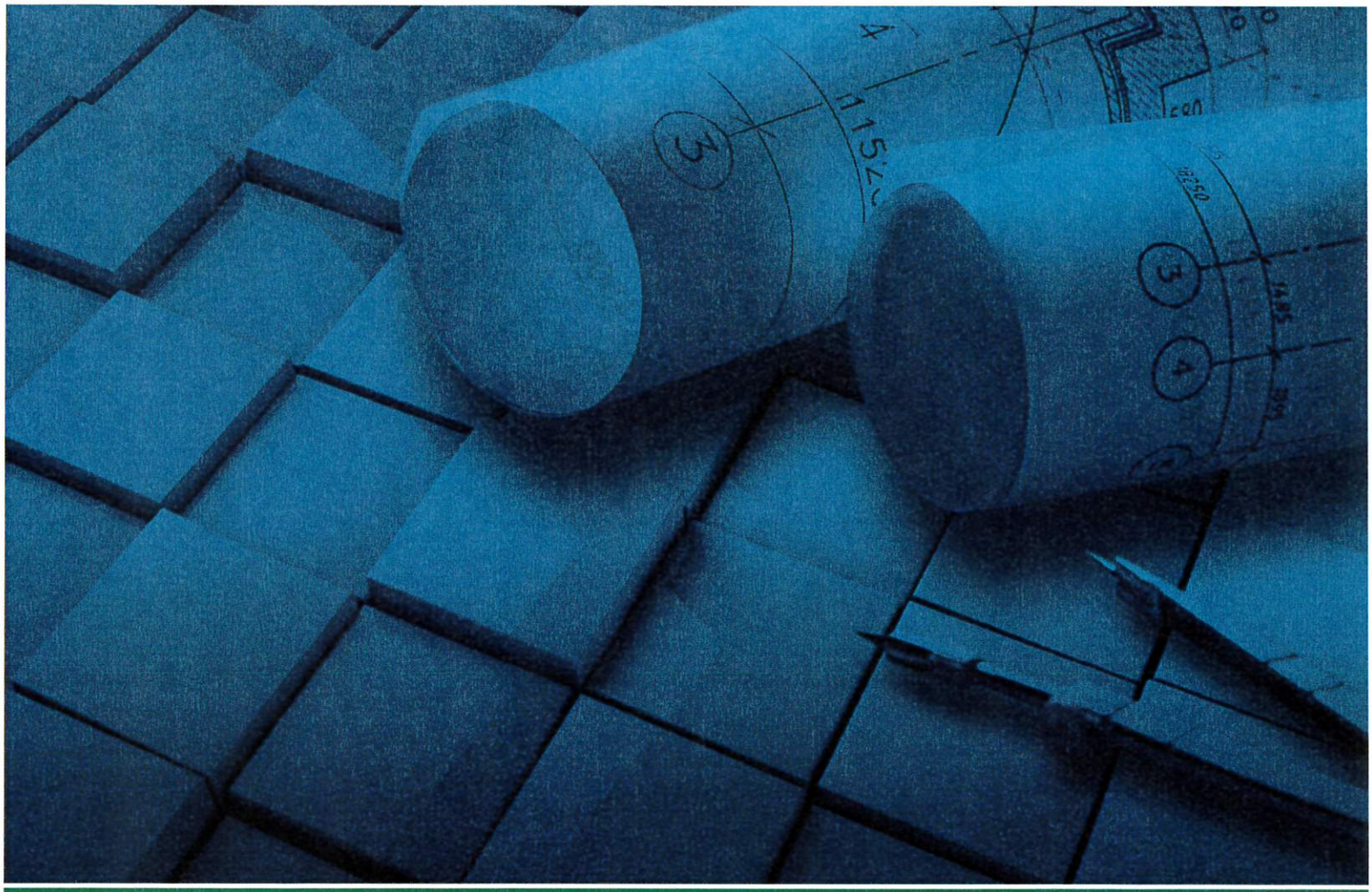

NRC·CNRC Administrative Services and Property Management

SPECIFICATIONS

SOLICITATION #: 18-22082

BUILDING: U-61
1920 Research Private
Ottawa, Ontario

PROJECT: U61- Washrooms Renovation 205

PROJECT #: U61-5553

Date: November 2018

SPECIFICATION

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NRC·CNRC
From Discovery to Innovation...

Directions to the Ottawa Research Facilities — Uplands

NRC Institute for Aerospace Research (NRC-IAR)
Research Road
Ottawa, Ontario, Canada

Tel: 613-991-5738

NRC Centre for Surface Transportation Technology (NRC-CSTT)
2320 Lester Road
Ottawa, Ontario, Canada

Tel: 613-998-9639

NRC Institutes/Branch/Program	Buildings
NRC Administrative Services and Property Management (NRC-ASPM)	U-62
NRC Institute For Aerospace Research (NRC-IAR)	U-61, U-66, U-67, U-69, U-70
NRC Centre for Surface Transportation Technology (NRC-CSTT)	U-84, U-86, U-87, U-88, U89, U-90, U-91

By Road, from the MONTREAL RD FACILITIES to NRC-CSTT, 2320 Lester Road

1. Drive EAST on MONTREAL RD
2. Turn RIGHT on BLAIR RD, cross OGILVIE RD
3. Take the ramp and follow Highway 174 WEST
4. Keep RIGHT and take first exit on ramp Highway 417 EAST towards Cornwall/Montreal
5. Exit at WALKLEY RD, merge RIGHT on WALKLEY
6. Turn LEFT at CONROY RD
7. Turn RIGHT at DAVIDSON RD, cross BANK ST – name changes to LESTER RD
8. Continue on LESTER RD and watch for NRC Research Facilities signs

By Road, from the MONTREAL RD FACILITIES to NRC-IAR, Research Road

1. Drive EAST on MONTREAL RD
2. Turn RIGHT on BLAIR RD, cross OGILVIE RD
3. Take the ramp and follow Highway 174 WEST
4. Keep RIGHT and take first exit on ramp Highway 417 EAST towards Cornwall/Montreal
5. Exit at WALKLEY RD, merge RIGHT on WALKLEY
6. Turn LEFT at HAWTHORNE RD
7. Turn RIGHT at HUNT CLUB RD, cross CONROY RD, ALBION RD, BANK ST
8. Turn LEFT at UPLANDS DR. Continue and watch for NRC Research Facilities signs


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
Island Park
Ottawa River
Carling
Fisher
Prince of Wales
Bronson
Walkley
Heron
Hawthorne
Hunt Club
Baseline
Riverside
Conroy
Uplands
Airport
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Davidson
Albion
Hunt Club (W)
Merivale
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Fallowfield
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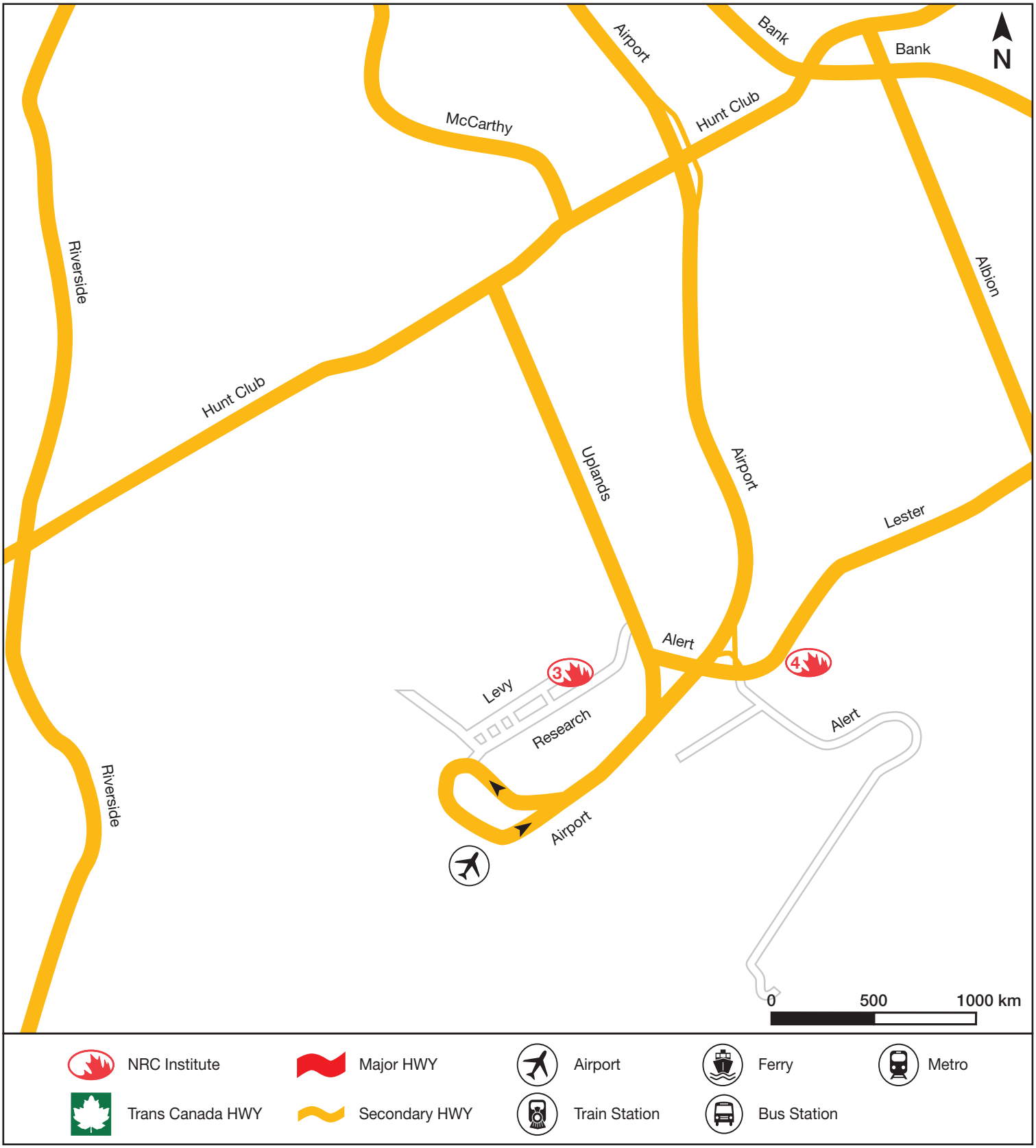
Airport
Train Station
Ferry
Bus Station
Metro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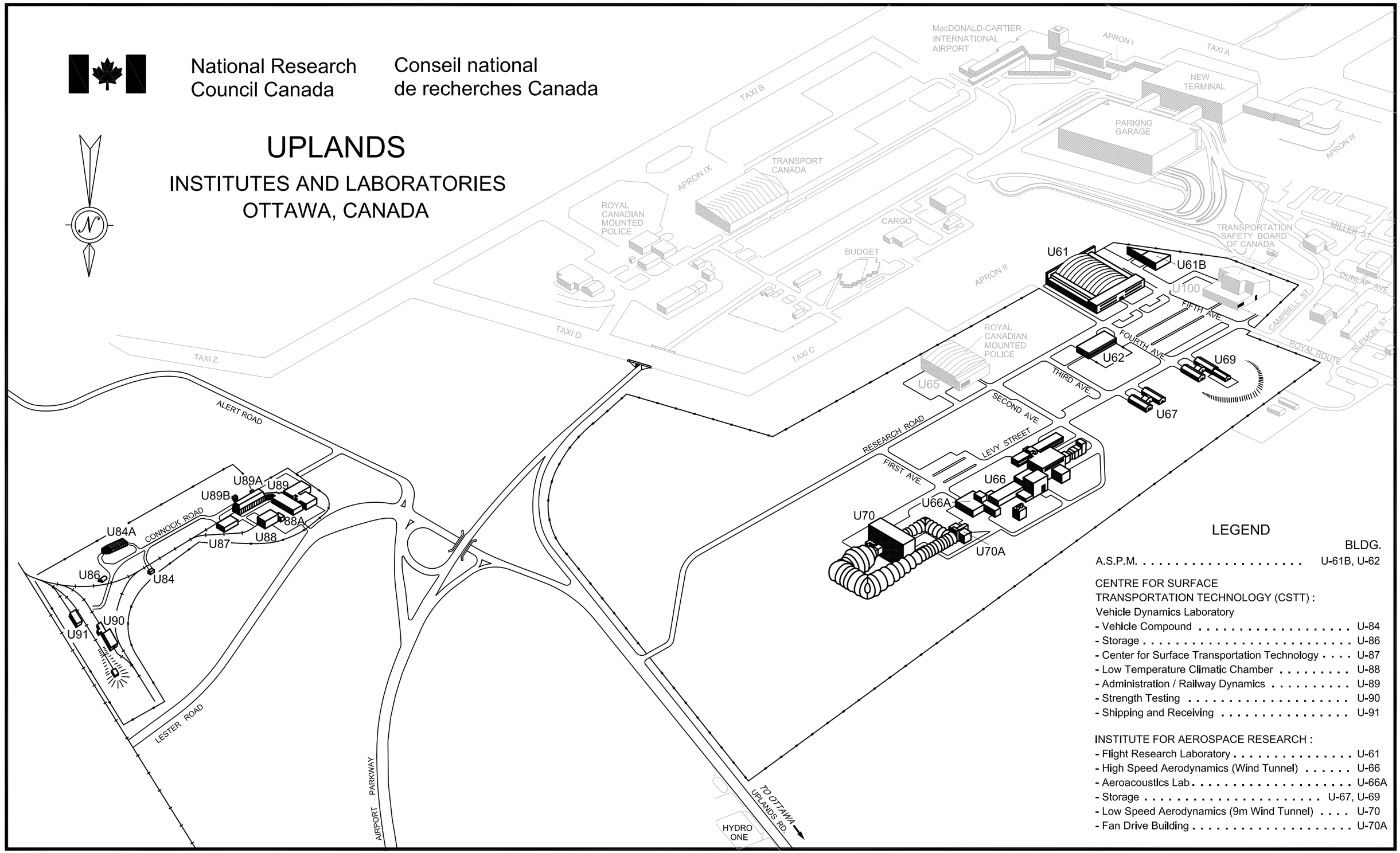
Ferry
Metro
Trans Canada HWY
Secondary HWY
Train Station
Bus Station

National Research Council Canada

Conseil national de recherches Canada

UPLANDS

INSTITUTES AND LABORATORIES
OTTAWA, CANADA



LEGEND

	BLDG.
A.S.P.M.	U-61B, U-62
CENTRE FOR SURFACE TRANSPORTATION TECHNOLOGY (CSTT) :	
Vehicle Dynamics Laboratory	
- Vehicle Compound	U-84
- Storage	U-86
- Center for Surface Transportation Technology	U-87
- Low Temperature Climatic Chamber	U-88
- Administration / Railway Dynamics	U-89
- Strength Testing	U-90
- Shipping and Receiving	U-91
INSTITUTE FOR AEROSPACE RESEARCH :	
- Flight Research Laboratory	U-61
- High Speed Aerodynamics (Wind Tunnel)	U-66
- Aeroacoustics Lab	U-66A
- Storage	U-67, U-69
- Low Speed Aerodynamics (9m Wind Tunnel)	U-70
- Fan Drive Building	U-70A

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 **U61- Renovate Washroom 205**

Tender No.: **18-22082**

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

U61- Washroom Renovation 205

The National Research Council Canada, 1920 Research Private, Ottawa, ON has a requirement for a project that includes:

For the Renovation Washroom Room 205.

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 December 5th and December 6th, 2018 at **11:00** . Meet Sylvain Thibodeau at Building U61, Main Entrance, 1920 Private Research, 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 December 20th , 2018 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: **Sylvain Thibodeau**
Telephone: **613 301-3576.**

Contracting Authority for this project is: **Alain Leroux alain.leroux@nrc-cnrc.gc.ca**
Telephone**: 613 991-9980.**

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
Alain Leroux, Senior Contracting Officer
Building M-58
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-58
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-58, 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-58, 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

Articles of Agreement

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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END OF TABLE

1. SCOPE OF WORK

.1 Work under this contract covers the renovation of washroom 205 in the Council's Building U-61 of the National Research Council.

2. DRAWINGS

.1 The following drawings illustrate the work and form part of the contract documents:

.1 5553-A00
.2 5553-A01
.3 5553-A02
.4 5553-A03
.5 5553-A04
.6 5553-M01
.7 5553-E01

3. COMPLETION

.1 Complete all work by March 31, 2019.

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, 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.

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 may be required whenever working outside normal hours. Contractor to bear the associated costs.

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 7 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.

.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 Provide snow clearing and removal as required during the contract period.

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

.4 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.

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

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

.7 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 two (2) bilingual copies of maintenance manuals or two English and two French maintenance manuals and one electronic copy of same 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.

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 Scope of Work

.1 Provide interior protection prior to demolition work.

.2 Protection to be constructed in such a fashion so as to afford security, dust and weather resistance.

.3 [Barriers to be constructed continuously on the interior perimeter within corridor rm 201. Ensure walkthrough is maintain in hallway.

Part 2 PRODUCTS

2.1 Materials

.1 1/2" x 4'-0" x 8'-0" wood sheathing.

.2 3-5/8" metal studding.

.3 3-1/2" spruce wood, construction grade studding.

.4 6 mil. polyethylene.

.5 Vinyl reinforced tarps.

2.2 Erection

.1 Construct a solid barrier in all locations where window, A/C, or roof modifications are to occur.

.2 Construct barriers full height and line with polyethylene to ensure dust and water tightness.

.3 Have a mock-up assembly approved by the Departmental Representative prior to proceeding with the erection.

.4 Ensure that the barrier does not interfere with the building's overhead crane or the work operations of the building occupants.

Part 3 SECONDARY PROTECTION

3.1 Dust Walls

.1 As the work progresses and after all structural work and wall framing have been completed, remove the temporary interior protection walls and construct a 6 mill polyethylene dust wall in its place, to allow finish work to proceed.

.2 Install wood sheathing in the new window openings temporarily until the new glazing units have been received.

.3 Inspect walls on a regular basis to ensure integrity of the assembly and to avoid dust and water infiltration to the interior of the building.

.4 Remove interior protections only when approved by the Departmental Representative.

Part 4 REINSTATEMENTS

4.1 Finishes

.1 Reinstate the interior finishes affected by this work to the satisfaction of the Departmental Representative.

END OF SECTION

Part 1 GENERAL

1.1 Reference Standard

.1 Do welding work in accordance with CSA W59-1982 unless specified otherwise.

1.2 Shop Drawings

.1 Submit to the Engineer for approval five (5) copies of erection drawings together with shop drawings of details, special connections, reinforced openings and other non-standard items. Shop drawings to bear the stamp of a registered professional Engineer.

.2 Indicate shop and erection details including cuts, copes, connections, holes, bolts and welds. Indicate welds by welding symbols defined in [CSA W59-M1984].

.3 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

Part 2 PRODUCTS

2.1 2.1 Materials

.1 Steel sections and plates: to CAN3-G40.21- M81, Grade 300W: Hollow steel sections to CAN3-G40.21-M81, Grade 350W.

.2 Steel pipe: to ASTM A53-82 extra strong finish.

.3 Welding materials: to CSA W59-1982.

.4 Bolts and anchor bolts: to ASTM A307-82a.

.5 Galvanizing: hot dipped galvanizing with zinc coating 600g/m² (0.12 lb/ft²) to CSA G164-M1981.

.6 Shop coat primer: to CGSB 1-GP-40M.

.7 Zinc primer: zinc rich, ready mix to CGSB 1-GP-181M.

.8 Grout: non-shrink, non-metallic, flowable, 24h, MPa 15 (2175 lbs/in2), pull-out strength 7.9 MPa (1145 lbs/in2).

2.2 Fabrication

.1 Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Fabricate items from steel unless otherwise noted.

.3 Use self-tapping shake-proof, flat, round, oval headed screws on items requiring assembly by screws or as indicated.

.4 Where possible, fit and shop assemble work, ready for erection.

.5 .Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 Shop Painting

.1 Apply one shop coat of primer to metal items, with exception of stainless steel, aluminum, 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°C (45°F).

.3 Clean surfaces to be field welded, do not paint.

2.4 Angle Lintels

.1 Steel angles: prime painted, and sizes as indicated for openings. Provide 150mm (6") minimum bearing at ends.

.2 Weld or bolt back-to-back angles to profiles as indicated.

2.5 Pipe Railings

.1 Steel Pipe: [] mm nominal outside diameter, formed to shapes and sizes as indicated.

.2 Galvanize external pipe railings after fabrication.

2.6 2.6 Access Ladders

.1 Stringers: [] mm thick, steel angle.

.2 Rungs: 20mm (3/4") diameter x x mm thick, angle, welded to stringers at mm o.c.

.3 Brackets: sizes and shapes as indicated, weld to stringers at mm c.c., complete with fixing anchors.

.4 Galvanize finish for exterior, prime paint for interior.

.5 Galvanize exterior ladders after fabrication.

2.7 Trench Covers and Frames

.1 Fabricate from 6mm (1/4") thick raised pattern plate set in L55mm x 55mm x 6mm frame (2-3/16" x 2-3/16" x 1/4"). Include anchors at 1200 mm (4 ft) oc for embedding in concrete. Supply trench covers in 1200 mm (4 ft) removable lengths. Galvanized finish.

Part 3 EXECUTION

3.1 Erection

.1 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.2 Provide suitable means of anchorage acceptable to Engineer, Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.3 Make field connections, with bolts to CSA S16-1969 and CSA S1653-1981, or weld.

.4 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.5 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

.6 Touch-up galvanized surfaces with zinc primer where burned by field welding and cutting.

END OF SECTION

Part 1 GENERAL

1.1 Source Quality Control

.1 Identify lumber and plywood by grade stamp of an agency certified by Canadian Lumber Standards Administration Board and in accordance with applicable CSA standards.

1.2 PRODUCTS

1.3 Lumber Material

.1 Except as indicated or specified otherwise lumber shall be softwood, S4S, moisture content (MC) not greater than 19% at time of installation, in accordance with following standards:

.2 CSA O141-91.

.3 NLGA Standard Grading Rules for Canadian Lumber.

.4 Furring, blocking, nailing strips, grounds, rough bucks:

.5 Use S2S or S4S material.

.6 Board sizes: C or D species, utility grade.

.7 Dimension sizes: C or D species, utility grade.

.8 Plywood, exterior quality, GIS to CSA O121-M1978.

1.4 Fastenings & Hardware

.1 In accordance with Part 9 of NBC 1977 as supplemented by following requirement except where specific type is indicated.

.2 Nails, spikes and staples to NBC 9.23.3 except:

.3 Use common spiral nails and spiral spikes except where indicated otherwise.

.4 Use hot galvanized finish steel for exterior work, interior high humidity areas and for pressure treated lumber except where indicated otherwise.

.5 Bolt, nut, washer, screw and pin type fasteners: with hot-dip galvanized finish to CSA G164-M92 for exterior work, interior high humidity areas and for pressure treated lumber.

.6 Use surface fastenings of following types, except where specific type is indicated.

.1 To hollow masonry, plaster and panel surfaces use toggle bolt.

.2 To solid masonry and concrete use expansion shield with lag screw, jute fibre or lead plug with wood screw.

.3 To structural steel use bolts through drilled hole, or welded stud-bolts or power driven self-drilling screws.

.4 Submit alternate fasteners for Engineer's approval.

Part 2 EXECUTION

2.1 Furring & Blocking

.1 Install furring and blocking as required to space-out and support surface applied materials or other work as indicated.

.2 Align and plumb faces of furring and blocking to tolerance of 1:600.

2.2 Nailers

.1 Install wood nailers as indicated.

.2 Except where indicated otherwise use material at least 40 mm (1-1/2") thick secured with 10 mm (3/8") bolts located within 300 mm (1 ft.) from ends of members and uniformly spaced at 1200 mm (4 ft.) between.

.3 Countersink bolts where necessary to provide clearance for other work.

END OF SECTION

Part 1 GENERAL

1.1 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.

1.2 Shop Drawings

.1 Submit shop drawings in accordance with Section 01000.

.2 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 Hollow steel: vertically stiffened with steel ribs and all voids filled with semi-rigid fibrous insulation minimum density [24] kg/m³ [polystyrene][polyurethane].

.2 Bonded core: urethane or isocyanurate board insulation to CGSB 51-GP-21M-78.

.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 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.

1.2 Guarantee

.1 Written guarantee to be supplied against all defects for a period of not less than three (3) years.

1.3 Reference Standards

.1 Door material and construction in accordance with CAN/CSA-0132.2.

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.

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 closers, locksets and fire exit hardware.

1.5 Hardware Requirements

.1 NRC has a bonded locksmith for our keying system on standing contract. See contract coordinator for information.

.2 Contractor will be responsible to have all cylinders keyed by NRC bonded locksmith on standing offer contract.

.3 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 closers, locksets and latchsets and items listed below.

.2 Use one manufacturer's products only for all similar items.

2.2 Door Hardware Standards

.1 Hinges:

.1 Interior doors: Dorex 114.3mm x 101.6mm x 179 454 NRP X C15.

.2 Latching devices: Apply to all buildings other than buildings M-50 and M-55.

.1 Lockset "Yale" AU-5307LN x 626.

.2 Latchset "Yale" AU-5301LN x 626.

.3 Storeroom "Yale" AU-5305LN x 626, keyed on approach side for use with HES 4500 electric strike.

.3 Latching devices: Apply to building M-50 only.

.1 Lockset: "Corbin" CL-3651 X626 x NZD.

.2 Latchset: "Corbin" CL-3610 x 626 x NZD.

.4 Latching devices: Apply to building M-55 only.

.1 Lockset: "Sargent" 10G05LL x 26B.

.2 Latchset: "Sargent" 10U65LL x 26B.

.5 Cylinders: not required

.1 Medeco, keyed to NRC key plan M19CA5 by Lister Lock.
Contractor to carry all costs associated with keying of doors.

.6 Electric Strikes: Not required

.1 Pre-wired by door supplier.

.2 Model: HES 4500.

.3 Model: HES 9600. (suface mounted for double door with exit device)

.7 Closers: Standard duty on:

.1 "LCN" 4040XP Rw/Pa-AL (regular arm/parallel arm bracket)

.1 Include integral overhead stop.

.8 Astragal: Provide 5mm thk. clear anodized aluminum astragal c/w nylon brush sweep on active leaf.

.1 K.N.Crowder W24S clear anodized aluminum brush sweep.

.9 Single Door Exit devices: (not required)

.1 Von Duprin Exit Device 98L-NL (includes lever; for electric strike), 3'or 4' length (to be chosen base on door width), 630 finish.

.2 Von Duprin Exit Device 98EO (lever not included), 3' or 4' length (to be chosen base on door width), 630 finish.

.10 Paired Door Exit devices: modern-narrow stile with exit trim.(not required)

.1 Sargent ASSA ABLOY 8300 Series 8315-F-xET-704-RHR-15-26D-36

.1 Auxiliary items: open back strike 815 with tamper proof plate.

.8 Door bottom seal: heavy duty, door seal of extruded aluminum frame and closed cell neoprene weather seal, closed ends, adjustable with automatic retract mechanism when door is open.

.1 K.N. Crowder CT-52 (surface mounted OR semi-mortised)

.9 Flush Bolt: lever action, with flat plate shoe on inactive leaf (top and bottom).

.1 Ives FB458 12” Manual 626.

.10 Threshold: Full length and width of opening, extruded aluminum, with thermal break of rigid PVC.

.1 K.N. Crowder CT45

.11 Door Holder: Provide "Hager" Kick down Door Holder 270C. S1-sprayed aluminum finish.

.12 Kick plates: 16 gauge stainless steel. Height: 8”(inside face), 8” (outside face). Width: to suit each door. To be adhered to inside face of each door.

.13 Above hardware is standard NRC requirements unless specified or listed on drawings to be otherwise.

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 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.4 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 Weatherstripping and surface smoke seals 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 Engineer.

END OF SECTION

Part 1 GENERAL

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)] [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 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.

.4 Acoustical sealant: to CAN/CGSB-19.21-M87.

.5 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.

Part 3 EXECUTION

3.1 Erection

.1 Align partition tracks at floor and ceiling and secure at 600 mm (2'-0") oc maximum.

.2 Place studs vertically at 600mm (24") oc 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.

.3 Erect metal studding to tolerance of 1:1000.

.4 Attach studs to bottom using screws.

.5 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.6 Co-ordinate erection of studs with installation of door frames and special supports or anchorage for work specified in other Sections.

.7 Provide wood blocking secured between studs for attachment of:

.1 Fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails,etc,

.2 Base and upper cabinets,

.3 Door closures, automatic door openers and swing door operators. 38x140

.8 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.

.9 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.

.10 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.11 Extend partitions to ceiling height except where noted otherwise on drawings.

.11 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. [Use double track slip joints.] [Use slotted deflection track.]

.12 Install continuous insulating strips to isolate studs from uninsulated surfaces.

.13 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.

.2 The work of this section, and related work specified in other sections shall comply with all requirements of Division 1.

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 twelve (12) 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

.4 Suspension system: non fire rated, made up as follows:

.1 Two directional exposed tee bar grid.

.5 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.

.6 Hanger wire: galvanized soft annealed steel 3.0 mm (1/8") dia. (12 gauge).

.7 Hangers: self-drilling type anchors similar to Phillips "Red Head" T-32.

.8 Carrying channels: 38 x 25 mm (1-1/2" x 1") channel, of 1.2 mm thick galvanized steel.

.9 Ceiling tiles: to CAN/CGSB-92.1; 5/8” thick, 2’-0” x 2’-0” non-combustible mineral fibre lay-in panels, square edge, colour white, Armstrong KITCHEN ZONE (NO.672 FLAT WHITE).

.10 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 Designated 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 CGC 1/2-inch SHEETROCK UltraLight Mold Tough: 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. (lightweight 1/2 in. moisture- and mold-resistant panels.)

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 N/a.

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 of all types of ceramic tile as per architectural :50mm x50mm (2”x 2’) , 150mm x 450mm (6” x 17.5”), and 305mm x 610mm (1’-0” x 2’-0”) sample panels of each colour, texture, size, and pattern of tile, in accordance with Section 00 10 00.

1.3 Maintenance Materials

.1 Provide minimum 2.0m² 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 Ceramic tile: CAN/CGSB-75.1-M88 = OLYMPIA - ONTARIO SERIES: SECURA (Anti-SLIP) – Snow White - 50mm x 50mm (2”x 2’), water absorption (ISO 10545-3), Co-Efficient of Friction (ASTM C-1028), Scratch Hardness (MOHs Avg.7), Chemical Resistance (ISO 10545-13), Frost Resistance (ISO 10545-12)

2.2 Wall Tile

.1 Ceramic Tile: CAN/CGSB-75.1-M88 = OLYMPIA - - ONTARIO SERIES: SECURA (Porcelain glazed surface) .GLOSS WHITE - 150mm x 450mm (6” x 17.5”) , water absorption (ISO 10545-3), Co-Efficient of Friction (ASTM C-1028), , Bending Strength (ASTM C-648), Deep Abrasion Resistance (ISO 10545-6), Scratch Hardness (MOHs 6), Chemical Resistance (ASTM C-650), Frost Resistance (ISO 10545-12)

.2 Ceramic Tile: CAN/CGSB-75.1-M88 = OLYMPIA - YURO NEW SERIES (Porcelain glazed surface) .LEAD GREY - 305mm x 610mm (1’-0” x 2’-0”), water absorption (ISO 10545-3), Co-Efficient of Friction (ASTM C-1028), , Bending Strength (ASTM C-648), Deep Abrasion Resistance (ISO 10545-6), Scratch Hardness (MOHs 6), Chemical Resistance (ASTM C-650), Frost Resistance (ISO 10545-12)

2.3 Mortar , Grout and Adhesive

.1 Waterproof, Mold, Mildew Resistent Grout And Mortar

.2 Grout using flextile two part epoxy grout (color "bright WHITE") for floor and wall tiles to CAN3-A5-M1983.

.3 Mortar to be flextile #51 mixed with flextile #44

.4 Thin-set adhesive: latex modified high bond strength.

.5 Sand and cement grout additive: liquid latex.

2.4 Accessories

.1 Curb Thresholds: 140 mm (5.5”) wide CORIAN (or marble), 19 mm (3/4") thick, bevelled edges, honed finish to exposed surfaces, size to suit shower door opening and full frame height to u/s of ceiling tiles..

.2 Sealant: in accordance to manufacturer's specifications. Waterproof, Mold, Mildew Resistent = WHITE.

.3 Waterproof membrane (flextile wp-980 sealed at drain). See architectural for extent.

2.5 Mortar and Adhesive Mixes

.1 Mortar bed for floors to level surface prior to flooring installation: 1 part cement, 2 parts sharp sand, liquid polymer mortar additive mixed in accordance with manufacturer's instructions.

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 2.5 mm (3/16") 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 ENERAL

1.1 SUMMARY

.1 Definitions: Complete Resinous flooring system to include a durable flooring system with a decorative, slip resistant surface, impact resistant:

- .1 HRI Epoxy Base : troweled mortar base consisting of epoxy resin, curing agent and finely graded silica aggregate,
- .2 Epoxy Undercoat: high performance, three-component epoxy formulation consisting of high solids epoxy resin, curing agent and fine aggregates.
- .3 Aggregates: Brightly coloured quartz broadcast aggregate
- .4 Stonkote CE4: a two-component, high performance, UV resistant, clear epoxy sealer
- .5 Texture: thickness to be applied to achieve slip resistant surface.

.2 Must comply with troweled mortar base with broadcast topping. Liquid rich, slurry type systems will not be accepted

1.2 SUBMITTALS

.1 Submittals in accordance with Section 00 10 00.

.2 Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with project requirements.

.3 Samples: Submit, for verification purposes, 150mm square samples of each type of resinous flooring material required, applied to a rigid backing, in color and finish indicated.

1. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.
2. For initial selection of texture, submit manufacturer’s texture samples showing full range of slip resistant textures available.

1.3 QUALITY ASSURANCE

.1 Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, aggregates, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least five projects of similar size and complexity; Stonhard or approved equal.

.2 Pre-Installation Conference

- .1 Convene pre-installation meeting 5 days prior to beginning work of this Section and on-site installation, with Contractor's Representative, Manufacturer/Installer's Representative and NRC Departmental Representative to:

.1 Verify project requirements.
.2 Review installation and substrate conditions.
.3 Review manufacturer's written installation instructions and warranty requirements.

.3 ISO 9001: All materials, including primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9001 registered quality system.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Material shall be delivered to job site and checked by flooring contractor for completeness and shipping damage prior to job start.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 All materials used shall be factory blended and packaged in single, easy to manage batches to eliminate on site blending errors. Only the on-site weighing of catalyst will be allowed.

.4 Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85^{o}F/16 and 30^{o}C.

.5 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.6 Replace defective or damaged materials with new.

1.5 PROJECT CONDITIONS

.1 Concrete or masonry substrates shall be properly prepared and shall be tested to ensure relative humidity or water vapour emission rates are in accordance with Manufacturer’s written instructions prior to the resinous flooring application. A vapor barrier or exterior applied waterproofing membrane must be present for concrete slabs below grade.

.2 Utilities, including electric, water, heat (air temperature between 32 and 85^{o}F/0 and 30^{o}C) and finished lighting to be supplied by General Contractor.

.3 Job area to be free of other trades during, and for a period of 24 hours, after flooring system installation.

.4 Protection of finished flooring system from damage by subsequent trades shall be the responsibility of the General Contractor.

1.6 WARRANTY

.1 Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation.

Part 2 PRODUCTS

2.1 COLORS

.1 Colors:

.1 Floor: FLAGSTONE.

2.2 RESINOUS FLOORING SYSTEM

.1 STONESHIELD HRI as distributed by Stonhard division, RPM Canada, is a nominal 5-6mm (3/16in) thick durable flooring system with a decorative, slip resistant surface. Its troweled base provides superior impact resistant and allows to be applied over rough substrates. Integral texture will be determined on site by Departmental Representative with varying degrees non-slip properties depending on range chosen from 1 to 5 (100 grit to 24 grit). The colour quartz broadcast topshield layer textured for safety.

.1 Physical Properties: Provide flooring system in which minimum physical properties of the complete system, including primers, fillers, aggregates, and sealers, and when tested in accordance with standards or procedures referenced below, are as follows:

Compressive Strength (ASTM C-579)(after 7 days)..……...10,000psi
Tensile Strength (ASTM C-307)…….……..…….... ..2,000psi
Flexural Strength (ASTM C-580)…….……..…….... ..4300psi
Flexural Modulus of Elasticity (ASTM C-580)…….……2.0 x 10psi
Hardness (ASTM D-2240, Shore D)……85-90
Impact Resistance (ASTM D-2794) ……>160 in/lbs
Abrasion Resistance (ASTM D-4060, CS-17) ..... 0.06 gm max. weight loss
Flammability (ASTM E-648)…….Class I
Water Absorption (ASTM C-413)……0.1%
VOC Content (ASTM D-2369)……Stonshield HRI Base – 40g/l
……..Stonshield Undercoa – 34 g/l
…….Stonkote CE4 – 34g/l
Cure Rate (@ 77°F/25°C)……12 hours for foot traffic
……...…24hours for normal operations

2.3 SYSTEM COMPONENTS

.1 Primer:

.1 Material Basis: Stonhard Standard Primer
.2 Resin: Epoxy
.3 Formulation Description: (2) two component, 100 percent solids.
.4 Application Method: Squeegee and roller.
.5 Number of Coats: (1) one.

.2 Mortar Base:

.1 Material design basis: Stonshield HRI Base
.2 Resin: Epoxy.
.3 Formulation Description: (3) three component, 100 percent solids.
.4 Application Method: Metal Trowel.
.1 Thickness of Coats: nominal 4mm.
.2 Number of Coats: One.
.5 Aggregates: Pigmented Blended aggregate.

.3 Undercoat:

.1 Material design basis: Stonshield undercoat
.2 Resin: Epoxy.
.3 Formulation Description: (2) two component, 100% solids, UV Stable.
.4 Type: clear.
.5 Finish: gloss
.6 Number of Coats: one.

.4 Broadcast Media:

.1 Material Basis: Stonshield quartz aggregate
.2 Type: pigmented.
.3 Finish: standard.
.4 Number of Coats: one.
.5 Pattern: Tweed.

.5 Sealer:

.1 Material Basis: Stonshield Sealer.
.2 Resin: Epoxy
.3 Formulation Description: (2) two-component, 100% solids, UV Stable.
4 Type: Clear.
.5 Finish: Gloss.
.6 Number of Coats: one.
.7 Texture level: Standard or medium.

note: Components listed above are the basis of design intent; all bids will be compared to this standard including resin chemistry, color, wearing surface, thickness, and installation procedures, including number of coats. Contractor shall be required to comply with all the requirements of the Specifications and all of the components required by the Specifications, whether or not such products are specifically listed above.

.6 System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

.1 Compressive Strength: 10,000 psi after 7 days per ASTM C 579.
.2 Tensile Strength: 2,000 psi per ASTM C 307.
.3 Flexural Strength: 4,300 psi per ASTM C 580.
.4 Water Absorption: < 1% per ASTM C 413.
.5 Impact Resistance: > 160 in. lbs. per ASTM D 2794.
.6 Flammability: Class 1 per ASTM E-648.
.7 Hardness: 85 to 90, Shore D per ASTM D 2240.

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2.4 ACCESSORY MATERIALS

.1 Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

.2 Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for Stonflex MP7 joint fill material, and CT5 concrete crack treatment. Unit prices should be included if the extent of control joints and non-moving cracks are not quantifiable at time of bid.

Part 3 EXECUTION

3.1 PREPARATION

.1 Concrete Substrate: Concrete preparation shall be by mechanical means and may include use of diamond grinder, sander, shotblast method and / or other mechanical means for removal of bond inhibiting materials such as curing compounds, dust, form release agents or laitance. General contractor shall approve concrete preparation to ICRI Concrete Surface Profile 3 minimum prior to coating application.

.2 Mechanically prepare substrates as follows:

.1 Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

.2 Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.

.3 Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.

.4 Verify that concrete substrates are dry.

.1 Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 75 percent.

.2 Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. of slab in 24 hours.

.3 Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.

.5 Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

.3 Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

.4 Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

.5 Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for Stonflex MP7 joint fill material, and CT5 concrete crack treatment.

3.2 APPLICATION

.1 General: Apply each component of resinous flooring system in compliance with manufacturer's directions to produce a uniform monolithic surface of thickness indicated, uninterrupted except at expansion joints or other types of joints (if any), indicated or required.

.2 Primer: Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates. Primer shall be applied in one coat at 6-8 mils thickness immediately after mixing using high quality medium nap rollers. Coordinate timing of primer application with application of flooring system to ensure optimum inter-coat adhesion. For a textured system, the selected aggregate is broadcasted into the primer layer to refusal. Excess aggregate not bonded to the primer layer is removed via broom or vacuum once the system is cured. (The total thickness of the system will be increased as a result of the added aggregate).

.3 Integral Cove Base: Stonclad GS mortar, apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, of cove base. Round internal and external corners.

.1 Integral Cove Base: 100 mm high.

.2 Continuous non-rust metal termination strip.

.4 Apply metal trowel single mortar coat in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.

.5 Undercoat: Remove any surface irregularities by lightly abrading and vacuuming the floor surface. Mix and apply undercoat with strict adherence to manufacturer's installation procedures and coverage rates.

.6 Broadcast: Immediately broadcast quartz silica aggregate into the undercoat using manufacturer's specially designed spray caster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative

.7 Topcoat: Mix material according to manufacturer's recommended procedures. Topcoat material shall be applied in two coats at 6-8 mils per coat immediately after mixing using high quality medium nap rollers. Strict adherence to manufacturer's coverage rates shall be maintained.

3.3 TERMINATIONS

.1 Chase edges to “lock” the flooring system into the concrete substrate along lines of termination.

.2 Penetration Treatment: Lap and seal resinous system onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.

.3 Trenches: Continue flooring system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.

.4 Treat floor drains by chasing the flooring system to lock in place at point of termination.

3.4 JOINT AND CRACKS

.1 Treat control joints to bridge potential cracks and to maintain monolithic protection.

.2 Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.

.3 Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.5 FIELD QUALITY CONTROL

.1 The right is reserved to invoke the following material testing procedure(s) at any time, and any number of times during period of flooring application.

.2 The Owner will engage service of an independent testing laboratory to sample materials being used on the job site. Samples of material will be taken, identified and sealed, and certified in presence of Contractor.

.3 Testing laboratory will perform tests for any of characteristics specified, using applicable testing procedures referenced herein, or if none referenced, in manufacturer's product data.

.4 The General Contractor shall engage service of an independent coating inspector to perform core tests to verify installation thickness meets the requirements of the specification. Installer shall repair to the Architect’s satisfaction any damage in the flooring system.

.5 If test results show materials being used do not comply with specified requirements, flooring contractor may be directed by Owner to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

3.6 CURING, PROTECTION AND CLEANING

.1 Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 4 hours after application.

.2 Protect flooring system from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor shall be responsible for protection and cleaning of surfaces after final coats.

.3 Cleaning: Remove temporary covering and clean resinous flooring system prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring system manufacturer. General Contractor shall be responsible for cleaning of the surfaces prior to inspection.

END SECTION

Part 1 General

1.1 SUMMARY

.1 Work of this Section includes surface preparation and paint finishes for all new and previously painted exposed and semi-concealed surfaces within the area under contract for which a paint formula is specified.

.1 Semi-concealed areas include inside of light troughs and valences, behind grilles, and projecting edges above and below sight lines.

.2 Moisture testing of substrates.

.3 Provision of safe and adequate ventilation as required where toxic and/or volatile/flammable materials are being used over and above temporary ventilation supplied by others.

.2 Re-painting previously painted surfaces also includes:

.1 Material and installation of site applied paint finishes painting pre-existing painted surfaces.

.2 Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to limits defined under MPI Repainting Maintenance Manual requirements.

.3 Specific pre-treatments noted herein or specified in the MPI Repainting Maintenance Manual.

.4 Sealing/touch-up, spot priming, and/or full priming surfaces for repainting in accordance with MPI Repainting Maintenance Manual requirements.

1.2 REFERENCES

.1 Environmental Protection Agency (EPA)

.1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).

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

.1 Material Safety Data Sheets (MSDS).

.3 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual, 2005.

.2 MPI Maintenance Repainting Manual 2004

.4 Current National Fire Code of Canada

1.3 PERFORMANCE REQUIREMENTS

.1 Unless specified otherwise, provide materials and perform the work in accordance with the MPI Premium grade requirements for each system specified.

1.4 QUALITY ASSURANCE

.1 Qualifications and Experience:

.1 Painting Subcontractor shall have a minimum of five years proven satisfactory experience. Submit list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Journeymen shall be qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.

.3 Apprentices shall work under direct supervision of qualified trades person in accordance with trade regulations.

.2 Pre-Installation Meeting:

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Coordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.3 Retain purchase orders, invoices and other documents to prove conformance with specification requirements when requested by Departmental Representative.

1.5 SCHEDULING

.1 Submit work schedule for various stages of painting to Departmental Representative for review. Submit schedule minimum of 10 Working Days in advance of proposed operations.

.2 Paint occupied facilities in accordance with approved schedule.

.3 Obtain written authorization from Departmental Representative for changes in work schedule.

.4 Schedule painting operations to prevent disruption of occupants.

1.6 SUBMITTALS

.1 Submittals in accordance with submittal procedures of Section 01 10 00.

.2 Product Data:

.1 Submit product data and instructions for each paint and coating product to be used prior to ordering materials. Do not order materials until list has been accepted.

.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 10 00 – General Instructions. Indicate VOCs during application and curing.

.3 Samples:

.1 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.

.2 Prepare samples with stepped application of finish system showing each separate coat, including primers and block fillers.

.3 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating, and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:

.1 3 mm plate steel for finishes over primed ferrous metal surfaces.

.2 3 mm wipe-coat galvanized plate steel for finishes over wipe-coated galvanized metal surfaces such as hollow metal doors and frames.

.3 3 mm galvanized plate steel for finishes over galvanized metal surfaces other than hollow metal doors and frames.

.4 13 mm birch plywood for finishes over wood surfaces.

.5 50 mm concrete block for finishes over concrete or concrete masonry surfaces.

.6 13 mm gypsum board of each type specified for finishes over each type of gypsum board specified and other smooth surfaces.

.4 Include list of material and application for each coat of each sample. Label each sample as to location and application.

.5 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.

.4 Test reports and Certificates:

.1 Submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.1 Lead, cadmium and chromium: presence of and amounts.

.2 Mercury: presence of and amounts.

.3 Organochlorines and PCBs: presence of and amounts.

.2 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.5 Closeout Submittals:

.1 Submit maintenance data for incorporation into manual specified in Section 01 10 00 include following:

.1 Product name, type and use.

.2 Manufacturer's product number.

.3 Colour numbers.

.4 MPI Environmentally Friendly classification system rating.

1.7 MOCK-UPS:

.1 Construct mock-ups in accordance with quality assurance requirements of Section 01 10 00

.1 Provide 3 000 mm x 3 000 mm mock-up.

.2 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements of each interior finish system listed, with specified paint or coating showing selected colours, gloss/sheen, textures.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.

.4 Locate where directed where indicated.

.5 Allow 24 hours for inspection of mock-up before proceeding with work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may not remain as part of finished work. Remove mock-up and dispose of materials when no longer required and when directed by Departmental Representative.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Pack, ship, handle and unload materials in accordance with manufacturer's written instructions.

.2 Acceptance at Site:

.1 Identify products and materials with labels indicating:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 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 with temperature range 7 degrees C to 30 degrees C.

.5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.

.7 Remove paint materials from storage only in quantities required for same day use.

.8 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to each 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.

1.9 SITE CONDITIONS

.1 Heating, Ventilation and Lighting:

.1 Provide continuous ventilation for seven days after completion of application of paint.

.2 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.

.3 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.4 Provide minimum lighting level of 323 Lux (30 foot candles) on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Perform painting work when maximum moisture content of the substrate is below:

.1 12% for concrete, concrete masonry, clay masonry.

.2 15% for wood.

.3 12% for plaster and gypsum board.

.2 Test for moisture using calibrated electronic Tramex type moisture meter. Test concrete floors for moisture using "cover patch test".

.3 Allow new concrete and masonry to cure minimum of 28 days.

.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

.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 to adequately prepared surfaces and to surfaces within moisture limits.

.3 Apply paint when previous coat of paint is dry or adequately cured.

1.10 EXTRA MATERIALS:

.1 Submit maintenance materials in accordance with closeout submittals requirements of Section 01 10 00.

.2 Deliver extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels.

.3 Quantity: provide one one-litre can of each type and colour of primer and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

.4 Delivery, storage and protection: comply with Departmental Representative requirements for delivery and storage of extra materials.

1.11 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 WF-1: Sherwin Williams, Olympus White, SW 6253.
.2 WF-2: Sherwin Williams, WHITE, SW xxxx (to match existing corridor wall)
.3 CF-2: Sherwin Williams, Olympus White, SW 6253.
.4 DF-1: Sherwin Williams, Lazy Grey, SW 6254.
.5 DF-2: Sherwin Williams, Morning Fog, SW 6255.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Departmental Representative for tinting of painting materials on site.

.1 For re-painting, the first coat in a two coat (Premium) repaint system shall be tinted slightly lighter colour than top coat to show visible difference between coats.
.2 For painting new surfaces, the second coat in three coat system shall be tinted slightly lighter colour than top coat to show visible difference between coats.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.4 Thin paint for spraying in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

.5 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 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.

2.5 INTERIOR PAINTING AND RE-PAINTING SYSTEMS

.1 Galvanized metal: New interior doors, frames.

.1 INT 5.3M – Waterborne Light Industrial Coating, MPI gloss level 5 (semi-gloss) finish.

.2 Dressed lumber: including doors, door and window frames, casings, mouldings:

.1 INT 6.3BB - Waterborne alkyd MPI gloss level 5 (semi-gloss) finish for interior doors in non-humid locations only.

.3 Electrical backer boards.

.1 INT 6.4P – Intumescent fire retardant alkyd coating, gloss level 1 (flat) finish, ULC listed.

.4 Plaster and gypsum board walls: gypsum wallboard and textured finishes:

.1 INT 9.2B - High performance architectural latex, gloss level 5 (semi-gloss) finish.

.5 Plaster and gypsum board ceilings, soffits and bulkheads: plaster, gypsum wallboard and textured finishes:

.1 INT 9.2B - High performance architectural latex, gloss level 1 (flat) finish.

.6 Plastic laminate door trim and edges:

.1 INT 6.4E Polyurethane varnish over semi-transparent stain, gloss level 5.

.7 Concrete horizontal surfaces: Mechanical room floor and housekeeping pads:

.1 INT 3.2L - Waterborne epoxy floor finish.

2.6 EXISTING PAINTED STEEL SURFACES

.1 Paint system applicable to:

.1 Existing painted steel windows.

.2 Existing steel door frames to remain.

.2 Provide specified paint system products or approved equal:

.1 De-greaser: non-flammable, biodegradable synthetic safety solvent based on N-methyl 2-pyrrolidone containing no methylene chloride, methanol or benzenes, in gel and liquid form.

.1 Acceptable product and manufacturer: Green Solve as manufactured by Cyndan Chemicals.

.2 Primer: Pro-Cryl Universal Primer B66W00310 Off-White as manufactured by Sherwin Williams.

.3 Top coat: Water Based Catalyzed Epoxy Part A B73-300 Series (Gloss) with Part B B73V300 Hardener as manufactured by Sherwin Williams.

.4 Colour: as indicated on drawings.

.1 Tint first coat lighter than top finish coat.

Part 3 Execution

3.1 GENERAL

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Perform preparation and operations for interior re-painting of existing surfaces in accordance with MPI Maintenance Repainting Manual requirements except where otherwise specified.

.3 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

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 Maximum moisture content as follows:

.1 Stucco, plaster and gypsum board: 12%.

.2 Concrete: 12%.

.3 Clay and Concrete Block/Brick: 12 %.

.4 Wood: 15%.

3.3 INSPECTION REQUIREMENTS FOR RE-PAINTING WORK

.1 Inspect existing interior surfaces requiring repainting and notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.

.2 Assume responsibility for preparation of surfaces with assessed degree of surface degradation up to and including DSD-2 as defined in MPI Maintenance Repainting Manual.

.3 Where an assessed degree of surface degradation of DSD-0 to DSD-2 before preparation of surfaces for repainting is revealed to be DSD-3 or DSD-4 after preparation, notify Departmental Representative Do not begin repainting until Departmental Representative issues instruction.

3.4 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.

.4 Protect passing pedestrians, building occupants and general public in and about the building.

.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 MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly.

.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.

.6 Use trigger operated spray nozzles for water hoses.

.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.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 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.

.6 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. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.

.7 Touch up of shop primers with primer as specified.

.8 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

3.5 APPLICATION

.1 Apply paint by brush, roller, air sprayer, or airless sprayer. Conform to manufacturer's application instructions, including spreading rates, unless specified otherwise. Method of application shall be approved by Departmental Representative prior to commencement of work.

.2 Brush and Roller Application:

- .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
- .2 Work paint into cracks, crevices and corners.
- .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
- .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
- .5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray application is not permitted for standard paint products.

.4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.

.5 Apply each coat of paint in a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.7 Sand and dust between coats to remove visible defects.

.8 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.

.9 Finish inside of cupboards and cabinets as specified for outside surfaces.

.10 Finish closets and alcoves as specified for adjoining rooms.

.11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 EXISTING PAINTED STEEL SURFACES

.1 In addition to the requirements specified, prepare and apply coatings to the following surfaces:

- .1 Stair railings, guardrails, stringers, risers and nosings.
- .2 Hollow steel doors and frames to remain.
- .3 Existing heat register louvered covers.
  - .1 At option of Contractor, register covers may be removed from site to paint shop for surface preparation and finish painting.
  - .2 For materials taken off site:
    - .1 Prepare inventory of items removed and submit to Departmental Representative.
    - .2 Transport, store and handled all items taken off site protected from all loss, deterioration and damage.
    - .3 Re-finish as specified, including testing.
    - .4 Transport to site and re-install.

.2 Testing Requirements:

- .1 Prior to complete application, prepare surfaces and apply coatings as specified, for three test areas.
- .2 Allow paint to dry one week and test for adhesion in presence of Departmental Representative.
- .3 If adhesion is poor, perform additional abrasion and re-test.
- .4 Repeat until adhesion is acceptable.

.3 Abrade existing painted metal surfaces to provide required surface texture.

.4 Grind all weld burn marks down to smooth, clean, bare metal.

.5 Clean all particulate matter from surface.

.6 De-grease existing painted and new bare metal surfaces with specified de-greaser in liquid and/or gel form to suit surface.

.7 Apply specified primer to all painted and bare metal surfaces in strict accordance with manufacturer’s instructions.

.8 Apply two coats of specified top coat to primed surfaces in strict accordance with manufacturer’s instructions.

3.7 MECHANICAL/ELECTRICAL EQUIPMENT

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.

.2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red.

.9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.10 Paint natural gas piping yellow.

.11 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.

.12 Do not paint interior transformers and substation equipment.

3.8 SITE TOLERANCES

.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface when viewed using final lighting source.

.2 Floors and ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.3 Final coat shall exhibit uniformity of colour and uniformity of sheen across full surface area.

3.9 FIELD QUALITY CONTROL

.1 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.2 Cooperate with inspection and provide access to areas of work.

.3 Retain purchase orders, invoices and other documents to prove conformance with specified requirements when requested by Departmental Representative.

3.10 RESTORATION

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

Part 1 GENERAL

1.1 Shop Drawings

.1 Submit shop drawings in accordance with Section 00 10 00.

.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 (2'-0" x 2'-8") high 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 Submittals

.1 Submittals in accordance with Section 010010.

.2 Samples: Submit duplicate 300 mm long samples of profiles and colours of each type of products including end cap and mounting hardware.

.3 Clearly indicate fabrication details, plans, elevations, hardware, and installation details.

.4 Shop Drawings: Indicate, by large scale details, all materials, finishes, dimensions, anchorage and assembly.

.5 Submit two copies of WHMIS MSDS - Material Safety Data Sheets Indicate VOC's:

- .1 For caulking materials during application and curing.
- .2 For adhesives.

1.2 DELIVERY STORAGE AND HANDLING

.1 Deliver materials in sealed cartons, clearly labelled.

.2 Store materials in cool, dry storage room minimum temperature 4oC.

.3 Store materials flat

Part 2 PRODUCTS

2.1 Rigid Panel - Hygienic Wall Covering

.1 Manufactures

- .1 Trovex-Diamond, Bioclad or Altro Whiterock
- .2 Product: Rigid PVC
- .3 Thickness: 2.5 – 3 mm
- .4 Size of sheet: extruded 2500 mm x 1220 mm. size of required sheets as noted on drawings.
- .5 Colour: as noted on drawings.

Part 3 EXECUTION

3.1 Substrate Preparation

.1 Walls should be smooth and level. High points must be removed and low points filled with filler intended for the substrate and environmental conditions.

.2 Wall tiles must be fixed firmly to the wall.

.1 Existing ceramic tiles to be thoroughly degreased rinsed and allowed to dry.

.2 Loose tiles to be removed and the area made good.

.3 As long as the tile edges do not protrude you do not have to skim grout joints.

.4 Voids to be filled with sand cement render using pva mix. Follow manufactures recommendations.

.3 Surfaces must be permanently dry and free from all substances that may contribute to adhesive bond failure.

.4 Remove loose paint and conduct an adhesive bond test with paint.

.5 Exterior walls must be adequately damp-proofed and insulated.

.6 Dry wall substrates should be paint ready.

3.2 Installation – Rigid Panel Wall Covering

.1 Install wall covering in accordance with the manufacturer's instructions and the following specifications.

.1 All joints should be joined by approved methods as detailed on drawings.

.2 Ensure that walls to receive wall covering are smooth and straight to 3 mm in 3 m (1/8 inch in 10 feet).

.3 Testing of concrete walls: concrete including patching or levelling to have cured for minimum 28 days, Ensure that concrete is free of sealer, curing compounds, oil, grease and other agents detrimental to the test and Product performance. Locate test sites to cover representative installation areas. Do not proceed with work when concrete does not conform to the specified performance criteria:

.1 Moisture vapour transmission: To ASTM D4263 plastic sheet method, no visible condensation or vapour allowed. Do one test for every 500 sq.ft. or fraction thereof.

.2 Surface moisture content: Maximum 2.5%, tested by Delhmorst moisture meter. Do one test for every 500 sq.ft. or fraction thereof.

.3 Surface temperature: Minimum 18 degrees C.

.4 Alkalinity: Acceptable range of 5 to 9 on the pH scale. Test floors using distilled water and pH paper. Provide 2 tests for every moisture vapour emission test.

.4 Thermoform all inside and outside corners.

.5 Dry-fit sheet prior to fixing. Cut sheet neatly to accommodate pipes, and electrical boxes. Provide 3 mm gap at door and window frames, and penetrations. Provide 19 mm gap above floor base.

.6 Extend sheets to ceiling line where suspended ceilings are indicated. In locations where hard surface ceilings as indicated, terminate wall panels within 3 mm of ceiling finish and seal with sealant to ceiling.

.7 Bevel leading edges of sheet prior to welding seams or fitting joint, transition, and cap strips.

.8 Apply adhesive to back of sheet using notched trowel. Allow adhesive to dry tacky to the touch.

.9 Apply sheet to wall. Tap sheet with white rubber mallet for initial contact with adhesive tape. Roll thoroughly to ensure full adhesion.

.10 Apply sealant to bottom edge of transition strip at flooring and all edges and at penetrations to create water-tight installation.

3.3 Cleaning

.1 Leave protective film in place until final inspection of the work.

.2 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Clean surfaces after installation using manufacturer's recommended cleaning procedures.

.4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 00 10 00 – General Instructions.

.2 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.3 Shop drawings and product data accompanied by:

- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify current model production.
- .5 Certification of compliance to applicable codes.

.4 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.
- .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data to include:
  - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
  - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
  - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .6 Approvals:

.1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.

.2 Make changes as required and re-submit as directed by Departmental Representative.

.7 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Departmental Representative for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 DEFINITIONS

.1 For purposes of this the Mechanical Division the following:

.1 "Concealed" - mechanical services and equipment in suspended ceilings and in chases and furred spaces.

.2 "Exposed" - will mean not concealed as defined above.

1.3 EXAMINATION OF THE SITE

.1 Carefully examine conditions at the site which the site will or may affect your work, and become familiar with both the new and existing construction, finishes, and other work associated with your work in order that your tender price includes for everything necessary for completion of your work within the proposed project schedule

1.4 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 and 00 15 45 – General Safety Section and Fire Instructions.

1.5 MAINTENANCE

.1 Furnish spare parts in accordance with Section 00 10 00 – General Instructions.

1.6 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 and Section 00 15 45 – General Safety Section and Fire Instructions.

1.7 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.

1.8 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 Engineer prior to commencement of soldering, welding or other high temperature work.

.3 Comply with all requirements of Section 00 10 00 – General Instructions.

1.9 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.

1.10 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 and refurbish all equipment and leave in first class operating condition including replacement of all filters in all air and piping systems.

.3 Balance and adjust all systems and each piece of equipment to operate as designed.

1.11 PROTECTION OF EQUIPMENT & MATERIALS Properly protect all of your equipment and materials on site from damage due to the elements, your work and the work of other trades, to the approval of the Engineer.

.2 Wherever possible, coordinate equipment deliveries with the manufacturers and/or suppliers such that equipment is delivered to the site when it is required, or so that it can be suitably stored within the building and protected from the elements.

1.12 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.

1.13 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

Part 2 Products

2.1 MATERIALS

.1 Materials and products in accordance with Section 00 10 00 – General Instructions.

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 As per section 00 10 00 – General Instructions, clean interior and exterior of all systems including but not limited to strainers, vacuum interior of ductwork and air handling units. to the satisfaction of NRC representative

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 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION (If Required)

.1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Trial usage to apply to following equipment and systems:

.1 Fume hood and associated services.

.3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.5 Instruction duration time requirements as specified in appropriate sections.

.6 Determination of whether or not demonstration is required will be decided by Departmental Representative in consultation with end user (client).

3.5 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED

.1 Section 00 10 00 – General Instructions
.2 Section 00 15 45 – General Safety Section and Fire Instructions
.3 Section 21 05 01 – Common Work Results- Mechanical

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB).
  .1 CAN/CGSB-1.60, Interior Alkyd Gloss Enamel.
  .2 CAN/CGSB-24.3, Identification of Piping Systems.
.2 Canadian Gas Association (CGA).
  .1 CAN/CGA B149.1.
  .2 CAN/CGA B149.2.

.3 National Fire Protection Association
  .1 NFPA 13-1989, Installation of Sprinkler Systems.
  .2 NFPA 14-1986, Standpipe and Systems.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 00 10 00 – General Instructions.
.3 Product data to include paint colour chips, all other products specified in this section.

1.4 SAMPLES

.1 Submit samples in accordance with Section 00 10 00 – General Instructions.
.2 Samples to include nameplates, labels, tags, lists of proposed legends.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

.1 Metal or plastic laminate nameplate mechanically fastened to each piece of equipment by manufacturer.
.2 Lettering and numbers to be raised or recessed.
.3 Information to include, as appropriate:
  .1 Equipment: Manufacturer's name, model, size, serial number, capacity.
  .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 EXISTING IDENTIFICATION SYSTEMS

.1 Apply existing identification system to new work.
.2 Where existing identification system does not cover for new work, use identification system specified this section.
.3 Before starting work, obtain written approval of identification system from NRC representative.

2.3 PIPING SYSTEMS GOVERNED BY CODES

.1 Identification:
  .1 Natural gas: To CAN/CGA B149.1

.2 Propane gas: To CAN/CGA B149.2
.3 Sprinklers: To NFPA 13.
.4 Standpipe and hose systems: To NFPA 14.

2.4 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, to Workplace Hazardous Materials Information System (WHMIS) regulations.
.3 Legend:
.1 Block capitals to sizes and colours listed in CAN/CGSB-24.3.
.4 Arrows showing direction of flow:
.1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.
.2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.
.3 Use double-headed arrows where flow is reversible.
.5 Extent of background colour marking:
.1 To full circumference of pipe or insulation.
.2 Length to accommodate pictogram, full length of legend and arrows.
.6 Materials for background colour marking, legend, arrows:
.1 Pipes and tubing 20 mm and smaller: Waterproof and heat-resistant pressure sensitive plastic marker tags.
.2 All other pipes: Pressure sensitive [plastic-coated cloth] [vinyl] with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150øC and intermittent temperature of 200øC.
.7 Colours and Legends:
.1 Where not listed, obtain direction from Departmental Representative.
.2 Colours for legends, arrows: To following table:

Background colour:	Legend, arrows:
Yellow	BLACK
Green	WHITE
Red	WHITE

.3 Background colour marking and legends for piping systems:

Contents	Background Colour	Legend
Domestic hot water supply	Green	DOM. HW SUPPLY
Dom. HWS recirculation	Green	DOM. HW CIRC
Domestic cold water supply	Green	DOM. CWS
Storm water	Green	STORM
Sanitary	Green	SAN
Plumbing vent	Green	SAN. VENT

2.5 IDENTIFICATION DUCTWORK SYSTEMS

.1 50 mm high stencilled letters and directional arrows 150 mm long x 50 mm high.

.2 Colours: Black, or co-ordinated with base colour to ensure strong contrast.

2.6 VALVES, CONTROLLERS

.1 Brass tags with 12 mm stamped identification data filled with black paint.

.2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.

2.7 LANGUAGE

.1 Use one nameplate, label, etc. for both languages.

PART 3 - EXECUTION

3.1 TIMING

.1 Provide identification only after all painting Interior Painting has been completed.

3.2 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.

3.3 NAMEPLATES

.1 Locations:

.1 In conspicuous location to facilitate easy reading and identification from operating floor.

.2 Standoffs:

.1 Provide for nameplates on hot and/or insulated surfaces.

.3 Protection

.1 Do not paint, insulate or cover in any way.

3.4 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, other confined spaces, at entry and exit points, and at each access opening.

.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, dampers, etc. Where this is not possible, place identification as close as possible, preferably on upstream side.

.9 Identification to be easily and accurately readable from usual operating areas and from access points.

.1 Position of identification to be approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.5 VALVES, CONTROLLERS

.1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed "S" hooks.

.2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by NRC representative. Provide one copy (reduced in size if required) in each operating and maintenance manual.

.3 Number valves in each system consecutively.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Thermal insulation for piping and piping accessories.

1.2 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

.1 ASHRAE Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings.

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

.1 Material Safety Data Sheets (MSDS).

.3 Manufacturer's Trade Associations

.1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).

1.3 DEFINITIONS

.1 For purposes of this section:

.1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" - will mean "not concealed" as specified.

1.4 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. Include product characteristics, performance criteria, and limitations.

.1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

.3 Shop Drawings:

.1 Submit shop drawings in accordance with Section 00 10 00 – General Instructions.

.1 Shop drawings: submit drawings stamped for review by NRC.

.4 Samples:

.1 Samples: Not required.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.2 Installer: specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project, member of TIAC.

.3 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 00 10 00 – General Instructions.

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 site in original factory packaging, labelled with manufacturer's name, address.

.2 Storage and Protection:

.1 Protect from weather, theft, construction traffic.

.2 Protect against damage.

.3 Store at temperatures and conditions required by manufacturer.

.3 Waste Management and Disposal:

.1 Remove all material from NRC property and dispose, reuse and recycle excel material as per local good waste management practices.

.2 Place excess or unused insulation and insulation accessory materials in designated containers.

Part 2 Products

2.1 FIRE AND SMOKE RATING

.1 In accordance with CAN/ULC-S102.

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.

.1 Vapor retarder jacket includes a continuous longitudinal self-sealing closure lap.

.2 Jacket shall be suitable to be painted with future latex paint.

.3 Mineral fibre: CAN/ULC S102-M88

.4 Jacket: to CGSB 51-GP-9M, self-sealing lap.

.5 Temperature Range: 0 to 538 °C

.6 Maximum "k" factor: 0.033 W/m°C at 24°C to ASTM C 335.

2.3 INSULATION SECUREMENT

.1 Tape: self-adhesive, aluminum 50 mm wide minimum.

.2 Contact adhesive: quick setting.

.3 Canvas adhesive: washable.

.4 Single/double bands: stainless steel, 19 mm wide, 0.5 mm thick.

.5 Wire mesh: 25 mm hexagonal type 304 stainless steel wire mesh, tightly laced together at horizontal and circumferential mesh joints.

2.4 VAPOUR RETARDER LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

2.5 INDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

2.6 JACKETS

.1 Polyvinyl Chloride (PVC):

.1 One-piece moulded type to CAN/CGSB-51.53 with pre-formed shapes as required.

.2 Colours: As indicated

.3 Minimum service temperatures: -20 °C

.4 Maximum service temperature: 65 °C

.5 Moisture vapour transmission: 0.02 perm.

.6 Thickness: 0.3 mm.

.7 Fastenings:

.1 Use solvent weld adhesive compatible with insulation to seal laps and joints.

.2 Pressure sensitive vinyl tape of matching colour.

.8 Special requirements:

.1 Indoor: As indicated.

.2 Outdoor: UV rated material at least 0.5 mm thick.

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 PRE-INSTALLATION REQUIREMENT

.1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified by NRC.

.2 Piping to be inspected and approved by NRC.

.3 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturers instructions and this specification.

.3 Use two layers with staggered joints (minimal 400 mm) when required nominal wall thickness exceeds 50 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Install hangers, supports outside vapour retarder jacket.

.5 Supports, Hangers:

.1 Apply high temperature and compressive strength insulation between all hangers and piping where temperature of pipe exceeds 230 °C. Insulation to be sized to suit compressive loads at hanger. Where pipe surface temperature is less then 230°C, wood blocking may be used between pipe support hanger.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

.1 Application: at expansion joints, valves, primary flow measuring elements, flanges, unions, equipment and where indicated.

.2 Design: to permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.

.3 Insulation:

.1 Insulation, fastenings and finishes: same as system.

.2 Jacket: aluminum, SS, PVC

3.5 INSTALLATION OF ELASTOMERIC INSULATION

.1 Insulation to remain dry. Overlaps to manufacturers instructions. Ensure tight joints.

.2 Provide vapour retarder as recommended by manufacturer.

3.6 PIPING INSULATION SCHEDULES

.1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.

.2 TIAC Code: A-3.

.1 Securements: SS bands at 300 mm on centre.

.2 Seals: VR lap seal adhesive, VR lagging adhesive.

.3 Installation: TIAC Code: 1501-C.

.3 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 runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	MAX TEMP. °C	TIAC CODE	Pipe sizes (NPS) and insulation thickness (mm)				
			< 1	1 to <1-1/2	1-1/2 to < 4	4 to < 8	8 & over
Domestic hot water		A-3	25	25	25	25	25
Domestic cold water		A-3	25	25	25	25	25

.4 Finishes:

.1 Exposed indoors: aluminum jacket.

.2 Installation: to appropriate TIAC code CRF/1 through CPF/5.

3.7 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions and to the satisfaction of the NRC representative.

.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 installation for wet pipe fire protection and sprinkler systems for heated areas.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – Common Safety Section and Fire Instructions.

.3 Section 21 05 01 – Common Work Results - Mechanical

1.2 REFERENCES

.1 American National Standards Institute/National Fire Prevention Association (ANSI/NFPA)

.1 ANSI/NFPA 13, Installation of Sprinkler Systems.

.2 ANSI/NFPA 24, Installation of Private Fire Service Mains and Their Appurtenances.

.3 ANSI/NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

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

.1 Material Safety Data Sheets (MSDS).

.3 Underwriter's Laboratories of Canada (ULC)

.1 CAN4 S543, Standard for Internal Lug Quick Connect Couplings for Fire Hose.

1.3 DESIGN REQUIREMENTS

.1 Design automatic wet pipe fire suppression sprinkler systems in accordance with required and advisory provisions of NFPA 13.

.2 Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use.

.3 Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed shop drawings.

.4 Locate sprinkler heads in consistent pattern with ceiling grid, lights, and air supply diffusers.

.5 Devices and equipment for fire protection service: ULC approved for use in wet pipe sprinkler systems.

.6 Location of Sprinkler Heads:

.1 Locate heads in relation to ceiling and spacing of sprinkler heads not to exceed that permitted by NFPA 13 for ordinary.

.2 Uniformly space sprinklers on branch.

.7 Density of Application of Water:

.1 Size pipe to provide specified density when system is discharging specified total maximum required flow.

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.

.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 Test reports:

.1 Submit certified test reports for wet pipe fire protection sprinkler systems from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Instructions: submit manufacturer's installation instructions.

.2 Manufacturer's Field Reports: manufacturer's field reports specified.

.4 Closeout Submittals:

.1 Submit maintenance and engineering data for incorporation into manual specified in Section 00 10 00 – General Instructions in accordance with ANSI/NFPA 20.

.2 Manufacturer's Catalog Data, including specific model, type, and size for:

.1 Pipe and fittings.

.2 Sprinkler heads.

.3 Pipe hangers and supports.

.4 Mechanical couplings.

.3 Field Test Reports:

.1 Preliminary tests on piping system.

.4 Records:

.1 As-built drawings of each system.

.1 After completion, but before final acceptance, submit complete set of as-built drawings of each system for record purposes.

.5 Operation and Maintenance Manuals:

.1 Provide maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company or person specializing in wet sprinkler systems with documented experience.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and Fire Instructions.

1.6 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 00 10 00 – General Instructions.

.2 Provide spare sprinklers and tools as required by ANSI/NFPA 13.

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 Storage and Protection:

.1 Store materials indoors, in dry location.

.3 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 ABOVE GROUND PIPING SYSTEMS

.1 Provide fittings for changes in direction of piping and for connections.

.1 Make changes in piping sizes through tapered reducing pipe fittings, bushings will not be permitted.

.2 Perform welding in shop; field welding will not be permitted.

.3 Conceal piping in areas with suspended ceiling.

2.2 PIPE, FITTINGS AND VALVES

.1 Pipe:

.1 Ferrous: to ANSI/NFPA 13.

.2 Copper tube: to ANSI/NFPA 13.

.2 Fittings and joints to ANSI/NFPA 13:

.1 Ferrous: screwed, welded, flanged or roll grooved.

.2 Copper tube: screwed, soldered, brazed.

.3 Provide grooved-end type fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded.

.4 Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into pipe when pressure is applied will not be permitted.

.5 Rubber gasketted grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 32 mm and larger.

.6 Fittings: ULC approved for use in wet pipe sprinkler systems.

.7 Ensure fittings, mechanical couplings, and rubber gaskets are supplied by same manufacturer.

.8 Side outlet tees using rubber gasketted fittings are not permitted.

.9 Sprinkler pipe and fittings: metal.

.3 Pipe hangers:

.1 ULC listed for fire protection services in accordance with NFPA.

2.3 SPRINKLER HEADS

.1 General: to ANSI/NFPA 13 and ULC listed for fire services.

.2 Match to existing sprinkler heads

.3 Sprinkler Head Type:

.1 Type C: pendant chrome glass bulb type.

.4 Provide nominal 1.2 cm orifice sprinkler heads.

.1 Release element of each head to be of standard temperature rating.

.2 Provide polished stainless steel ceiling plates for sprinklers below suspended ceilings.

.3 Provide corrosion-resistant sprinkler heads and sprinkler head guards in accordance with NFPA 13.

.4 Deflector: not more than 75 mm below suspended ceilings.

.5 Ceiling plates: not more than 25 mm deep.

.6 Ceiling cups: not permitted.

2.4 PIPE SLEEVES

.1 Provide pipe sleeves where piping passes through walls.

.2 Secure sleeves in position and location during construction.

.3 Provide sleeves of sufficient length to pass through entire thickness of walls.

.4 Provide 2.5 cm minimum clearance between exterior of piping and interior of sleeve or core-drilled hole.

.1 Firmly pack space with mineral wool insulation.

.2 Seal space at both ends of sleeve or core-drilled hole with[plastic waterproof cement which will dry to firm but pliable mass,] [provide mechanically adjustable segmented elastomeric seal].

.3 In fire walls and fire floors, seal both ends of pipe sleeves or core-drilled holes with ULC listed fill, void, or cavity material.

.5 Sleeves in Masonry and Concrete Walls, Floors, and Roofs:

.1 Provide hot-dip galvanized steel sleeves.

.2 Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in core-drilled hole are completely grouted smooth.

2.5 ESCUTCHEON PLATES

.1 Provide split hinge type metal plates for piping passing through walls in exposed spaces.

.2 Provide polished stainless steel plates in finished spaces.

.3 Provide paint finish on metal plates in unfinished spaces.

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, inspect and test to acceptance in accordance with ANSI/NFPA 13 and ANSI/NFPA 25.

3.3 PIPE INSTALLATION

.1 Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings.

.2 Keep interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter.

.3 Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter.

.4 Inspect piping before placing into position.

3.4 FIELD PAINTING

.1 Clean, pretreat, prime, and paint new systems including valves, piping, conduit, hangers, supports, miscellaneous metalwork, and accessories.

.2 Apply coatings to clean, dry surfaces, using clean brushes.

.3 Clean surfaces to remove dust, dirt, rust, and loose mill scale.

.4 Immediately after cleaning, provide metal surfaces with coat of pretreatment primer applied to minimum dry film thickness of 0.3 ml, and one coat of zinc chromate primer applied to minimum dry film thickness of 1.0 ml.

.5 Shield sprinkler heads with protective covering while painting is in progress.

.6 Upon completion of painting, remove protective covering from sprinkler heads.

.7 Remove sprinkler heads which have been painted and replace with new sprinkler heads.

.8 Provide primed surfaces with following:

.1 Piping in Finished Areas:

.1 Provide primed surfaces with 2 coats of paint to match adjacent surfaces.

.2 Provide valves and operating accessories with 1 coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil.

3.5 FIELD QUALITY CONTROL

.1 Site Test, Inspection:

.1 Perform test to determine compliance with specified requirements in presence of NRC Representative.

.2 Test, inspect, and approve piping before covering or concealing.

.3 Preliminary Tests:

.1 Piping above suspended ceilings: tested, inspected, and approved before installation of ceilings.

.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 Proceed in accordance with Section 00 10 00 – General Instructions and to the satisfaction of the NRC representative.

.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 Selection of piping valves in domestic water system.

1.2 RELATED SECTIONS

.1 Section 00 10 00 – General Instructions

.2 Section 00 15 45 – General Safety Section and Fire Instructions

.3 Section 21 05 01 – Common Work Results - Mechanical

.4 Section 23 05 23.01 Valves – Bronze.

.5 Section 23 05 01 - Installation of Pipework

1.3 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)

.1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.

.2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

.3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

.4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

.2 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)

.1 ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.3 Canadian Standards Association (CSA International)

.1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).

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

.1 Material Safety Data Sheets (MSDS).

.6 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).

.1 MSS-SP-67, Butterfly Valves.

.2 MSS-SP-70, Gray Iron Gate Valves, Flanged and Threaded Ends.

.3 MSS-SP-71, Gray Iron Swing Check Valves, Flanged and Threaded Ends.

.4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

.7 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) .

.8 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide manufacturer shop drawings for all valves, piping, fittings and as specified on drawings and in 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.

1.5 DELIVERY, STORAGE AND HANDLING

.1 See section 00 10 00 – General Instructions

Part 2 Products

2.1 PIPING

.1 Domestic hot, cold and recirculation systems, within building.

.1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.

.2 Buried or embedded: copper tube, soft annealed, type K: to ASTM B88M. No buried joints.

2.2 FITTINGS

.1 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22. NPS 2 and larger: roll grooved to CSA B242.

.3 Cast bronze threaded fittings, Class 150: to ANSI/ASME B16.15.

.4 Cast copper, solder type: to ANSI/ASME B16.18.

.5 Bronze pipe flanges and flanged fittings, Class 150 to ANSI/ASME B16.24.

2.3 JOINTS

.1 Solder: 95% tin / 5% copper alloy.

.2 Teflon tape: for threaded joints.

.3 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 SWING CHECK VALVES

.1 NPS 2 and under, soldered:

.1 To MSS-SP-80, Class 150, bronze body, bronze swing disc, screw in cap, see Section 23 05 23.01 - Valves – Bronze.

.2 NPS 2 and under, screwed:

.1 To MSS-SP-80, Class 150, bronze body, bronze swing disc, screw in cap, see Section 23 05 23.01 - Valves - Bronze.

2.5 BALL VALVES

.1 NPS 2 and under, screwed:

.1 Threaded, 2-Piece, Std. Port, Bronze Ball Valve, 600 CWP, with extension, see Section 23 05 23.01 - Valves - Bronze

.2 NPS 2 and under, soldered:

.1 Solder, 2-Piece, Std. Port, Bronze Ball Valve, 600 CWP, with extension, see Section 23 05 23.01 - Valves - Bronze.

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.

.2 Install pipe work in accordance with Section 23 05 01 - Installation of Pipework, supplemented as specified herein.

.3 Assemble piping using fittings manufactured to ANSI standards.

.4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.

.5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.6 Buried tubing:

.1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.

.2 Bend tubing without crimping or constriction. Minimize use of fittings.

.7 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance and equipment removal.

3.3 VALVES

.1 Isolate equipment with unions, fixtures and branches with gate valves.

.2 Provide valves as indicated on drawing and in specifications.

.3 Balance recirculation system using balancing valve. Mark settings and record on as-built drawings on completion.

.4 Provide line size check valve on discharge of all pumps.

3.4 PRESSURE TESTS

.1 Test pressure: Hydrostatic test pressure (1.5 times maximum working pressure), Pneumatic test pressure (1.2 maximum working pressure pending NRC approval) for a minimum of 15 minutes. 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 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper to Provincial potable water guidelines.

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 pressure booster systems are operating properly.

.4 Ensure that air chambers, expansion compensators are installed properly.

3.7 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 HWC piping systems for freedom of movement, pipe expansion as designed.

.5 Check control, limit, safety devices for normal and safe operation.

3.8 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 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

.3 Verify performance of temperature controls.

.4 Verify compliance with safety and health requirements.

.5 Check for proper operation of water hammer arrestors. Run [one][two…] 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.

.6 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning

3.9 CLEANING

.1 As per section 00 10 00 – General Instructions and to the satisfaction of the NRC Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

.3 Section 01 74 11 – Cleaning.

.4 Section 21 05 01 – Common Work Results – Mechanical

.5 Section 21 05 02 – Mechanical Identification

.6 Section 23 05 05 – Installation of Pipework

1.2 REFERENCES

.1 ASTM International Inc.

.1 ASTM B32, Standard Specification for Solder Metal.
.2 ASTM B306, Standard Specification for Copper Drainage Tube (DWV).
.3 ASTM C564, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

.2 Canadian Standards Association (CSA International).

.1 CSA B67, Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
.2 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
.3 CAN/CSA-B125.3, Plumbing Fittings.

.3 Green Seal Environmental Standards (GSES)

.1 Standard GS-36, Commercial Adhesives.

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 and 00 15 45 - General Safety Section and Fire 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 TUBE AND FITTINGS

.1 Above ground sanitary and vent, NPS 2 and under Type DWV to: ASTM B306.

.1 Fittings.

.1 Cast brass: to CAN/CSA-B125.3.

.2 Wrought copper: to CAN/CSA-B125.3.

.2 Solder: lead free, tin-antimony 95:5, to ASTM B32.

2.2 CAST IRON PIPING AND FITTINGS

.1 Buried sanitary, storm and vent minimum NPS 3, to: CAN/CSA-B70, with one layer of protective coating of bitumen.

.1 Joints:

.1 Mechanical joints:

.1 Neoprene or butyl rubber compression gaskets: to ASTM C564 or CAN/CSA-B70.

.2 Stainless steel clamps.

.2 Hub and spigot:

.1 Caulking lead: to CSA B67.

.2 Cold caulking compounds.

.2 Above ground sanitary, storm and vent NPS 2-1/2 and greater: to CAN/CSA-B70.

.1 Joints:

.1 Hub and spigot:

.1 Caulking lead: to CSA B67.

.2 Mechanical joints:

.1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

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 Storm water drainage:

.1 Verify domes are secure.

.2 Ensure weirs are correctly sized and installed correctly.

.3 Verify provisions for movement of roof system.

.4 Ensure that fixtures are properly anchored, connected to system and effectively vented.

.5 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

3.5 LABELLING

.1 Label all above ground (sanitary), (storm), (vent) piping as per section 21 05 02 – Mechanical Identification

3.6 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions and to the satisfaction of NRC representative.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for plumbing specialties and accessories.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM).

.1 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.

.2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.

.2 American Water Works Association (AWWA).

.1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.

.2 AWWA C701, Cold Water Meters-Turbine Type for Customer Service.

.3 AWWA C702-1, Cold Water Meters-Compound Type.

.3 Canadian Standards Association (CSA International).

.1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.

.2 CSA-B79, Floor, Area and Shower Drains, and Cleanouts for Residential Construction.

.3 CSA-B356, 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, Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data.

.2 PDI-WH201, Water Hammer Arresters Standard.

1.3 SUBMITTALS

.1 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.

.2 Shop Drawings:

.1 Submit shop drawings to indicate ,materials, finishes, method of anchorage, number of anchors, dimensions, color, construction and assembly details.

.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Instructions: submit manufacturer's installation instructions.

.5 Manufacturers' Field Reports: manufacturers' field reports specified.

Part 2 Products

2.1 FLOOR DRAINS

.1 Type 1, General purpose: all duco coated cast iron body, reversible flashing clamp with seepage openings and adjustable 5" diameter nickel bronze 1/2" thick strainer, secured with S.S. screws, 4" throat on strainer. In quarry or mosaic tiled areas, provide 'BHD' - 5" x 5" square nickel bronze strainer. Provide trap primer connection ‘P’.

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.

2.3 WATER HAMMER ARRESTORS

.1 Stainless steel construction, piston type: Normal operating pressure 35 to 250 PSIG. Spike pressure 1,500 PSIG. Copper construction, piston type, working pressure, 150 psig from 33 to 180 deg F PDI-WH201.

2.4 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”.

2.5 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

2.6 FLOOR DRAIN TRAP SEAL PRIMERS

.1 1/2" NPT connections with strainer and integral back flow preventer & vacuum breaker.

2.7 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 and where indicated.

.2 All arrestors shall be accessible. Provide access panels has required.

.3 Provide isolation ball valve.

3.6 INSTALLATION OF PIPE ESCUTCHEON

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

.2 Install the plates so that they are tight against the building surface concerned, and ensure that the plates completely cover pipe sleeves and/or openings.

.3 Where sleeve extends above finished floor, escutcheons or plates shall cover sleeve extension

3.7 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 NRC. Where located in wall unit shall be c/w access panel sized to suit proper access to primer.

.3 Install soft copper tubing to floor drain.

3.8 START-UP

.1 General:

.1 In accordance with Section 00 10 00 – General Instructions.

.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.

.3 Provide continuous supervision during start-up of all equipment.

3.9 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.

.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 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.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

.3 Section 21 05 01 – Common Work Results- Mechanical

.4 Section 21 07 19 – Thermal Insulation for Piping

.5 Section 22 11 16 – Domestic Water Piping

.6 Section 22 42 01 – Plumbing Specialties and Accessories

.7 Section 23 05 05 – Installation of Pipework

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CAN/CSA-B45, Plumbing Fixtures.
- .2 CAN/CSA-B125.3, Plumbing Fittings.
- .3 CAN/CSA-B651, Accessible Design for the Built Environment.

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.

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.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Any alternates to basis of design shown on drawings **must** be submitted for approval during the tendering process.

.2 Fixtures: manufacture in accordance with CAN/CSA-B45 series.

.3 Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.

.4 Exposed plumbing brass to be chrome plated.

.5 Number, locations: as indicated on drawing 5553-M01..

.6 Fixtures in any one location to be product of one manufacturer and of same type.

.7 Trim in any one location to be product of one manufacturer and of same type.

.8 Water closets:

WC type	Mounting		Bowl		Flush valve		Flush tank	Handicapped
	Wall	Floor	Elong	Reg	Exp'd	Conc'd		
WC1		X	X		X			X

.1 WC1: floor-mounted, flush valve, for handicapped.

.1 Top of seat to be between 400 mm and 460 mm from finished floor.

.2 Bowl: vitreous china, floor mounted, syphon jet, elongated rim, top spud for flush valve, bolt caps.

.3 Acceptable Material: American Standard Kholer, Crane or approved equal.

.2 Water Closet Flush Valves:

.1 Flush valve: exposed, polished chrome, externally adjustable, diaphragm type with NPS 1 screwdriver angle stop, oscillating handle, wall and spud escutcheons and vacuum breaker.

.2 Acceptable Material: American Standard, Sloan, Zurn, Moen, TAC or approved equal

.3 Water Closet Seat

.1 Seat shall be heavy duty, open front, less cover, suitable injection molded polypropylene suitable for bowl type, external check hinge with 304 stainless steel hinge posts. Colour: White

.2 Acceptable Material: American Standard model 5905.100, Enpoco or approved equal.

.9 Urinals:

.1 UR1: wall mounted, ultra-low flush, exposed flush valve, top spud.

.1 Urinal: vitreous china, washout type, integral flushing rim, extended shields, integral trap, removable stainless steel strainer, back outlet.

.2 Acceptable Material: American Standard, Kholer Model, Crane or approved equal.

.2 Urinal Electronic Flush Valves:

.1 Surface mounted, controlled by infra-red] occupancy detector with manual override.

.1 Complete with removable filter, 9 second time delay, flush time adjustable from 0-8 seconds, factory set at 4.5 seconds, 4.5 L flush/cycle maximum.

.2 Sensor adjustable from 50-1220 mm, factory set to 860 mm.

.3 Solenoid valve: 12 VDC slow-closing type for 60 kPa (minimum), 1000 kPa (maximum), 85 degrees C with manual over-ride, adjustable flow control.

.2 Flush valve(s) controlled by programmed timer permitting 24 hour pre-scheduled flushing. Timer set to flush every 30 minutes from 20:00h till 6:00h plus once at midnight.

.3 Acceptable Material: American Standard, Sloan, Zurn, TAC or approved equal.

.10 Washroom Lavatories:

.1 LAV1: wall-hung, for handicapped.

.1 Vitreous china, low shelf, with integral back, contoured front, shallow front basin, front overflow, soap depressions, supply openings on 200 mm centres, concealed supports. Sizes: 685 x 508 mm.

.2 Acceptable Material: American Standard, Kholer, Crane, Sloan, Zurn or approved equal.

.11 Washroom Lavatory Trim:

.1 Wheelchair supply fitting with gooseneck spout, aerator, 150 mm blade handles with indexed buttons, bent tailpiece.

.1 Provide accessories to limit maximum flow rate to 8.35 l/minute at 413 kPa.

.2 Waste fitting: none.

.3 Acceptable Material: American Standard, Delta, Moen, Chicago Faucets, or approved equal.

.12 Fixture piping:

.1 Hot and cold water supplies to fixtures:

.1 Chrome plated flexible supply pipes with 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.

.13 Chair carriers:

.1 Factory manufactured floor-mounted carrier systems for wall-mounted 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 Wall-hung fixtures: as indicated on architectural drawings, measured from finished floor.

.2 Barrier free: to most stringent 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 Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS SECTIONS

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions

.3 Section 21 05 01 – Common Work Results – Mechanical.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 The contractor is responsibility to coordinate and dispose of all waste material to local provincial and municipality requirements.

.2 It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.

.3 The contractor is responsible for all damaged and stolen material, tools or equipment on site.

.4 The contractor is responsible for the delivery of all material, tools or equipment.

Part 2 Products

2.1 NOT USED

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 CONNECTIONS TO EQUIPMENT

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

.2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

.3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement and when penetrating ceiling/roof and has indicated..

3.3 CLEARANCES

.1 Provide clearance around systems, equipment and components for observation of operation, inspection, testing (x-ray, servicing, maintenance and as recommended by manufacturer.

.2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, components.

3.4 DRAINS

.1 Install piping with grade in direction of flow except as indicated.

.2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.

.3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.

.4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

3.5 AIR VENTS

.1 Install air vents at high points in piping systems.

.2 Install isolating valve at each air valve.

.3 Install drain piping to approved location and terminate where discharge is visible.

3.6 DIELECTRIC COUPLINGS

.1 General: compatible with system, to suit pressure rating of system.

.2 Locations: where dissimilar metals are joined.

.3 NPS 2 and under: isolating unions or bronze valves.

.4 Over NPS 2: isolating flanges.

3.7 PIPEWORK INSTALLATION

.1 Screwed fittings jointed with Teflon tape.

.2 Protect openings against entry of foreign material.

.3 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.

.4 Assemble piping using fittings manufactured to ANSI standards.

.5 Saddle type branch fittings may be used on mains if branch line is no larger than half size of main.

.1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.

.6 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.

.7 Install concealed pipework to minimize furring space, maximize headroom, conserve space.

.8 Slope piping, except where indicated, in direction of flow for positive drainage and venting.

.9 Install, except where indicated, to permit separate thermal insulation of each pipe.

.10 Group piping wherever possible.

.11 Ream pipes, remove scale and other foreign material before assembly.

.12 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.

.13 Provide for thermal expansion as indicated.

.14 Valves:

.1 Install in accessible locations.

.2 Remove interior parts before soldering.

.3 Install with stems above horizontal position unless otherwise indicated.

.4 Valves accessible for maintenance without removing adjacent piping.

.5 Install globe valves in bypass around control valves.

.6 Use valves at branch take-offs for isolating purposes except where otherwise specified.

.7 Install butterfly valves between weld neck flanges to ensure full compression of liner.

.8 Install ball valves for glycol service and where indicated.

.9 Use chain operators on valves NPS 2 1/2 and larger where installed more than 2400 mm above floor in Mechanical Rooms.

.15 Check Valves:

.1 Install silent check valves on discharge of pumps in vertical pipes with downward flow and elsewhere as indicated.

.2 Install swing check valves in horizontal lines on discharge of pumps and elsewhere as indicated.

3.8 SLEEVES

.1 General: install where pipes pass through masonry, concrete structures, fire rated assemblies, and elsewhere as indicated.

.2 Material: schedule 40 black steel pipe.

.3 Construction: foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.

.4 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.

.5 Installation:

.1 Concrete, masonry walls, concrete floors on grade: terminate flush with finished surface.

.2 Other floors: terminate 25 mm above finished floor.

.3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.

.6 Sealing:

.1 Foundation walls and below grade floors: fire retardant, waterproof non-hardening mastic.

.2 Elsewhere: Provide space for fire-stopping. Maintain fire rating integrity.

.3 Sleeves installed for future use: fill with lime plaster or other easily removable filler.

.4 Ensure no contact between copper pipe or tube and sleeve.

3.9 ESCUTCHEONS

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

.2 Construction: one piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.

.3 Sizes: outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

3.10 PREPARATION FOR FIRE STOPPING

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

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

.3 Uninsulated heated pipes subject to movement: wrap with non-combustible smooth material to permit pipe movement without damaging fires topping material or installation.

.4 Insulated pipes and ducts: ensure integrity of insulation and vapour barriers.

3.11 FLUSHING OUT OF PIPING SYSTEMS

.1 Flush system in accordance with good industry standards and as indicated.

3.12 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK

.1 Advise NRC with 48 hours minimum prior to performance of pressure tests.

.2 Pipework: test as specified in relevant sections.

.3 Maintain specified test pressure without loss for 4 hours minimum unless specified for longer period of time in relevant mechanical sections.

.4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.

.5 Conduct tests in presence of NRC and has indicated in relevant mechanical sections.

.6 Pay all costs for repairs or replacement, retesting, and making good. NRC to determine whether repair or replacement is appropriate.

.7 Insulate or conceal work only after approval and certification of tests and approved by NRC.

3.13 EXISTING SYSTEMS

.1 Connect into existing piping systems at times approved by NRC.

.2 Request written approval 10 days minimum, prior to commencement of work.

.3 Be responsible for damage to existing plant by this work.

.4 Ensure daily clean-up of existing areas.

3.14 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions and to the satisfaction of NRC representative.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes: Bronze valves that may be used for the following systems unless otherwise stated.

.1 Pressure less then 100 psig : domestic water, chilled water, heating water, glycol piping and compressed air piping

.2 Pressure less then 15 psig: saturated steam

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME).

.1 ANSI/ASME B1.20.1, Pipe Threads, General Purpose (Inch).

.2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM A276, Specification for Stainless Steel Bars and Shapes.

.2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.

.3 ASTM B283, Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).

.4 ASTM B505/B505M, Specification for Copper-Base Alloy Continuous Castings.

.3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).

.1 MSS-SP-25, Standard Marking System for Valves, Fittings, Flanges and Unions.

.2 MSS-SP-80, Bronze Gate Globe, Angle and Check Valves.

.3 MSS-SP-110, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 SUBMITTALS

.1 Contractor shall submit detailed shop drawings for all valves for NRC review.

.2 Shop drawings shall include but not limited to the following:

.1 Fitting type

.2 Material for valve body and internals

.3 ASME Class

.3 Valve shall not be purchased until shop drawing has been approved by NRC.

1.4 QUALITY ASSURANCE

.1 Health and Safety:

.1 See Sections 00 10 00 – General Instructions and 00 15 45 – General Safety Section and Fire Instructions

1.5 DELIVERY STORAGE AND DISPOSAL

.1 See Section 00 10 00 – General Instructions

1.6 MAINTENANCE

.1 Furnish following spares

.1 Valves: supply NRC with one spare valve for every 10 valves provided

Part 2 Products

2.1 MATERIALS

.1 Valves:

.1 Except for specialty valves, to be single manufacturer.

.2 All valves on steam and compressed air above at or above 15 psig shall have Canadian Registration Number (CRN#)

.2 End Connections:

.1 Connection into adjacent piping/tubing:

.1 Steel pipe systems: Screwed ends to ANSI/ASME B1.20.1.

.2 Copper tube systems: Solder ends to ANSI/ASME B16.18.

.3 Lockshield Keys:

.1 Where lockshield valves are specified, provide 2 keys of each size: malleable iron cadmium plated.

.4 Silent Check Valves:

.1 NPS 2 and under, screwed ends:

.1 Body: cast high tensile bronze to ASTM B62 with integral seat.

.2 Minimum pressure rating: Class 150.

.3 Connections: screwed ends to ANSI B1.20.1 and with hex. shoulders.

.4 Disc and seat: renewable rotating disc.

.5 Stainless steel spring, heavy duty.

.6 Seat: regrindable.

.5 Ball Valves:

.1 NPS 2 and under, threaded ends:

.1 Body and cap: cast high tensile bronze

.2 Chrome plated brass ball, RPTFE seat.

.3 Minimum pressure rating: 1000 kPa saturated steam, 4130 kPa WOG

.4 *Valves to be complete with minimal 31 mm stem extension for all insulated pipes, see section 21 07 19 THERMAL INSULATION FOR PIPING*

.5 Operator: steel lever handle with securely attached vinyl grip

.6 Connections: Screwed ends to ANSI B1.20.1 and with hexagonal shoulders

.2 NPS 2 and under, soldered ends:

.1 Body and cap: cast high tensile bronze

.2 Chrome plated brass ball, RPTFE seat.

.3 Minimum pressure rating: 1000 kPa saturated steam, 4130 kPa WOG

.4 *Valves to be complete with minimal 31 mm stem extension for all insulated pipes, see section 21 07 19 THERMAL INSULATION FOR PIPING*

.5 Operator: steel lever handle with securely attached vinyl grip

.6 All internals to be removed prior to soldering.

.7 Connections: solder ends to ANSI. Soldered ends to ANSI B16.18, solder ends to ANSI.

Part 3 Execution

3.1 INSTALLATION

.1 Install rising stem valves in upright position with stem above horizontal.

.2 Where soldered values are used contractor shall remove internal parts before soldering. Before soldering, installation shall be inspected by NRC.

.3 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance and equipment removal.

.4 No valve shall be insulated until all pressure tests relating to valve are completed and approved by NRC.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 10 00 – General Instructions

.2 Section 00 15 45 – General Safety Section and Fire Instructions

.3 Section 21 05 01 – Common Work Results - Mechanical.

1.2 REFERENCES

.1 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.

.2 Reference Standards:

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)

.1 ANSI/ASHRAE/IESNA 90.1, SI; Energy Standard for Buildings Except Low-Rise Residential Buildings.

.2 ASTM International Inc.

.1 ASTM B209M, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

.2 ASTM C335, Standard Test Method for Steady State Heat Transfer Properties of Pipe Insulation.

.3 ASTM C411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.4 ASTM C449/C449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.

.5 ASTM C547, Standard Specification for Mineral Fiber Pipe Insulation.

.6 ASTM C553, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

.7 ASTM C612, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

.8 ASTM C795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.9 ASTM C921, 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.

.4 Green Seal Environmental Standards (GSES)

.1 Standard GS-36, Commercial Adhesives.

.5 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (2005).

.6 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

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 duct insulation, and include product characteristics, performance criteria, physical size, finish and limitations.

.1 Description of equipment giving manufacturer's name, type, model, year and capacity.

.2 Details of operation, servicing and maintenance.

.3 Recommended spare parts list.

.3 Manufacturers' Instructions:

.1 Provide manufacture's written duct insulation jointing recommendations. and special handling criteria, installation sequence, cleaning procedures.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: specialist in performing work of this section, and have at least 5 years successful experience in this size and type of project, qualified to standards of TIAC.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle 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 factory applied vapour retarder 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 retarder 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 gm/m^2 cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.

.2 Lagging adhesive: compatible with insulation.

.1 Maximum VOC limit 200 g/L.

2.4 ACCESSORIES

.1 Vapour retarder lap adhesive:

.1 Water based, fire retardant type, compatible with insulation.

.1 Maximum VOC limit 200 g/L .

.2 Indoor Vapour Retarder Finish:

.1 Vinyl emulsion type acrylic, compatible with insulation.

.3 ULC Listed Canvas Jacket:

.1 220 gm/m^2 cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.

.4 Outdoor Vapour Retarder Mastic:

.1 Vinyl emulsion type acrylic, compatible with insulation.

.2 Reinforcing fabric: Fibrous glass, untreated 305 g/m^2.

.5 Tape: self-adhesive, aluminum, reinforced, 50 mm wide minimum.

.6 Contact adhesive: quick-setting

.1 Maximum VOC limit 50 g/L.

.7 Canvas adhesive: washable.

.1 Maximum VOC limit 50 g/L.

.8 Tie wire: 1.5 mm stainless steel.

.9 Banding: 19 mm wide, 0.5 mm thick stainless steel.

.10 Facing: 25 mm stainless steel hexagonal wire mesh stitched on one face of insulation with expanded metal lath on other face].

.11 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, 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 retarder jacket and finishes.

.1 Ensure hangers, and supports are outside vapour retarder 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 Retarder	Thickness (mm)
Rectangular cold and dual temperature supply air ducts	C-1	yes	50
Round cold and dual	C-2	yes	50

	TIAC Code	Vapour Retarder	Thickness (mm)
temperatire supply air ducts			
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

.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.

.1 Finishes: conform to following table:

	TIAC Code	
	Rectangular	Round
Indoor, concealed	none	none
Indoor, exposed within mechanical room	CRF/1	CRD/2
Indoor, exposed elsewhere	CRF/2	CRD/3

3.5 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions and to the satisfaction of NRC representative.

.1 Remove surplus materials, excess materials, rubbish, 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.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions

.3 Section 21 05 01 – Common Work Results - Mechanical

1.2 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.

1.3 SUBMITTALS

.1 Submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:

.1 Flexible connections.

.2 Flexible ductwork.

.3 Balancing dampers.

.4 Duct access doors.

.2 Submit WHMIS MSDS in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section and Fire Instructions. Indicate VOC's for adhesive 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.

.7 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.4 QUALITY ASSURANCE

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting one week prior to beginning on-site installations.

.1 Verify project requirements.

.2 Review installation conditions.

.3 Co-ordination with other building sub-trades.

.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 and 00 15 45 – Common Safety Section and Fire Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 The contractor is responsibility to coordinate and dispose of all waste material to local provincial and municipality requirements. Refer to section 00 10 00 – General Instructions.

.2 It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.

.3 The contractor is responsible for all damaged and stolen material, tools or equipment on site.

.4 The contractor is responsible for all delivery of material, tools or equipment

Part 2 Products

2.1 GENERAL

.1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

2.2 STEEL DUCTWORK

.1 Prime quality galvanized sheet steel with metal gauges in accordance with SMACNA standards to suit the duct configuration and classification.

.2 Acceptable manufacturers are Flexmaster Ltd., Trans Continental Equipment Ltd., "Al-U-Flex", and Alpha Sheet Metal Co.

2.3 FLEXIBLE DUCTWORK – INSULATED

.1 Flexmaster Triple Lock Type V U.L.C. listed flexible ductwork c/w a core of standard triple lock metal flexible ducting, factory supplied glass or mineral wool insulating blanket and an outer jacket of flexible PVC sheet.

.2 Acceptable manufacturers are Flexmaster Ltd., Trans Continental Equipment Ltd., "Al-U-Flex", and Alpha Sheet Metal Co.

2.4 BALANCING DAMPERS

.1 Nailor-Hart Industries Inc. opposed blade galvanized steel control damper, Model No. 1020 for rectangular ductwork, Model No. 1021 for round ductwork, each complete with No. 16 U.S.S. gauge frame, No. 18 U.S.S. gauge blades, nylon blade shaft bearings, linkage shaft extension, and a suitable and secure damper operator with locking device and visual indication of damper position from the duct exterior.

.2 Acceptable manufacturers are Nailor-Hart Industries Inc., Controlled Air Manufacturing Ltd., Ruskin Ltd., and Air Specialties Manufacturing Ltd.

2.5 DUCT ACCESS DOORS

.1 **General:**

.1 Non-insulated sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.7 mm thick (No. 24 gauge) complete with sheet metal angle frame.

.2 Insulated sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.7 mm thick No. 24 gauge) complete with sheet metal angle frame and 25mm (1") thick rigid glass fibre insulation.

.2 Gaskets: neoprene or foam rubber.

.3 Hardware**:**

.1 Up to 300 x 300 mm (12" x 12"): 2 sash locks.

.2 301 to 450 mm (12" x 18"): 4 sash locks.

2.6 GRILLES, REGISTERS & DIFFUSERS

.1 Grilles, registers and diffusers of the type, size and arrangement as specified on the drawings.

.2 Grilles, registers and diffusers shall be product of one manufacturer.

.3 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency signifying adherence to codes and standards.

.4 Acceptable manufacturers are E.H. Price Ltd., Titus Ltd., Air Vector Ltd., Nailor Industries Inc., Krueger Manufacturing Co. and Carnes.

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 DUCT, DAMPER & SIMILAR FORMED OPENINGS

.1 Duct openings, air inlet and outlet openings, fire damper openings, etc. will be provided in poured concrete work, masonry, drywall surfaces, etc., by the trade responsible for the particular construction in which the opening is required.

.2 Ensure that openings for fire dampers to 350 mm (14") high are sized to suit the damper arrangement with folding blade out of the air stream.

.2 FABRICATION & INSTALLATION OF STEEL DUCTWORK

.1 Provide all required steel ductwork. Unless otherwise noted, all ductwork shall be constructed of galvanized steel.

.2 Unless specifically noted otherwise, all duct, bends, elbows, transformations, branch fittings, etc. shall be fabricated, sealed and installed in accordance with the 1" water gauge (0.25 kPa) pressure class of the latest edition of SMACNA Hvac Duct Construction Standards, except for duct upstream of VAV boxes, which shall comply with the requirements of the 2" water gauge (0.50 kPa) pressure class..

.3 FLEXIBLE DUCTWORK

.1 Install flexible ductwork where indicated.

.2 At connections between sheet metal ducts and flexible ducts, provide galvanized steel round to rectangular duct connections as specified hereinbefore.

.3 Install flexible ducts as straight as possible, secure at each end with steel gear type clamps, and seal joints. Where bends are required, they shall be long radius.

.4 Maximum length of flexible duct to be 3m (10').

.4 BALANCING DAMPERS

.1 Provide volume type dampers in all open end ductwork and wherever else shown.

.2 Install the dampers such that the operating mechanism is positioned for easy operation, and such that the dampers cannot move or rattle.

.5 DUCT ACCESS DOORS

.1 Provide access doors in ductwork for access to all duct system components which will or may need maintenance and/or repair.

.2 Size:

.1 300 x 300 mm for viewing.

.2 As indicated.

.3 Locations:

.1 Devices requiring maintenance.

.2 Required by code.

.3 Elsewhere as indicated.

.4 Identify access doors provided for fusible link fire damper maintenance as such.

.5 Access doors in insulated ductwork shall be sandwich construction type with insulation between the inner and outer panels.

.6 GRILLES, REGISTERS & DIFFUSERS

.1 Provide grilles and diffusers of the type, size and arrangement specified and shown on the drawings.

.2 Exactly locate grilles and diffusers to conform to the final architectural reflected ceiling plans and detailed wall elevations, and to conform to the final lighting, ceiling layout, ornamental and other wall treatment.

.3 Equip supply diffusers having a basic four-way or all round air pattern for operation in one (1), two (2) or three (3) way pattern where so directed on the drawings.

.4 Confirm finish of grilles, registers and diffusers prior to ordering.

3.3 CLEANING

.1 Perform cleaning operations as specified in Section 00 10 00 – General Instructions in accordance with manufacturer's recommendations and to the satisfaction of the NRC representative.

.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 Supply, return and exhaust grilles and registers, diffusers and linear grilles, for commercial and residential use.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions

.3 Section 21 05 01 – Common Work Results- Mechanical

.4 Section 21 05 02 – Mechanical Identification

.5 Section 23 05 13 – Common Motor Requirements for HVAC

.6 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC

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.

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.

.2 Indicate following:

.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.

1.4 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and 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: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 GENERAL

.1 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity.

.2 Frames:

.1 Full perimeter gaskets.

.2 Plaster frames where set into plaster or gypsum board.

.3 Concealed fasteners.

.3 Concealed manual volume control damper operators.

.4 Colour: as directed by Departmental Representative.

.5 All new and existing diffusers, grilles and registers as well as any associated ductwork is to be cleaned and vacuumed (within vacuum hose length)

.6 Refer to drawing 5553-M01 for diffuser and grille schedule(s), basis of design and acceptable material

2.2 MANUFACTURED UNITS

.1 Grilles, registers and diffusers of same generic type, products of one manufacturer.

2.3 RETURN AND EXHAUST GRILLES AND REGISTERS

.1 General: with opposed blade dampers.

.2 Type EG1: aluminum, 19 mm border, 13mmx13mm egg-crate type, horizontal face bars. Finish: White.

.3 Acceptable Material: EH Price Model 80, Titus, Nailor or approved equal.

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 manufacturer’s instructions.

.2 Install with oval headed, stainless steel screws in countersunk holes where fastenings are visible.

.3 Bolt grilles, registers and diffusers, in place, in gymnasium and similar game rooms.

3.3 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions and to the satisfaction of the NRC representative.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

1 REFERENCES

.1 Perform all work to meet or exceed the requirements of the Canadian Electrical Code, CSA Standard C22.1 - (latest edition).

.2 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.

.3 Do overhead and underground systems in accordance with CSA C22.3 except where specified otherwise.

.4 Where requirements of this specification exceed those of above mentioned standards, this specification shall govern.

.5 Notify the NRC Departmental Representative as soon as possible when requested to connect equipment supplied by NRC which is not CSA approved.

.6 Refer to Sections 01 10 00 & 01 35 30.

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.

3 START-UP

.1 Instruct the NRC Departmental Representative and operating personnel in the operation, care and maintenance of equipment supplied under this contract.

4 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.

5 FINISHES

.1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning, application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Outdoor electrical equipment "equipment green" finish to EEMAC Y1-1-1955.

.2 Indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1-1958.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

6 ACOUSTICAL PERFORMANCE

.1 In general provide equipment producing minimal sound levels in accordance with the best and latest practices established by the electrical industry.

.2 Do not install any device or equipment containing a magnetic flux path metallic core, such as gas discharge lamp ballasts, dimmers, solenoids, etc., which are found to produce a noise level exceeding that of comparable available equipment.

7 EQUIPMENT IDENTIFICATION

.1 Identify with 3mm (1/8") Brother, P-Touch non-smearing tape, or an alternate approved by the NRC 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 NRC 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. These labels are available from NRC's Facilities Maintenance group in building M-19.

.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 molded case breaker with lamicoid nameplate.

8 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.

9 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 condulets 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.

10 MANUFACTURER'S & APPROVALS 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.

11 WARNING SIGNS AND PROTECTION

.1 Provide warning signs, as specified or to meet requirements of Authorized Electrical Inspection Department and NRC Departmental Representative.

.2 Accept the responsibility to protect those working on the project from any physical danger due to exposed live equipment such as panel mains, outlet wiring, etc. Shield and mark all live parts with the appropriate voltage. Caution notices shall be worded in both English and French.

12 LOAD BALANCE

.1 Measure phase current to new panelboards with normal loads operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes, and revise panelboard schedules.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

13 GROUNDING

.1 Thoroughly ground all electrical equipment, cabinets, metal supporting frames, ventilating ducts and other apparatus where grounding is required in accordance with the

requirements of the latest edition of the Canadian Electrical Code Part 1, C.S.A. C22.1 and corresponding Provincial and Municipal regulations. Do not depend upon conduits to provide the ground circuits.

.2 Run separate green insulated stranded copper grounding conductors in all electrical conduits including those feeding toggle switches and receptacles.

14 TESTS

.1 Provide any materials, equipment and labour required and make such tests deemed necessary to show proper execution of this work, in the presence of the NRC Departmental Representative.

.2 Correct any defects or deficiencies discovered in the work in an approved manner at no additional expense to the Owner.

.3 Megger all branch circuits and feeders using a 600V tester for 240V circuits and a 1000V tester for 600V circuits. If the resistance to ground is less than permitted by Table 24 of the Code, consider such circuits defective and do not energize.

.4 The final approval of insulation between conductors and ground, and the efficiency of the grounding system is left to the discretion of the local Electrical Inspection Department.

15 COORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, fuses, are installed to values and settings as indicated on the Drawings.

16 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 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.

Part 2 Products

2.1 BUILDING WIRES 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 AC90 (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 switches or receptacles in existing or new hollow gypsum partitions, vertical runs only with cable length not to exceed 3.5m (12'), or
  - .3 When specifically called for on drawings or approved in writing by departmental representative.
  - .4 AC90 shall not be used in isolated walls or masonry walls.
  - .5 Only AC90 cable of No. 12 AWG will be accepted.
- .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%.

Part 3 Execution

3.1 BUILDING WIRES

.1 Install building wires as follows:

.1 Make joints, taps and splices in approved boxes with solderless connectors. Joints and/or splices are not acceptable inside a panelboard.

.2 Ensure the lugs accommodate all the strands of the conductor.

.3 Replace any wire or cable showing evidence of mechanical injury.

.4 Use No. 10 AWG for branch circuit wiring extending more than 30 m (100 ft.) to farthest outlet from panel.

.5 Circuit numbers indicated on the drawing are intended as a guide for the proper connection of multi-wire circuits at the panel.

.6 Take care to keep the conductors free from twisting.

.7 Use an approved lubricant for pulling in conduit.

.8 Leave sufficient slack on all runs to permit proper splicing and connection of electrical devices.

.9 Branch circuit wiring of 120 volt applications to be multi-wire utilizing common neutrals. Under no condition shall any switch break a neutral conductor.

.10 Provide and install an approved fire- retardant wrap or coating for PVC jacketed cables installed in a grouped configuration of two or more.

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.

Part 2 Products

2.1 WIRE AND BOX CONNECTORS

.1 Pressure type wire connectors sized to fit conductors.

2.2 WIRING TERMINATIONS

.1 Provide first grade wire and cable connectors suitable for the service on which they are used and install them in accordance with the latest trade practice.

.2 Provide high quality extruded copper-free aluminium (0.4% or less) connectors for single and multi conductor cable. Steel and then zinc plated connectors for multi conductor cables.

.3 When used in hazardous area, connectors should be certified for such location in Class, Division and Group.

.4 For large conductor sizes, use bolted or compression solderless type connectors.

.5 Use high temperature connectors and insulation on all connections of high temperature conductors.

.6 Where connector types are called for on the drawings or in the specification, do not use other types.

.7 Lugs, terminals, screws used for termination of wiring to be suitable for copper conductors.

Part 3 Execution

3.1 INSTALLATION

.1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.

.2 Bond and ground as required [to CSA C22.2No.41].

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.

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.

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 16mm (1/2").

.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 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 conduit of any size. 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 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.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 01 10 00.

1.3 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 occupancy sensor (wall mounted):

.1 120V, suitable for use with installed light fixture.

.2 Rated for 600W LED.

.3 Can be set to Manual-ON/Automatic-OFF or Auto-ON/Auto-OFF.

.4 Adjustable delayed-OFF time.

.5 Suitable for use in “3-way” configuration where indicated.

.6 Fire year warranty.

.7 Standard of acceptance: Hubbell, Leviton, Philips or equivalent approved by NRC Departmental Representative.

.3 LED occupancy sensor (ceiling mounted):

.1 120V, suitable for use with installed light fixture.

.2 360° coverage pattern.

.3 No minimum load requirements.

.4 Adjustable delayed-OFF time.

.5 No field calibration or sensitivity adjustments required.

.6 Fire year warranty.

.7 Standard of acceptance: Philips LRM2377 or equivalent approved by NRC Departmental Representative.

.4 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 Special receptacles with ampacity and voltage as indicated.

.3 Receptacles of one manufacturer throughout the project.

.5 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 Multi-outlet covers as indicated.

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.

.4 Locate roof top maintenance receptacle within 7.5m of the rooftop electrical equipment.

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 400mm (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 400mm (1'-4") to centreline.
.6 Fan coil speed control switch 1.2m (3'-11") to centreline.
.7 Roof top maintenance receptacle: 750mm above the finished roof.

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 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 10 00.

.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.

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 120V 610mm x 610mm, 30W-35W, suitable for recessed mounting in T-bar ceiling.

.2 Rigid die embossed steel housing, 100mm 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 L80 performance for 50,000 hours.

.7 3500k colour temperature, minimum 3200 Lumen output.

.8 Standard of acceptance: Philips 2AVE-G-32L-835-2-ACR-UNV-DIM or equivalent approved by the NRC Departmental Representative.

.2 LED Pot light

.1 l20V, 175mm open LED downlight, suitable for surfaced mounting in drywall ceiling.

.2 5-year warranty.

.3 3500k colour temperature, 82 CRI, minimum 1000 lumen output.

.4 Standard of acceptance: Philips S-7-R-8-35K-10-AL 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.

.2 Unless otherwise specified support fluorescent luminaires mounted in continuous rows once every 3.6 m (12').

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

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.

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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.

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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
NRC	ASPM
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
U-61 washroom renovation

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 ☑ Not releasable / À ne pas diffuser ☐ Restricted to: / Limité à : ☐ Specify country(ies): / Préciser le(s) pays :	All NATO countries / Tous les pays de l'OTAN ☐ Restricted to: / Limité à : ☐ Specify country(ies): / Préciser le(s) pays :	No release restrictions / Aucune restriction relative à la diffusion ☐ 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? — No / Non ☑ Yes / Oui ☐
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 :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets? — No / Non ☑ Yes / Oui ☐
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate?

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? — No / Non ☐ Yes / Oui ☑
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?
If Yes, will unscreened personnel be escorted? — No / Non ☐ Yes / Oui ☑
Dans l'affirmative, le personnel en question sera-t-il escorté?

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? — No / Non ☑ Yes / Oui ☐
Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS?

11. b) Will the supplier be required to safeguard COMSEC information or assets? — No / Non ☑ Yes / Oui ☐
Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC?

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? — No / Non ☑ Yes / Oui ☐
Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ?

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? — No / Non ☑ Yes / Oui ☐
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?

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency? — No / Non ☑ Yes / Oui ☐
Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale?

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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	B	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).

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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.ca	Nov. 5, 2018

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature
Richard Bramucci	Analyst, Security in Contracting	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
(613) 991-1093	(613) 990-0946	richard.bramucci@nrc-cnrc.gc.ca	2018.11.05

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
Alain Lepage	Senior Proc. Offic	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
613 991-9990			29-11-2018

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