÈS AUX EMPLACEMENTS			

Special comments:
Commentaires spéciaux : _____

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.
REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work?
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail? ☒ No / Non ☐ Yes / Oui

If Yes, will unscreened personnel be escorted?
Dans l'affirmative, le personnel en question sera-t-il escorté? ☒ No / Non ☐ Yes / Oui

PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises?
Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS? ☒ No / Non ☐ Yes / Oui

11. b) Will the supplier be required to safeguard COMSEC information or assets?
Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC? ☒ No / Non ☐ Yes / Oui

PRODUCTION

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises?
Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ? ☒ No / Non ☐ Yes / Oui

INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data?
Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS? ☒ No / Non ☐ Yes / Oui

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency?
Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale? ☒ No / Non ☐ Yes / Oui

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PART C - *(continued)* / PARTIE C - *(suite)*

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.
Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.
Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category / Catégorie	PROTECTED / PROTÉGÉ			CLASSIFIED / CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET	NATO RESTRICTED / NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL / NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET / COSMIC TRÈS SECRET	PROTECTED / PROTÉGÉ A	PROTECTED / PROTÉGÉ B	PROTECTED / PROTÉGÉ C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET
Information / Assets / Renseignements / Biens																
Production	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
IT Media / Support TI	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
IT Link / Lien électronique	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?
La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

☒ No / Non ☐ Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".
Dans l'affirmative, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?
La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

☒ No / Non ☐ Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).
Dans l'affirmative, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquer qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).

Government of Canada / Gouvernement du Canada

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PART D - AUTHORIZATION / PARTIE D - AUTORISATION

13. Organization Project Authority / Chargé de projet de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Derek Foot	Construction Project Manager	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
613-991-4451		derek.foot@nrc.gc.ca	September 19, 2016

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Charlotte Carrier	***Controlled Goods and Contracts Security Coordinator***	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
(613) 993-8956	(613) 990-0946	Charlotte.Carrier@nrc-cnrc.gc.ca	19 Sep 2016

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?
Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?
☒ No / Non ☐ Yes / Oui

16. Procurement Officer / Agent d'approvisionnement

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Collin Long	Procurement Officer	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
613-993-0431		collin.long@nrc-cnrc.gc.ca	Oct. 4, 2016

17. Contracting Security Authority / Autorité contractante en matière de sécurité

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date