



**RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:**

**Bid Receiving - PWGSC / Réception des
soumissions - TPSGC**

**11 Laurier St. / 11 rue Laurier
Place du Portage, Phase III
Core 0B2 / Noyau 0B2
Gatineau, Québec K1A 0S5
Bid Fax: (819) 997-9776**

**Request For a Standing Offer
Demande d'offre à commandes**

Departmental Individual Standing Offer (DISO)

Offre à commandes individuelle du département(OCID)

Canada, as represented by the Minister of Public Works and
Government Services Canada, hereby requests a Standing Offer
on behalf of the Identified Users herein.

Le Canada, représenté par le ministre des Travaux Publics et
Services Gouvernementaux Canada, autorise par la présente,
une offre à commandes au nom des utilisateurs identifiés
énumérés ci-après.

Comments - Commentaires

**Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur**

Issuing Office - Bureau de distribution

Consultant Services Division/Division des services
d'experts-conseils
11 Laurier St./11 Rue Laurier
3C2, Place du Portage
Phase III
Gatineau, Québec K1A 0S5

Title - Sujet ESAP-Mechanical & Electrical Indust	
Solicitation No. - N° de l'invitation EP635-181065/A	Date 2017-10-24
Client Reference No. - N° de référence du client 20181065	GETS Ref. No. - N° de réf. de SEAG PW-\$\$FE-178-73620
File No. - N° de dossier fe178.EP635-181065	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2017-12-04	
Time Zone Fuseau horaire Eastern Standard Time EST	
Delivery Required - Livraison exigée See Herein	
Address Enquiries to: - Adresser toutes questions à: Matende, Robinah	Buyer Id - Id de l'acheteur fe178
Telephone No. - N° de téléphone (873)469-4923 ()	FAX No. - N° de FAX (819)956-3160
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: SEE HEREIN	
Security - Sécurité This request for a Standing Offer does not include provisions for security. Cette Demande d'offre à commandes ne comprend pas des dispositions en matière de sécurité.	

Instructions: See Herein

Instructions: Voir aux présentes

Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

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SUPPLEMENTARY INSTRUCTIONS TO PROPONENTS (SI)

SI 1 INTEGRITY PROVISIONS – DECLARATION OF CONVICTED OFFENCES

In accordance with the Ineligibility and Suspension Policy (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Proponent must provide **with its bid, as applicable**, to be given further consideration in the procurement process, the required documentation as per General instructions to Proponents (GI), Integrity Provisions – Proposal, **section 3b**.

SI 2 FEDERAL CONTRACTORS PROGRAM FOR EMPLOYMENT EQUITY - CERTIFICATION

By submitting a proposal, the Proponent certifies that the Proponent, and any of the Proponent's members if the Proponent is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available at the bottom of the page of the Employment and Social Development Canada (ESDC) - Labour's website (<https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html>).

Canada will have the right to declare a proposal non-responsive, or to set-aside a Standing Offer, if the Proponent, or any member of the Proponent if the Proponent is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of issuing of a Standing Offer or during the period of the Standing Offer.

Canada will also have the right to terminate the Call-up for default if a Consultant, or any member of the Consultant if the Consultant is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list during the period of the contract.

The Proponent must provide the Contracting Authority with a completed Federal Contractors Program for Employment Equity - Certification (see Appendix A - Declaration/Certifications Form), before the issuance of a Standing Offer. If the Proponent is a Joint Venture, the Proponent must provide the Contracting Authority with a completed Federal Contractors Program for Employment Equity - Certification, for each member of the Joint Venture.

SI 3 SECURITY REQUIREMENTS

Proponents are hereby informed that there is a strong possibility that some call-ups against the Standing Offers might require that the consultants and their personnel possess a Facility Security Clearance (FSC) at the SECRET level issued by the Contract Security Program of Public Works and Government Services Canada (PWGSC).

Should the successful proponents not have the level of security indicated above, PWGSC shall sponsor the successful proponents so CISD can initiate procedures for security clearance. CISD, by letter, shall forward documentation to the successful proponents for completion.

Proponents desiring such sponsorship should so indicate in their covering letter with their proposal.

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GENERAL INSTRUCTIONS TO PROPONENTS

Integrity Provisions – Proposal

1. The *Ineligibility and Suspension Policy* (the “Policy”) in effect on the date the Request for Standing Offers (RFSO) is issued, and all related Directives in effect on that date, are incorporated by reference into, and form a binding part of the RFSO. The Proponent must comply with the Policy and Directives, which can be found at <http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>.
2. Under the Policy, charges and convictions of certain offences against a Supplier, its affiliates or first tier sub-consultants, and other circumstances, will or may result in a determination by Public Works and Government Services Canada (PWGSC) that the Supplier is ineligible to be issued or is suspended from being issued a standing offer and to enter into a contract with Canada. The list of ineligible and suspended Suppliers is contained in PWGSC’s Integrity Database. The Policy describes how enquiries can be made regarding the ineligibility or suspension of Suppliers.
3. In addition to all other information required in the Request for Standing Offers, the Proponent must provide the following:
 - a. by the time stated in the Policy, all information required by the Policy described under the heading “Information to be Provided when Bidding, Contracting or Entering into a Real Property Agreement”; and
 - b. with its bid, a complete list of all foreign criminal charges and convictions pertaining to itself, its affiliates and its proposed first tier sub-consultants that, to the best of its knowledge and belief, may be similar to one of the listed offences in the Policy. The list of foreign criminal charges and convictions must be submitted using an Integrity Declaration Form, which can be found at <http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>.
4. Subject to subsection 5, by submitting a bid in response to this Request for Standing Offers, the Proponent certifies that:
 - a. it has read and understands the [Ineligibility and Suspension Policy](#);
 - b. it understands that certain domestic and foreign criminal charges and convictions, and other circumstances, as described in the Policy, will or may result in a determination of ineligibility or suspension under the Policy;
 - c. it is aware that Canada may request additional information, certifications, and validations from the Proponent or a third party for purposes of making a determination of ineligibility or suspension;
 - d. it has provided with its bid a complete list of all foreign criminal charges and convictions pertaining to itself, its affiliates and its proposed first tier sub-consultants that, to the best of its knowledge and belief, may be similar to one of the listed offences in the Policy;
 - e. none of the domestic criminal offences, and other circumstances, described in the Policy that will or may result in a determination of ineligibility or suspension, apply to it, its affiliates and its proposed first tier sub-consultants; and
 - f. it is not aware of a determination of ineligibility or suspension issued by PWGSC that applies to it.

5. Where a Proponent is unable to provide any of the certifications required by subsection 4, it must submit with its bid a completed Integrity Declaration Form, which can be found at <http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>.
6. Canada will declare non-responsive any bid in respect of which the information requested is incomplete or inaccurate, or in respect of which the information contained in a certification or declaration is found by Canada to be false or misleading in any respect. If Canada establishes after issuance of the Standing Offer that the Proponent provided a false or misleading certification or declaration, Canada may set aside the Standing Offer and terminate for default any resulting contracts. Pursuant to the Policy, Canada may also determine the Proponent to be ineligible for issuance of a standing offer for providing a false or misleading certification or declaration.

GI 1 DEFINITION

In this Request for Standing Offers (RFSO), the following words or phrases have the corresponding meaning.

"Applicable Taxes":

The Goods and Services Tax (GST), the Harmonized Sales Tax (HST), and any provincial tax, by law, payable by Canada such as, the Quebec Sales Tax (QST) as of April 1, 2013.

"Consultant Team":

The team of consultants, specialists and sub consultants, including the Proponent, proposed by the Proponent to perform the services required.

"Key Personnel":

Staff of the Proponent, sub consultants and specialists proposed to be assigned to this project.

"Price Rating":

A rating assigned to the price component of a proposal and subsequently used to establish a Price Score for inclusion as a percentage of the total score to be established following the evaluation and rating of technical proposals.

"Proponent":

"Proponent" means the person or entity (or, in the case of a joint venture, the persons or entities) submitting a proposal to provide services under a call-up resulting from a standing offer. It does not include the parent, subsidiaries or other affiliates of the Proponent, or its sub-consultants.

"PWGSC Evaluation Board":

The board established to evaluate and rate proposals. Board members represent a broad cross-section of professional qualifications and experience.

"Technical Rating":

A rating assigned to the technical component of a proposal in the selection procedure and subsequently used to establish a Technical Score for inclusion as a percentage of the total score.

GI 2 INTRODUCTION

1. Public Works and Government Services Canada (PWGSC) is inviting consulting firms with

Mechanical and Electrical Industrial Engineering expertise to submit proposals for a Standing Offer to support PWGSC Energy Service Acquisition Program (ESAP). **To be considered, the firm shall have extensive experience in district energy systems and use of sustainable fuels.** The selected consultant shall provide a range of services as identified in the Required Services section of this document for industrial projects in the National Capital Area (NCA).

ESAP is a PWGSC initiative to modernize PWGSC heating and cooling infrastructure within the NCA. PWGSC operates six central heating and/or cooling (CHCP) plants that serve over 80 buildings within the NCA.

Five heating plants operate on high pressure steam and one operates on high temperature hot water. Based on a review of best practices and on technical and economic analysis of central heating systems worldwide, it is clear that the government can achieve greater efficiency, savings for taxpayers and a greener more sustainable solution through modernization and converting all of the heating systems to low temperature hot water. The Energy Service Acquisition Program (ESAP) will use a Design, Build, Finance, Operate and Maintain contract that will involve a Public-Private Partnership (PPP). In anticipation of conversion of all the central heating plants and distribution systems to low temperature hot water, PWGSC is now in the process of preparation of converting the buildings connected to these systems. Cooling technology and medium will likely remain unchanged except for life cycle equipment replacement and that chillers must be changed from steam driven to electrical and to eliminate chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) refrigerants in consideration of the Montreal Protocol. The selected Consultants should be familiar with best practices in district heating and cooling and potential innovations that will facilitate improved financial, energy efficiency and environmental performance.

The Consultant shall have experience in sustainable fuels including biomass and renewable fuel oil(s). PWGSC has initiated pilot projects in use of such fuels. ESAP stage 2 "Deeper Greening", which is in the planning stage will examine further the use of sustainable fuels to reduce greenhouse gas emissions.

2. Proponents shall be licensed or eligible to be licensed to practise in the province of Quebec and Ontario. If a Proponent is licensed to practise in only one of the two provinces, then that Proponent must be eligible and willing to be licensed in the province in which they are not licensed. Firms should be able to demonstrate successful delivery of these services for a broad variety of projects over the last five (5) years. In general, the firm and its personnel will be evaluated on the basis of their demonstrated understanding of the scope of services, their approach and methodology to providing those services, the quality of their relevant experience in this area, as well as the cost of the provision of the services.
3. It is PWGSC's intention to authorize a single Standing Offer, for a period of four (4) years from the date of issuing the Standing Offer with two (2) optional periods of one (1) years each. The total dollar value of all Standing Offers is estimated to be \$8,000,000.00 (Applicable Taxes included). Individual call-ups will vary, up to a maximum of \$1,500,000.00 (Applicable Taxes included). Proponents should note that there is no guarantee that the full or any amount of the Standing Offer will be called-up; PWGSC will issue call-ups only when the specific services to be provided under the Standing Offer are needed. Please refer to Section SP5, CALL-UP PROCEDURE.
4. This procurement is subject to the provisions of the North American Free Trade Agreement (NAFTA), World Trade Organization - Agreement on Government Procurement (WTO-AGP) and Canadian Free Trade Agreement (CFTA)

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GI 3 PROCUREMENT BUSINESS NUMBER

Proponents are required to have a Procurement Business Number (PBN) before issuance of a standing offer. Proponents may register for a PBN on line at Supplier Registration Information (<https://srisupplier.contractsCanada.gc.ca/>). For non-Internet registration, proponents may contact the InfoLine at 1-800-811-1148 to obtain the telephone number of the nearest Supplier Registration Agent.

GI 4 CONTRACTING AUTHORITY AND DEPARTMENTAL REPRESENTATIVE

1. The Contracting Authority for this Request for Standing Offer is:

Public Works and Government Services Canada
Real Property Contracting Directorate
3C2, Phase III, Place du Portage
Gatineau, Quebec
K1A 0S5

2. The Contracting Authority is responsible for the establishment of the Standing Offer, its administration, and any contractual issues relating to individual call-ups.
3. A Departmental Representative will be identified at time of each individual Call-Up.
4. The Departmental Representative will be responsible for all matters concerning the technical content of the work under the Call-Up.

GI 5 QUANTITY

The level of services and estimated expenditure specified in the Request for Standing Offer are only an approximation of requirements given in good faith. The making of a proposal by the Proponent shall not constitute an agreement by Canada. Canada may make one or several call-ups against a Standing Offer.

GI 6 PWGSC OBLIGATION

A Request for Standing Offer does not commit PWGSC to authorize the utilization of a standing offer or to pay any cost incurred in the submission of proposals, or cost incurred in making necessary studies for the preparation thereof, or to procure or contract for any services. PWGSC reserves the right to reject or authorize for utilization any proposal in whole or in part, with or without further discussion or negotiation. Canada reserves the right to cancel or amend the Request for Standing Offer at any time.

GI 7 RESPONSIVE PROPOSALS

To be considered responsive, a proposal must meet all of the mandatory requirements set out in the Request for Standing Offer. No further consideration in the selection procedure will be given to a Proponent submitting a non-responsive proposal. Proponents that submitted non-responsive proposals are notified accordingly.

GI 8 COMMUNICATIONS - SOLICITATION PERIOD

1. Questions or requests for clarification during the solicitation period must be submitted in writing to the Contracting Authority named on the Request for Standing Offer - Page 1 as early as possible. **Enquiries should be received no later than ten (10) working days prior to the**

closing date identified on the front page of the Request for Standing Offer. Enquiries received after that time may not be answered.

2. To ensure the integrity of the competitive bid process, enquiries and other communications regarding the RFSO must be directed only to the Contracting Authority identified in the RFSO. Failure to comply with this requirement may result in the proposal being declared non-responsive.
3. To ensure consistency and quality of information provided to proponents, significant enquiries received and their replies will be posted on the Government Electronic Tendering Service (GETS).

GI 9 OVERVIEW OF SELECTION PROCESS

1. The Standing Offer selection process is as follows:
 - a) a Request for Standing Offer is obtained by proponents through the GETS;
 - b) in response to the Request for Standing Offer, interested proponents shall submit their proposals using a "two-envelope" procedure, in which proponents submit the "technical" component of their proposal in one envelope and the proposed price of the services (price proposal) in a second envelope as further described in GI 10.3 below;
 - c) responsive proposals are reviewed, evaluated and rated by a PWGSC Evaluation Board in accordance with the criteria, components and weight factors set out in the Request for Standing Offer;
 - d) PWGSC may issue a standing offer to the successful proponent;
 - e) Proponents are notified of the results within one week after PWGSC has entered into a standing offer arrangement with the successful proponents.

GI 10 SUBMISSION OF PROPOSAL

1. Canada requires that each proposal, at closing date and time or upon request from the Contracting Authority, be signed by the Proponent or by an authorized representative of the Proponent. If a proposal is submitted by a joint venture, it must be in accordance with section G118.
2. It is the Proponent's responsibility to:
 - a) obtain clarification of the requirements contained in the Request for Standing Offer, if necessary, before submitting a proposal;
 - b) submit an original of the proposal plus the specified number of copies, duly completed, IN THE FORMAT REQUESTED, on or before the closing date and time set for receipt of proposals;
 - c) send its proposal only to Public Works and Government Services Canada (PWGSC) Bid Receiving Unit specified on page 1 of the Request for Standing Offer;

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- d) ensure that the Proponent's name, return address, the solicitation number and description, and solicitation closing date and time are clearly visible on the envelope or the parcel(s) containing the proposal; and
- e) provide a comprehensive and sufficiently detailed proposal that will permit a complete evaluation in accordance with the criteria set out in the Request for Standing Offer.
3. The technical and price components of the proposal must be submitted in separate, easily identified envelopes in accordance with the instructions contained in the proposal document. Both envelopes shall be submitted as one package which shall clearly and conspicuously display and indicate on the outside of the package the information identified in paragraph 2. d) above.
4. Timely and correct delivery of proposals to the office designated for receipt of proposals is the sole responsibility of the Proponent. Public Works and Government Services Canada will not assume or have transferred to it those responsibilities. All risks and consequences of incorrect delivery of proposals are the responsibility of the Proponent.
5. The evaluation of proposals may result in authorization to utilize one Standing Offer in whole or in part, taking into consideration the evaluation criteria and selection method stated herein. The lowest or any proposal will not necessarily be authorized. In case of error in the calculation of prices, the unit prices will govern.
6. The proposal should completely and thoroughly address each element of the requirements as enumerated in the Request for Standing Offer. It is also essential that the elements contained in the proposal be stated in a clear and concise manner.
7. Proposal documents and supporting information may be submitted in either English or French.
8. Canada will make available Notices of Proposed Procurement (NPP), RFSOs and related documents for download through the Government Electronic Tendering Service (GETS). Canada is not responsible and will not assume any liabilities whatsoever for the information found on websites of third parties. In the event an NPP, RFSO or related documentation would be amended, Canada will not be sending notifications. Canada will post all amendments using GETS. It is the sole responsibility of the Proponent to regularly consult GETS for the most up-to-date information. Canada will not be liable for any oversight on the Proponent's part nor for notification services offered by a third party.

GI 11 NON-ACCEPTANCE OF ELECTRONICALLY TRANSMITTED PROPOSALS

Due to the nature of this solicitation, a complete technical proposal, as well as a cost of services proposal (submitted under separate cover), with supporting information is required to allow a proper evaluation to be conducted. Electronic transmission of the proposal by such means as electronic mail or facsimile is not considered to be practical, and therefore, will not be accepted.

GI 12 EVALUATION OF PRICE

The price proposal must be submitted in Canadian dollars and will be evaluated excluding Applicable Taxes.

GI 13 LIMITATION OF SUBMISSIONS

1. A Proponent may not submit more than one proposal. This limitation also applies to the persons or entities in the case of a joint venture. If more than one proposal is received from a Proponent (or, in the case of a joint venture, from the persons or entities), all such proposals shall be rejected and no further consideration shall be given.
2. A joint venture is defined as an association of two or more parties which combine their money, property, knowledge, skills, time or other resources in a joint business enterprise agreeing to share the profits and the losses and each having some degree of control over the enterprise.
3. An arrangement whereby Canada contracts directly with a consultant who may retain sub-consultants or specialist consultants to perform portions of the services is not a joint venture arrangement. A sub-consultant or specialist consultant may, therefore, be proposed as part of the consultant team by more than one Proponent. The Proponent warrants that it has written permission from such sub-consultant or specialist consultant to propose their services in relation to the services to be performed.
4. Notwithstanding paragraph 3 above, in order to avoid any conflict of interest, or any perception of conflict of interest, a Proponent shall not include in its submission another Proponent as a member of its consultant team, as a sub-consultant or specialist consultant.
5. Any joint venture entered into for the provision of professional services or other services must be in full compliance with the requirements of any provincial or territorial law pertaining thereto in the Province or Territory in which the project is located.

GI 14 LICENSING REQUIREMENTS

1. Consultant team members and key personnel shall be, or be eligible to be licensed, certified or otherwise authorized to provide the necessary professional services to the full extent that may be required by provincial law in the province of the work.
2. By virtue of submission of a proposal, the Proponent certifies that the Proponent's consultant team and key personnel are in compliance with the requirements of paragraph 1 above. The Proponent acknowledges that PWGSC reserves the right to verify any information in this regard and that false or erroneous certification may result in the proposal being declared non-responsive.

GI 15 REJECTION OF PROPOSAL

1. Canada may reject a proposal where any of the following circumstances is present:
 - (a) the Proponent has been declared ineligible for selection, following unsatisfactory performance in a previous project as determined in accordance with the department's performance review procedures;
 - (b) an employee, sub-consultant or specialist consultant included as part of the proposal has been declared ineligible, for selection for work with the department in accordance with the performance review procedure referred to in paragraph 1.(a), which would render the employee, sub-consultant or specialist consultant ineligible to bid on the requirement, or the portion of the requirement the employee, sub-consultant or specialist consultant is to perform;

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- (c) the Proponent is bankrupt or where, for whatever reason, its activities are rendered inoperable for an extended period;
 - (d) evidence, satisfactory to Canada, of fraud, bribery, fraudulent misrepresentation or failure to comply with any law protecting individuals against any manner of discrimination, has been received with respect to the Proponent, any of its employees, any sub-consultant or any specialist consultant included as part of the proposal;
 - (e) evidence satisfactory to Canada that based on past conduct or behavior, the Proponent, a sub-consultant, a specialist consultant or a person who is to perform the Services is unsuitable or has conducted himself/herself improperly;
 - (f) with respect to current or prior transactions with the Government of Canada,
 - (i) Canada has exercised its contractual remedies of taking the services out of the consultant's hands, suspension or termination for default with respect to a contract with the Proponent, any of its employees, any sub-consultant or any specialist consultant included as part of the proposal;
 - (ii) Canada determines that the Proponent's performance on other contracts, including the quality of the services provided and the quality and timeliness of the delivery of the project, is sufficiently poor to jeopardize the successful completion of the requirement being bid on.

2. Where Canada intends to reject a proposal pursuant to subsection 1.(f), the Contracting Authority will so inform the Proponent and provide the Proponent ten (10) days within which to make representations, before making a final decision on the proposal rejection.

GI 16 NOT APPLICABLE

GI 17 INSURANCE REQUIREMENTS

1. The successful Proponent shall be required to obtain and maintain Professional Liability and Comprehensive General insurance coverage in accordance with the requirements set out elsewhere in the Request for Standing Offer documents.
2. No insurance requirement stipulated in the Request for Standing Offer documents should be construed as limiting any insurance required by federal, provincial or municipal law. Neither should it limit any coverage which the successful Proponent and other members of the consultant team may consider to be necessary for their own protection or to fulfill their obligations.
3. By virtue of submission of a proposal, the Proponent certifies that the Proponent and the other members of the consultant team as may be applicable are capable of obtaining, and will obtain and maintain liability insurance in accordance with the requirements set out in the proposal documents.

GI 18 JOINT VENTURE

1. A joint venture is an association of two or more parties who combine their money, property, knowledge, expertise or other resources in a single joint business enterprise, sometimes referred as a consortium, to bid together on a requirement. Proponents who bid as a joint venture must indicate clearly that it is a joint venture and provide the following information:
 - (a) the name of each member of the joint venture;

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- (b) the Procurement Business Number of each member of the joint venture;
 - (c) the name of the representative of the joint venture, i.e. the member chosen by the other members to act on their behalf, if applicable;
 - (d) the name of the joint venture, if applicable.
2. If the information is not clearly provided in the proposal, the Proponent must provide the information on request from the Contracting Authority.
 3. The proposal and any resulting standing offer must be signed by all the members of the joint venture unless one member has been appointed to act on behalf of all members of the joint venture. The Contracting Authority may, at any time, require each member of the joint venture to confirm that the representative has been appointed with full authority to act as its representative for the purposes of the RFSO and any resulting standing offer. If a standing offer is issued to a joint venture, all members of the joint venture will be jointly and severally or solidarily liable for the performance of any contract resulting from a call-up against the standing offer.

GI 19 LATE SUBMISSIONS

Submissions delivered after the stipulated closing date and time will be returned unopened.

GI 20 LEGAL CAPACITY

The Proponent must have the legal capacity to contract. If the Proponent is a sole proprietorship, a partnership or a corporate body, the Proponent must provide, if requested by the Contracting Authority, a statement and any requested supporting documentation indicating the laws under which it is registered or incorporated together with the registered or corporate name and place of business. This also applies to proponents submitting a proposal as a joint venture.

GI 21 DEBRIEFING

Should a Proponent desire a debriefing, the Proponent should contact the person identified on the front page of the Request for Standing Offer within 15 working days of the notification of the results of the solicitation. The debriefing will include an outline of the strengths and weaknesses of the submission, referring to the evaluation criteria. The confidentiality of information relating to other submissions will be protected. The debriefing may be provided in writing, by telephone or in person.

GI 22 FINANCIAL CAPABILITY

1. Financial Capability Requirement: The Proponent must have the financial capability to fulfill this requirement. To determine the Proponent's financial capability, the Contracting Authority may, by written notice to the Proponent, require the submission of some or all of the financial information detailed below during the evaluation of proposals. The Proponent must provide the following information to the Contracting Authority within fifteen (15) working days of the request or as specified by the Contracting Authority in the notice:
 - (a) Audited financial statements, if available, or the unaudited financial statements (prepared by the Proponent's outside accounting firm, if available, or prepared in-house if no external statements have been prepared) for the Proponent's last three fiscal years, or for the years that the Proponent has been in business if this is less than three years (including, as a minimum, the Balance Sheet, the Statement of Retained Earnings, the Income Statement and any notes to the statements).

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- (b) If the date of the financial statements in (a) above is more than five months before the date of the request for information by the Contracting Authority, the Proponent must also provide, unless this is prohibited by legislation for public companies, the last quarterly financial statements (consisting of a Balance Sheet and a year-to-date Income Statement), as of two months before the date on which the Contracting Authority requests this information.
- (c) If the Proponent has not been in business for at least one full fiscal year, the following must be provided:
- (i) the opening Balance Sheet on commencement of business (in the case of a corporation, the date of incorporation); and
- (ii) the last quarterly financial statements (consisting of a Balance Sheet and a year-to-date Income Statement) as of two months before the date on which the Contracting Authority requests this information.
- (d) A certification from the Chief Financial Officer or an authorized signing officer of the Proponent that the financial information provided is complete and accurate.
- (e) A confirmation letter from all of the financial institution(s) that have provided short-term financing to the Proponent outlining the total of lines of credit granted to the Proponent and the amount of credit that remains available and not drawn upon as of one month prior to the date on which the Contracting Authority requests this information.
2. If the Proponent is a joint venture, the financial information required by the Contracting Authority must be provided by each member of the joint venture.
3. If the Proponent is a subsidiary of another company, then any financial information in 1. (a) to (e) above required by the Contracting Authority must be provided by the ultimate parent company. Provision of parent company financial information does not by itself satisfy the requirement for the provision of the financial information of the Proponent, and the financial capability of a parent cannot be substituted for the financial capability of the Proponent itself unless an agreement by the parent company to sign a Parental Guarantee, as drawn up by Public Works and Government Services Canada (PWGSC), is provided with the required information.
4. Financial Information Already Provided to PWGSC: The Proponent is not required to resubmit any financial information requested by the Contracting Authority that is already on file at PWGSC with the Contract Cost Analysis, Audit and Policy Directorate of the Policy, Risk, Integrity and Strategic Management Sector, provided that within the above-noted time frame:
- (a) the Proponent identifies to the Contracting Authority in writing the specific information that is on file and the requirement for which this information was provided; and
- (b) the Proponent authorizes the use of the information for this requirement.
- It is the Proponent's responsibility to confirm with the Contracting Authority that this information is still on file with PWGSC.
5. Other Information: Canada reserves the right to request from the Proponent any other information that Canada requires to conduct a complete financial capability assessment of the Proponent.

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6. **Confidentiality:** If the Proponent provides the information required above to Canada in confidence while indicating that the disclosed information is confidential, then Canada will treat the information in a confidential manner as permitted by the Access to Information Act, R.S., 1985, c. A-1, Section 20(1) (b) and (c).
 7. **Security:** In determining the Proponent's financial capability to fulfill this requirement, Canada may consider any security the Proponent is capable of providing, at the Proponent's sole expense (for example, an irrevocable letter of credit from a registered financial institution drawn in favour of Canada, a performance guarantee from a third party or some other form of security, as determined by Canada).
 8. In the event that a proposal is found to be non-compliant on the basis that the Proponent is considered NOT to be financially capable of performing the subject requirement, official notification shall be provided to the Proponent.

GI 23 REVISION OF PROPOSAL

A proposal submitted may be amended by letter or facsimile provided the revision is received at the office designated for the receipt of proposals, on or before the date and time set for the receipt of proposals. The revision must be on the Proponent's letterhead or bear a signature that identifies the Proponent, and must clearly identify the change(s) to be applied to the original proposal. The revision must also include the information identified in GI 10 2. d).

GI 24 PERFORMANCE EVALUATION

Proponents shall take note that the performance of the Consultant during and upon completion of the services shall be evaluated by Canada. The evaluation includes all or some of the following criteria: Design, Quality of Results, Management, Time and Cost. Should the Consultant's performance be considered unsatisfactory, the Consultant may be declared ineligible for future contracts. The form [PWGSC-TPSGC 2913-1](http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/2913-1.pdf), SELECT - Consultant Performance Evaluation Report (<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/2913-1.pdf>), is used to record the performance.

GI 25 PROPOSAL COSTS

No payment will be made for costs incurred in the preparation and submission of a proposal in response to the Request for Standing Offer. Costs associated with preparing and submitting a proposal, as well as any costs incurred by the Proponent associated with the evaluation of the proposal, are the sole responsibility of the Proponent.

GI 26 CONFLICT OF INTEREST - UNFAIR ADVANTAGE

1. In order to protect the integrity of the procurement process, proponents are advised that Canada may reject a proposal in the following circumstances:
 - (a) if the Proponent, any of its sub-consultants, any of their respective employees or former employees was involved in any manner in the preparation of the bid solicitation or in any situation of conflict of interest or appearance of conflict of interest;
 - (b) if the Proponent, any of its sub-consultants, any of their respective employees or former employees had access to information related to the bid solicitation that was not available to other proponents and that would, in Canada's opinion, give or appear to give the Proponent an unfair advantage.

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2. The experience acquired by a Proponent who is providing or has provided the goods and services described in the bid solicitation (or similar goods or services) will not, in itself, be considered by Canada as conferring an unfair advantage or creating a conflict of interest. This Proponent remains however subject to the criteria established above.
 3. Where Canada intends to reject a proposal under this section, the Contracting Authority will inform the Proponent and provide the Proponent an opportunity to make representations before making a final decision. Proponents who are in doubt about a particular situation should contact the Contracting Authority before bid closing. By submitting a proposal, the Proponent represents that it does not consider itself to be in conflict of interest nor to have an unfair advantage. The Proponent acknowledges that it is within Canada's sole discretion to determine whether a conflict of interest, unfair advantage or an appearance of conflict of interest or unfair advantage exists.

GI 27 LIMITATION OF LIABILITY

Except as expressly and specifically permitted in this Request for Standing Offer, no Proponent or potential Proponent shall have any claim for any compensation of any kind whatsoever in relation to this Request for Standing Offer, or any aspect of the procurement process, and by submitting a proposal each Proponent shall be deemed to have agreed that it has no claim.

GI 28 STATUS AND AVAILABILITY OF RESOURCES

The Proponent certifies that, should it be issued a Standing Offer as a result of the Request for Standing Offer, every individual proposed in its proposal will be available to perform the Services resulting from a call-up against the Standing Offer as required by Canada's representatives and at the time specified in a call-up or agreed to with Canada's representatives. If the Proponent is unable to provide the services of an individual named in its proposal, the Proponent may propose a substitute with at least the same qualifications and experience. The Proponent must advise the Contracting Authority of the reason for the substitution and provide the name, qualifications and experience of the proposed replacement for Canada's approval in its sole discretion.

GI 29 CODE OF CONDUCT FOR PROCUREMENT – PROPOSAL

The Code of Conduct for Procurement provides that Proponents must respond to Requests for Standing Offers (RFSO) in an honest, fair and comprehensive manner, accurately reflect their capacity to satisfy the requirements set out in the RFSO and resulting contract, submit bids and enter into contracts only if they will fulfill all obligations of the Contract. By submitting a bid, the Proponent is certifying that it is complying with the Code of Conduct for Procurement (<http://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/contexte-context-eng.html>). Failure to comply with the Code of Conduct for Procurement may render the bid non-responsive

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STANDING OFFER PARTICULARS (SP)

- SP 1 General
- SP 2 Withdrawal/Revision
- SP 3 Period of the Standing Offer
- SP 4 Call-Up Limitation
- SP 5 Call-Up Procedure
- SP 6 Invoicing

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STANDING OFFER PARTICULARS

SP 1 GENERAL

1. The Consultant acknowledges that a standing offer is not a contract and that the issuance of a Standing Offer and Call-up Authority does not oblige or commit Canada to procure or contract for any services listed in the Standing Offer.
2. The Consultant offers to provide and deliver to Canada the services described in the Standing Offer, in accordance with the pricing set out in the Standing Offer if, and when the Contracting Authority may request such services, in accordance with the conditions listed at subsection 3 below.
3. The Consultant understands and agrees that:
 - a) a call-up against the Standing Offer will form a contract only for those services which have been called-up, provided that such call-up is made in accordance with the provisions of the Standing Offer;
 - b) Canada's liability is limited to that which arises from call-ups against the Standing Offer made within the period specified in the Standing Offer;
 - c) Canada has the right to procure the services specified in the Standing Offer by means of any other contract, standing offer or contracting method;
 - d) the Standing Offer cannot be assigned or transferred in whole or in part;
 - e) the Standing Offer may be set aside by Canada at any time.

SP 2 WITHDRAWAL/REVISION

In the event that the Consultant wishes to withdraw the Standing Offer after authority to call-up against the Standing Offer has been given, the Consultant must provide no less than thirty (30) days' written notice to the Contracting Authority, unless specified otherwise in the Standing Offer. The thirty (30) days' period will start upon receipt of the notification by the Contracting Authority and the withdrawal will be effective at the expiry of that period. The Consultant must fulfill any and all call-ups which are made before the expiry of that period.

The period of the Standing Offer may only be extended, or its usage increased, by the Contracting Authority issuing a revision to the Standing Offer in writing.

SP 3 PERIOD OF THE STANDING OFFER

The period for placing call-ups against the Standing Offer shall be for four (4) years commencing from the start date identified on the Standing Offer.

If the Standing Offer is authorized for use beyond the initial period, the Consultant offers to extend its proposal for an additional two (2) optional periods of one (1) years each under the same conditions and at the rates or prices specified in the Standing Offer.

The Consultant will be advised of the decision to authorize the use of the Standing Offer for an extended period by the Contracting Authority thirty (30) days before the expiry of the Standing Offer. A revision to the Standing Offer will be issued by the Contracting Authority.

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SP 4 CALL-UP LIMITATION

Each call-up against the Standing Offer will have a maximum limitation of expenditure of \$1,500,000.00 (Applicable Taxes included). The call-up limitation includes fees and all related disbursements.

SP 5 CALL-UP PROCEDURE

1. Services will be called-up as follows:
 - a) The Departmental Representative will establish the scope of services to be performed.
 - b) The Consultant will be provided the scope of services and will submit a proposal to the Departmental Representative in accordance with the fixed hourly rates established under the Standing Offer. The Consultant's proposal shall include the category of personnel, name of personnel and the number of hours estimated/required to perform the services, as well as an estimate of proposed disbursements, if applicable. If the Consultant is unable to provide the services of an individual named in its proposal (submitted in response to the Request for Standing Offer), the Consultant may propose a substitute with at least the same qualifications and experience in the estimation of Canada. The Consultant must advise the Contracting Authority of the reason for the substitution and provide the name, qualifications and experience of the proposed replacement for Canada's approval in its sole discretion. If the Consultant is unable to provide a substitute with similar qualifications and experience, Canada may set aside the standing offer.
 - c) For services from a Specialist Consultant that is not named or for which discipline is not identified in the Standing Offer, the Consultant's proposal shall include the category and name of personnel as well as their hourly rate(s) with the number of hours estimated/required by the Specialist Consultant to perform these services. A fixed fee or, where it is not possible or appropriate to agree upon a fixed fee, a time based fee to an upset limit will be established.
 - d) For the preparation of bilingual documents, the Consultant shall estimate the required number of hours and multiply by the hourly rates established in the Standing Offer. If the services of a translation firm are required to produce bilingual documents, these costs shall be treated as a disbursement.
 - e) A fixed fee or, where it is not possible or appropriate to agree upon a fixed fee, a time based fee to an upset limit will be established in accordance with the hourly rate(s) established in the Standing Offer.
2. The Consultant will be authorized in writing by the Contracting Authority to proceed with the services by issuance of a Call-up against the Standing Offer.
3. Any proposed changes to the scope of work are to be discussed with the Departmental Representative but any resulting changes can only be authorized by an amendment issued by the Contracting Authority.

SP 6 INVOICING

1. For prompt processing of invoices, include the following information on each invoice for payment:
 - a) PWGSC project number;

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- b) Invoicing period with dates;
c) Work done to justify invoice (short narrative) for services provided
d) Summary of costs as follows:
- | | | |
|---------------------------------|------------|---------------------------------|
| Amount this invoice | (1) | Fees + Applicable Taxes = Total |
| Total previous invoices | (2) | Fees + Applicable Taxes = Total |
| Total invoiced to date | (1+2) =(3) | Fees + Applicable Taxes = Total |
| Agreed fees | (4) | Fees + Applicable Taxes = Total |
| Amount to complete | (4-3) =(5) | Fees + Applicable Taxes = Total |
| % Services completed this stage | (6) | |
- e) Authorized signatures of the consultant and the date.

2. Include with each invoice for authorized disbursements, receipt of original invoices (or legible copies if originals cannot be supplied) for all items claimed.

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TERMS AND CONDITIONS

0220DA	General Conditions (GC)
0000DA	Supplementary Conditions (SC)
9998DA	Terms of Payment (TP)
9999DA	Consultant Services (CS)
2000DA	Calculation of Fees (CF)

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0220DA GENERAL CONDITIONS

GC 1	Definitions
GC 2	Interpretations
GC 3	Not applicable
GC 4	Assignment
GC 5	Indemnification
GC 6	Notices
GC 7	Suspension
GC 8	Termination
GC 9	Taking the Services Out of the Consultant's Hands
GC 10	Time and Cost Records to be Kept by the Consultant
GC 11	National or Departmental Security
GC 12	Rights to Intellectual Property
GC 13	Conflict of Interest and Values and Ethics Codes for the Public Service
GC 14	Status of Consultant
GC 15	Declaration by Consultant
GC 16	Insurance Requirements
GC 17	Resolution of Disagreements
GC 18	Amendments
GC 19	Entire Agreement
GC 20	Contingency Fees
GC 21	Harassment in the Workplace
GC 22	Taxes
GC 23	Changes in the Consultant Team
GC 24	Joint and Several Liability
GC 25	Performance evaluation - contract
GC 26	International Sanctions
GC 27	Integrity Provisions - Standing Offer
GC 28	Code of Conduct for Procurement – Standing Offer

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GC 1 Definitions

Applicable Taxes means the Goods and Services Tax (GST), the Harmonized Sales Tax (HST), and any provincial tax, by law, payable by *Canada* such as, the Quebec Sales Tax (QST) as of April 1, 2013;

Architectural and Engineering Services means services to provide a range of investigation and recommendation reports, planning, design, preparation, or supervision of the construction, repair, renovation or restoration of a work and includes contract administration services, for real property projects;

Average Bank Rate means the simple arithmetic mean of the *Bank Rate* in effect at 4:00 p.m. Eastern Time each day during the calendar month which immediately precedes the calendar month in which payment is made;

Bank Rate means the rate of interest established from time to time by the Bank of Canada as the minimum rate at which it makes short term advances to members of the Canadian Payments Association;

Canada, Crown, Her Majesty or the Government

means Her Majesty the Queen in right of Canada as represented by the Minister of Public Works and Government Services and any other person duly authorized to act on behalf of that minister or, if applicable, an appropriate minister to whom the Minister of Public Works and Government Services has delegated his or her powers, duties or functions and any other person duly authorized to act on behalf of that minister;

Construction Contract means a contract entered into between *Canada* and a *Contractor* for the construction of the Project;

Construction Contract Award Price means the price at which a *Construction Contract* is awarded to a *Contractor*;

Construction Cost Estimate means an anticipated amount for which a *Contractor* will execute the construction of the Project;

Construction Cost Limit means that portion of the total amount of Project funds which shall not be exceeded on construction of the Project;

Construction Services means construction, repair, renovation or restoration of any work except a vessel and includes; the supply and erection of a prefabricated structure; dredging; demolition; environmental services related to a real property; or, the hire of equipment to be used in or incidentally to the execution of any construction services referred to above;

Consultant means the party identified in the Standing Offer to perform the *Consultant Services* under the Standing Offer and any subsequent Call-up, and includes the officer or employee of the *Consultant* identified in writing by the *Consultant*;

Contracting Authority means the party identified on the front cover page, responsible for the establishment of the Standing Offer, its amendments, administration, and any contractual issues relating to individual call-ups;

Contractor means a person, firm or corporation with whom *Canada* enters, or intends to enter, into a *Construction Contract*;

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Contract Price means the amount stated in the Call-Up to be payable to the *Consultant* for the *Services*, exclusive of *Applicable Taxes*;

Cost Plan means the allocation of proposed costs among the various elements of the Project, as described in the *Project Brief or Terms of Reference*;

Days means continuous calendar days, including weekends and statutory public holidays;

Departmental Representative means the officer or employee of Canada identified to the consultant in writing by a duly authorized departmental officer to perform the Departmental Representative's duties under the Agreement;

Facility Maintenance Services means services related to activities normally associated with the maintenance of a facility and keeping spaces, structures and infrastructure in proper operating condition in a routine, scheduled, or anticipated fashion to prevent failure and degradation including inspection, testing, servicing, classification as to serviceability, repairs, rebuilding and reclamation, as well as cleaning, waste removal, snow removal, lawn care, replacement of flooring, lighting or plumbing fixtures, painting and other minor works;

Mediation is a process of dispute resolution in which a neutral third party assists the parties involved in a dispute to negotiate their own settlement;

Project Brief or Terms of Reference means a document describing in sufficient detail the *Services* to be provided by the *Consultant* to permit the *Consultant* to proceed with the *Services* and may include general project information, scope of the work, site and design data, and time plan, specifically related to the Project;

Project Schedule means a time plan, including the sequence of tasks, milestone dates and critical dates which must be met for the implementation of the planning, design and construction phases of the Project;

Services means the *Services* provided by the *Consultant* and the *Services* required for the project as set forth in the Standing Offer and subsequent Call-up documents;

Specialist Consultant means any Architect, Professional Engineer, or other specialist, other than the *Consultant*, engaged by *Canada* directly or, at the specific request of *Canada*, engaged by the *Consultant*;

Sub-Consultant means any Architect, Professional Engineer, or other specialist engaged by the *Consultant* for the *Services* included in the Standing Offer or any subsequent Call-up;

Technical Documentation includes designs, reports, photographs, physical models, surveys, drawings, specifications, computer software developed for the purpose of the Project, computer printouts, design notes, calculations, CADD (Computer-aided Design and Drafting) files, and other data, information and material, prepared, computed, drawn, or produced and operating and maintenance manuals either prepared or collected for the Project.

Total Estimated Cost, Revised Estimated Cost, Increase (Decrease) on Page 1 of the Contract or Contract Amendment means an amount used for internal administrative purposes only that comprises the *Contract Price*, or the revised *Contract Price*, or the amount that would increase or decrease the *Contract Price* and the *Applicable Taxes* as evaluated by the *Contracting Authority*, and does not constitute tax advice on the part of *Canada*.

GC 2 Interpretations

1. Words importing the singular only also include the plural, and vice versa, where the context requires;
2. Headings or notes in the Standing Offer shall not be deemed to be part thereof, or be taken into consideration in its interpretation;
3. "Herein", "hereby", "hereof", "hereunder" and similar expressions refer to the Standing Offer as a whole and not to any particular subdivision or part thereof.

GC 3 Not Applicable**GC 4 Assignment**

1. The Call-Up shall not be assigned, in whole or in part, by the *Consultant* without the prior consent of Canada.
2. An assignment of the Call-Up without such consent shall not relieve the *Consultant* or the assignee from any obligation under the Call-up, or impose any liability upon *Canada*.

GC 5 Indemnification

1. The *Consultant* shall indemnify and save harmless *Canada*, its employees and agents, from losses arising out of the errors, omissions or negligent acts of the *Consultant*, its employees and agents, in the performance of the *Services* under the Call-up that may result from the Standing Offer.
2. The *Consultant's* liability to indemnify or reimburse *Canada* under the Standing Offer shall not affect or prejudice *Canada* from exercising any other rights under law.

GC 6 Notices

1. Any notice, request, direction, consent, decision, or other communication that is required to be given or made by either party pursuant to the Standing Offer, shall be in writing, and shall be deemed to have been effectively given when:
 - (a) served personally, on the day it is delivered;
 - (b) forwarded by registered mail, on the day the postal receipt is acknowledged by the other party; or
 - (c) forwarded by facsimile or other electronic means of transmission, one working day after it was transmitted.
2. The address of either party, or the person authorized to receive notices, may be changed by notice in the manner set out in this provision.

GC 7 Suspension

1. The *Departmental Representative* may require the *Consultant* to suspend the *Services* being provided, or any part thereof, for a specified or unspecified period.

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2. If a period of suspension does not exceed sixty (60) *days* and when taken together with other periods of suspension does not exceed ninety (90) *days*, the *Consultant* will, upon the expiration of that period, resume the performance of the *Services* in accordance with the terms of the Standing Offer and the relevant Call-up, subject to any agreed adjustment of the time schedule as referred to in CS 3 of clause 9999DA, Consultant Services.
 3. If a period of suspension exceeds sixty (60) *days* or when taken together with other periods of suspension, the total exceeds ninety (90) *days*, and:
 - (a) the *Departmental Representative* and the *Consultant* agree that the performance of the *Services* shall be continued, then the *Consultant* shall resume performance of the *Services*, subject to any terms and conditions agreed upon by the *Departmental Representative* and the *Consultant*, or
 - (b) the *Departmental Representative* and the *Consultant* do not agree that the performance of the *Services* shall be continued, then the Call-Up shall be terminated by notice given by Canada to the *Consultant*, in accordance with the terms of GC 8.
 4. Suspension costs related to this clause are as outlined in TP 8 of clause 9998DA, Terms of Payment.

GC 8 Termination

Canada may terminate any Call-up at any time in its sole discretion, and the fees paid to the *Consultant* will be in accordance with the relevant provisions in TP 9 of clause 9998DA, Terms of Payment.

GC 9 Taking the Services Out of the Consultant's Hands

1. Canada may take all or any part of the *Services* out of the *Consultant's* hands and may employ reasonable means necessary to complete such *Services* in the event that:
 - (a) The *Consultant* has become insolvent or has committed an act of bankruptcy, and has neither made a proposal to the *Consultant's* creditors nor filed a notice of intention to make such a proposal, pursuant to the *Bankruptcy and Insolvency Act*, or
 - (b) the *Consultant* fails to perform any of the *Consultant's* obligations under the Standing Offer or any of the Call-ups or, in Canada's opinion, so fails to make progress as to endanger performance of the Standing Offer or any of its call-ups, in accordance with its terms.
2. If the *Consultant* has become insolvent or has committed an act of bankruptcy, and has either made a proposal to the *Consultant's* creditors or filed a notice of intention to make such a proposal, pursuant to the *Bankruptcy and Insolvency Act*, the *Consultant* shall immediately forward a copy of the proposal or the notice of intention to the *Contracting Authority*.
3. Before the *Services* or any part thereof are taken out of the *Consultant's* hands under GC 9.1(b), the *Departmental Representative* will provide notice to the *Consultant*, and may require such failure of performance or progress to be corrected. If within fourteen (14) *days* after receipt of notice the default is not corrected or corrective action is not initiated to correct such fault, Canada may, by notice, without limiting any other right or remedy, take all or any part of the *Services* out of the *Consultant's* hands.

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4. If the *Services* or any part thereof have been taken out of the *Consultant's* hands, the *Consultant* will be liable for, and upon demand pay to *Canada*, an amount equal to all loss and damage suffered by *Canada* by reason of the non-completion of the *Services* by the *Consultant*.
 5. If the *Consultant* fails to pay on demand for the loss or damage as a result of GC 9.4, *Canada* will be entitled to deduct and withhold the same from any payments due and payable to the *Consultant*.
 6. If the *Services* or any part thereof are taken out of the *Consultant's* hands as a result of GC 9.1(b) and GC 9.3, the amount referred to in GC 9.5 shall remain in the Consolidated Revenue Fund until an agreement is reached or a decision of a court or tribunal is rendered. At that time the amount, or any part of it, which may become payable to the *Consultant* shall be paid together with interest from the due date referred to in TP 2 of clause 9998DA, Terms of Payment, and in accordance with the terms of the Standing Offer.
 7. The taking of the *Services*, or any part thereof, out of the *Consultant's* hands does not relieve or discharge the *Consultant* from any obligation under the Standing Offer, the Call-up, or imposed upon the *Consultant* by law, in respect to the *Services* or any part thereof that the *Consultant* has performed.

GC 10 Time and Cost Records to be Kept by the Consultant

1. Time charged and the accuracy of the *Consultant's* time recording system may be verified by the *Departmental Representative* before or after payment is made to the *Consultant* under the terms and conditions of the Call up.
2. The *Consultant* shall keep accurate time and cost records and, if required for the purposes of the Standing Offer, shall make these documents available to the *Departmental Representative* who may make copies and take extracts therefrom.
3. The *Consultant* shall afford facilities for audit and inspection upon request and shall provide the *Departmental Representative* with such information as may be required from time to time with reference to the documents referred to in GC 10.2.
4. The *Consultant* shall, unless otherwise specified, keep the time sheets and cost records available for audit and inspection for a period of at least six (6) years following completion of the *Services*.
5. If the verification is done after payment by *Canada*, the *Consultant* agrees to repay any overpayment immediately upon demand.

GC 11 National or Departmental Security

1. If the *Departmental Representative* is of the opinion that the Project is of a class or kind that involves national or departmental security, the *Consultant* may be required:
 - (a) to provide any information concerning persons employed for purposes of the Standing Offer unless prohibited by law;
 - (b) to remove any person from the Project and its site if that person cannot meet the prescribed security requirements; and
 - (c) to retain the Project *Technical Documentation* while in the *Consultant's* possession in a manner specified by the *Departmental Representative*.

2. Notwithstanding the provisions of GC 12, if the Project is of a class or kind that involves national or departmental security, the *Consultant* shall not issue, disclose, discard or use the Project *Technical Documentation* on another project without the written consent of the *Departmental Representative*.

GC 12 Rights to Intellectual Property

1. Definitions

"Background" means all Technical Output that is not Foreground and that is proprietary to or the confidential information of the *Consultant*, the *Consultant's Sub-Consultants*, or any other entity engaged by the *Consultant* in the performance of the *Services*;

"Foreground" means any Invention first conceived, developed or reduced to practice as part of the *Services* and all other Technical Output conceived, developed, produced or implemented as part of the *Services*;

"IP Rights" means any intellectual property rights recognized by law, including any intellectual property right protected through legislation (such as that governing copyright, patents, industrial design, or integrated circuit topography) or arising from protection of information as a trade secret or as confidential information;

"Invention" means any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter, whether or not patentable and without limiting the foregoing the term includes any unique design and construction system;

"Technical Output" means: (i) all information of a scientific, technical, or artistic nature relating to the *Services*, whether oral or recorded in any form or medium and whether or not subject to copyright, including but not limited to any Inventions, designs, methods, reports, photographs, physical models, surveys, drawings, specifications developed for the purpose of the Project; as well as (ii) computer printouts, design notes, calculations, CADD (Computer-aided Design and Drafting) files, and other data, information and material, prepared, computed, drawn, or produced for the purpose of the Project; and (iii) operating and maintenance manuals prepared or collected for the Project; and (iv) any buildings, built works, structures and facilities constructed as, or as part of, the Project. Technical Output does not include data concerned with the administration of the Standing Offer and/or Call-Up by Canada or the *Consultant*, such as internal financial or management information, unless it is a deliverable under the terms of the Standing Offer and/or Call-Up.

2. Identification and Disclosure of Foreground

The *Consultant* shall:

- (a) promptly report and fully disclose to Canada all Foreground that could be Inventions, and shall report and fully disclose to Canada all other Foreground not later than the time of completion of the *Services* or such earlier time as Canada or the Standing Offer and/or Call-Up may require, and
- (b) for each disclosure referred to in (a), indicate the names of all *Sub-Consultants* at any tier, if any, in which IP Rights to any Foreground have vested or will vest.

Before and after final payment to the *Consultant*, Canada shall have the right to examine all records and supporting data of the *Consultant* which Canada reasonably decides is pertinent to the identification of the Foreground.

3. IP Rights Vest with *Consultant*

Subject to articles GC 12.10 and GC 12.11 and the provisions of GC 11 National or Departmental Security, and without affecting any IP Rights or interests therein that have come into being prior to the Standing Offer and/or Call-Up or that relate to information or data supplied by *Canada* for the purposes of the Standing Offer and/or Call-Up, all IP Rights in the Foreground shall immediately, as soon as they come into existence, vest in and remain the property of the *Consultant*.

4. Ownership Rights in Deliverables

Notwithstanding the *Consultant's* ownership of the IP Rights in the Foreground that is a prototype, built work, building, structure, facility, model or custom or customized system or equipment together with associated manuals and other operating and maintenance documents and tools, *Canada* shall have unrestricted ownership rights in those deliverables, including the right to make them available for public use, whether for a fee or otherwise, and the right to sell them.

5. Licence to Foreground

Without limiting any implied licences that may otherwise vest in *Canada*, and in consideration of *Canada's* contribution to the cost of development of the Foreground, the *Consultant* hereby grants to *Canada* a non-exclusive, perpetual, irrevocable, worldwide, fully-paid and royalty-free licence to exercise all IP Rights in the Foreground that vest in the *Consultant* pursuant to article GC 12.3, for the purpose of:

- (a) the construction or implementation of any building, built works, structures and facilities, contemplated by the Project;
- (b) the further development or alteration or evolution of any part of the constructed or implemented Project, including procurement of materials and components for this purpose;
- (c) the further development, modification (including additions or deletions), completion, translation, or implementation of the Foreground and any addition to it as *Canada* may require for the purposes of the completion, utilization and subsequent evolution of the Project;
- (d) the use, occupancy, operation, exploitation, maintenance, repair or restoration of the constructed or implemented or subsequently modified Project, including the procurement of replacement materials and components required for any such purpose; and
- (e) the publishing and transmission of reproductions of the Project or any part thereof in the form of paintings, drawings, engravings, photographs or cinematographic works, to the public, in hard copy or by any electronic or other means, except for copies in the nature of architectural drawings or plans.

6. Licence to Foreground for Other Projects

The *Consultant* hereby grants to *Canada* a non-exclusive, perpetual, world-wide, irrevocable licence to exercise all IP Rights that vest in the *Consultant* pursuant to paragraph GC 12.3 for the purpose of planning, designing and constructing or otherwise implementing any project other than the Project, and for any purpose set out in paragraph GC 12.5 as it relates to such other project. In the event that *Canada* exercises such IP Rights in another project, and provided that *Canada* does not already have equivalent rights under a previous contract or otherwise, *Canada* agrees to pay to the *Consultant* reasonable compensation determined in accordance with current industry practice and having regard to *Canada's* contribution to the cost of development of the Foreground. The *Consultant* shall ensure that in any sale, assignment, transfer or licence of any of the IP Rights that vest in the *Consultant* under the Standing Offer and/or Call-Up, the purchaser, assignee, transferee or licensee agrees to be bound by the terms of this provision and to accept reasonable compensation as is contemplated herein. The *Consultant* shall also ensure that any such purchaser, assignee, transferee or licensee of the IP Rights is required to impose the same obligations on any subsequent purchaser, transferee, assignee or licensee.

7. Licence to Background

Without limiting any implied licences that may otherwise vest in *Canada*, the *Consultant* hereby grants to *Canada* a non-exclusive, perpetual, irrevocable, worldwide, fully-paid and royalty-free licence to exercise such of the IP Rights in any Background incorporated into the *Services* or necessary for the performance of the *Services* as may be required

- (a) for the purposes contemplated in article GC 12.5 and GC 12.6;
- (b) for disclosure to any contractor engaged by *Canada*, or bidder for such a contract, to be used solely for a purpose set out in article GC 12.5 and GC 12.6;

and the *Consultant* agrees to make any such Background available to *Canada* upon request.

8. *Canada's* Right to Disclose and Sub-license

The *Consultant* acknowledges that *Canada* may wish to award contracts, which may include a competitive process, for any of the purposes contemplated in article GC 12.5, GC 12.6 and GC 12.7. The *Consultant* agrees that *Canada's* licence in relation to the IP Rights in the Foreground and in the Background, includes the right to disclose that Foreground and Background to bidders for such contracts, and to sub-license or otherwise authorize the use of that Foreground and Background by any contractor or consultant engaged by *Canada* for the purpose of carrying out such a contract.

9. *Consultant's* Right to Grant Licence

- (a) The *Consultant* represents and warrants that the *Consultant* has, or the *Consultant* shall obtain without delay, the right to grant to *Canada* the licence to exercise the IP Rights in the Foreground and the Background as required by the Standing Offer and/or Call-Up.
- (b) Where the IP Rights in any Background or Foreground are or will be owned by a *Sub-Consultant*, the *Consultant* shall either obtain a licence from that *Sub-Consultant* that permits compliance with articles GC 12.5, GC 12.6 and GC 12.7 or shall arrange for the *Sub-Consultant* to convey directly to *Canada* the same rights by execution of the form provided for that purpose by *Canada* no later than the time of disclosure to *Canada* of that Background and Foreground.

10. Trade Secrets and Confidential Information

The *Consultant* shall not use or incorporate any trade secrets or confidential information in any Foreground or Background used or created in performance of the Standing Offer and/or Call-Up.

11. *Canada* Supplied Information

- (a) Where performance of the *Services* involves the preparation of a compilation using information supplied by *Canada*, then the IP Rights that shall vest under paragraph GC 12.3 shall be restricted to the IP Rights in Foreground that are capable of being exploited without the use of the information supplied by *Canada*. All IP Rights in any compilation, the Foreground in which cannot be exploited without the use of such *Canada* supplied information shall vest in *Canada*. The *Consultant* agrees that the *Consultant* shall not use or disclose any *Canada* supplied information for any purpose other than completing the performance of the *Services*. The *Consultant* shall maintain the confidentiality of such information. Unless the Standing Offer and/or Call-Up otherwise expressly provides, the *Consultant* shall deliver to *Canada* all such information together with every copy, draft, working paper and note thereof that contains such information upon the completion or termination of the Standing Offer and/or Call-Up, or at such earlier time as *Canada* may require.
- (b) If the *Consultant* wishes to make use of any *Canada* supplied information that was supplied for purposes of the Standing Offer and/or Call-Up, for the commercial exploitation or further development of any of the Foreground, then the *Consultant* may make a written request for a licence to exercise the required IP Rights in that *Canada* supplied information, to *Canada*. The *Consultant* shall give *Canada* an explanation as to why such a licence is required. Should *Canada* agree to grant such a licence, it shall be on terms and conditions to be negotiated between the parties including payment of compensation to *Canada*.

12. Transfer of IP Rights

- (a) If *Canada* takes the *Services* out of the *Consultant's* hands in accordance with GC 9 of the General Conditions, in whole or in part, or if the *Consultant* fails to disclose any Foreground in accordance with article GC 12.2, *Canada* may upon reasonable notice, require the *Consultant* to convey to *Canada* all of the IP Rights in the Foreground or in the case of a failure to disclose, all the IP Rights in the Foreground not provided. The IP Rights to be conveyed shall include the IP Rights in any Foreground that have vested or are to vest in a *Sub-Consultant*. In the case of IP Rights in Foreground which have been sold or assigned to a party other than a *Sub-Consultant*, the *Consultant* shall not be obligated to convey those IP Rights to *Canada*, but shall pay to *Canada* on demand an amount equal to the consideration which the *Consultant* received from the sale or assignment of the IP Rights in that Foreground or, in the case of a sale or assignment was not at arm's length, the fair market value of the IP Rights in that Foreground, in each case including the value of future royalties or licence fees.
- (b) In the event of the issuance by *Canada* of a notice referred to in (a), the *Consultant* shall, at the *Consultant's* own expense and without delay, execute such conveyances or other documents relating to title to the IP Rights as *Canada* may require, and the *Consultant* shall, at *Canada's* expense, afford *Canada* all reasonable assistance in the preparation of applications and in the prosecution of any applications for, or any registration of, any IP Right in any jurisdiction, including without limitation the assistance of the inventor in the case of Inventions.

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- (c) Until the *Consultant* completes the performance of the *Services* and discloses all of the Foreground in accordance with article GC 12.2, and subject to the provisions of GC 11 National or Departmental Security, the *Consultant* shall not, without the prior written permission of Canada, sell, assign or otherwise transfer title to the IP Rights in any of the Foreground, or license or otherwise authorize the use of the IP Rights in any of the Foreground by any person.
- (d) In any sale, assignment, transfer or licence of IP Rights in Foreground by the *Consultant* except a sale or licence for end use of a product based on Foreground, the *Consultant* shall impose on the other party all of its obligations to *Canada* in relation to the IP Rights in the Foreground and any restrictions set out in the Standing Offer and/or Call-Up on the use or disposition of the IP Rights in the Foreground (and, if applicable, the Foreground itself), including the obligation to impose the same obligations and restrictions on any subsequent transferee, assignee or licensee. The *Consultant* shall promptly notify *Canada* of the name, address and other pertinent information in regard to any transferee, assignee or licensee.

GC 13 Conflict of Interest and Values and Ethics Codes for the Public Service

1. The *Consultant* declares that the *Consultant* has no pecuniary interest in the business of any third party that would cause, or seem to cause, a conflict of interest in carrying out the *Services*, and should such an interest be acquired during the life of the Standing Offer, the *Consultant* shall declare it immediately to the *Departmental Representative*.
2. The *Consultant* shall not have any tests or investigations carried out by any persons, firms, or corporations, that may have a direct or indirect financial interest in the results of those tests or investigations.
3. The *Consultant* shall not submit, either directly or indirectly, a bid for any Construction Contract related to the Project.
4. The Consultant acknowledges that individuals who are subject to the provisions of the Conflict of Interest Act, 2006, c. 9, s.2, the Conflict of Interest Code for Members of the House of Commons, the Values and Ethics Code for the Public Services, or all other codes of values and ethics applicable within specific organizations cannot derive any direct benefit resulting from the Standing Offer or subsequent Call-ups.
5.
 - (a) The Consultant shall not be eligible to compete as a consultant or sub-consultant for a project which may result from the provision of the *Services* if the Consultant is involved in the development of a Project Brief or Terms of Reference, a Request for Proposal or similar documents for such project.
 - (b) The Consultant providing certain pre-design services (e.g. studies, analysis, schematic design) that do not involve the development of a Project Brief or Terms of Reference, a Request for Proposal or similar documents for such project may be eligible to compete as a consultant or sub-consultant for a project which may result from the provision of these services. The experience acquired by a Consultant who has only provided pre-design services, where the information / documentation resulting from these services is made available to other proponents, will not be considered by Canada as conferring an unfair advantage or creating a conflict of interest.

GC 14 Status of Consultant

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The Consultant is an independent contractor engaged by Canada to perform the Services. Nothing in the Standing Offer through a Call-up is intended to create a partnership, a joint venture or an agency between Canada and the other party or parties. The Consultant must not represent itself as an agent or representative of Canada to anyone. Neither the Consultant nor any of its personnel is engaged as an employee or agent of Canada. The Consultant is responsible for all deductions and remittances required by law in relation to its employees.

GC 15 Declaration by Consultant

The *Consultant* declares that:

- (a) based on the information provided pertaining to the *Services* required under the Standing Offer, the *Consultant* has been provided sufficient information by the *Departmental Representative* to enable the *Services* required under the Standing Offer to proceed and is competent to perform the *Services* and has the necessary licences and qualifications including the knowledge, skill and ability to perform the *Services*; and
- (b) the quality of *Services* to be provided by the *Consultant* shall be consistent with generally accepted professional standards and principles.

GC 16 Insurance Requirements

1. General

- a) The Consultant shall ensure that appropriate liability insurance coverage is in place to cover the consultant and the members of the consultant team and shall maintain all required insurance policies as specified herein.
- b) The Consultant shall, if requested by the Contracting Officer at any time, provide to the Contracting Officer an Insurer's Certificate of Insurance and/or the originals or certified true copies of all contracts of insurance maintained by the Consultant pursuant to the provisions contained herein.
- c) The payment of monies up to the deductible amount made in satisfaction of a claim shall be borne by the Consultant.
- d) Any insurance coverages additional to those required herein that the Consultant and the other members of the consultant team may deem necessary for their own protection or to fulfill their obligations shall be at their own discretion and expense.

2. Commercial General Liability

- a) The insurance coverage provided shall not be less than that provided by IBC Form 2100, as amended from time to time, and shall have: a limit of liability of not less than \$5,000,000.00 per occurrence; an aggregate limit of not less than \$5,000,000.00 within any policy year.
- b) The policy shall insure the Consultant and shall include Her Majesty the Queen in right of Canada, represented by the Minister of Public Works and Government Services as an Additional Insured, with respect to liability arising out of the performance of the Services.

3. Professional Liability

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- a) The Professional Liability insurance coverage shall be in an amount usual for the nature and scope of the Services but, shall have a limit of liability of not less than \$1,000,000 per claim, and be continually maintained from the commencement of performance of the Services until five (5) years after their completion.
 - b) The following provision must be incorporated into the conditions of the Consultant's Professional Liability insurance coverage: "Notice of Cancellation of Insurance Coverage: The Insurer agrees to give the Contracting Authority at least thirty (30) days' prior written notice of any policy cancellation and before making any reduction in coverage."

GC 17 Resolution of Disagreements

1. In the event of a disagreement regarding any aspect of the *Services* or any instructions given under the Standing Offer and subsequent Call-ups:
 - (a) The *Consultant* may give a notice of disagreement to the *Departmental Representative*. Such notice shall be promptly given and contain the particulars of the disagreement, any changes in time or amounts claimed, and reference to the relevant clauses of the Standing Offer and Call-up;
 - (b) The *Consultant* shall continue to perform the *Services* in accordance with the instructions of the *Departmental Representative*; and
 - (c) The *Consultant* and the *Departmental Representative* shall attempt to resolve the disagreement by negotiations conducted in good faith. The negotiations shall be conducted, first, at the level of the *Consultant's* project representative and the *Departmental Representative* and, secondly and if necessary, at the level of a principal of the *Consultant* firm and a senior departmental manager.
2. The *Consultant's* continued performance of the *Services* in accordance with the instructions of the *Departmental Representative* shall not jeopardize the legal position of the *Consultant* in any disagreement.
3. If it was subsequently agreed or determined that the instructions given were in error or contrary to the Standing Offer or Call-up, *Canada* shall pay the *Consultant* those fees the *Consultant* shall have earned as a result of the change(s) in the *Services* provided, together with those reasonable disbursements arising from the change(s) and which have been authorized by the *Departmental Representative*.
4. The fees mentioned in GC 17.3 shall be calculated in accordance with the Terms of Payment set out in the Standing Offer and the relevant Call-up.
5. If the disagreement is not settled, the *Consultant* may make a request to the *Departmental Representative* for a written departmental decision and the *Departmental Representative* shall give notice of the departmental decision within fourteen (14) *days* of receiving the request, setting out the particulars of the response and any relevant clauses of the Standing Offer or Call-up.
6. Within fourteen (14) *days* of receipt of the written departmental decision, the *Consultant* shall notify the *Departmental Representative* if the *Consultant* accepts or rejects the decision.
7. If the *Consultant* rejects the departmental decision, the *Consultant*, by notice may refer the disagreement to *Mediation*.

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8. If the disagreement is referred to *Mediation*, the *Mediation* shall be conducted with the assistance of a skilled and experienced mediator chosen by the *Consultant* from a list of mediators proposed by Canada, and departmental *Mediation* procedures shall be used unless the parties agree otherwise.
 9. Negotiations conducted under the Standing Offer and any resulting Call-up, including those conducted during *Mediation*, shall be without prejudice.

GC 18 Amendments

The Standing Offer or any resulting Call-up may not be amended, or modified, nor shall any of its terms and conditions be waived, except by agreement in writing executed by the Consultant and the Contracting Authority.

GC 19 Entire Agreement

The Standing Offer and Call-up constitutes the entire and only agreement between the parties and supersedes all previous negotiations, communications and other agreements, whether written or oral, unless they are incorporated by reference in the Standing Offer and/or Call-up. There are no terms, covenants, representations, statements or conditions binding on the parties other than those contained in the Standing Offer and Call-up.

GC 20 Contingency Fees

The Consultant certifies that it has not, directly or indirectly, paid or agreed to pay and agrees that it will not, directly or indirectly, pay a contingency fee for the solicitation, negotiation or obtaining of the Standing Offer to any person, other than an employee of the Consultant acting in the normal course of the employee's duties. In this section, "contingency fee" means any payment or other compensation that depends or is calculated based on a degree of success in soliciting, negotiating or obtaining the Standing Offer and "person" includes any individual who is required to file a return with the registrar pursuant to section 5 of the Lobbying Act, 1985, c. 44 (4th Supplement).

GC 21 Harassment in the Workplace

1. The Consultant acknowledges the responsibility of Canada to ensure, for its employees, a healthy work environment, free of harassment. A copy of the Treasury Board policy, the Policy on the Prevention and Resolution of Harassment in the Workplace, which is also applicable to the Consultant, is available on the Treasury Board Web site.
2. The Consultant must not, either as an individual, or as a corporate or unincorporated entity, through its employees or sub consultants, harass, abuse, threaten, discriminate against or intimidate any employee, consultant or other individual employed by, or under contract with Canada. The Consultant will be advised in writing of any complaint and will have the right to respond in writing. Upon receipt of the Consultant's response, the Contracting Authority will, at its entire discretion, determine if the complaint is founded and decide on any action to be taken.

GC 22 Taxes

1. Federal government departments and agencies are required to pay *Applicable Taxes*.
2. *Applicable Taxes* will be paid by Canada as provided in the invoice submission. *Applicable Taxes* must be specified on all invoices as a separate item along with corresponding registration numbers from the tax authorities. All items that are zero-rated, exempt or to which these

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Applicable Taxes do not apply must be identified as such on all invoices. It is the sole responsibility of the Consultant to charge *Applicable Taxes* at the correct rate in accordance with applicable legislation. The Consultant agrees to remit to appropriate tax authorities any amounts of *Applicable Taxes* paid or due.

3. The Consultant is not entitled to use Canada's exemptions from any tax, such as provincial sales taxes, unless otherwise specified by law. The Consultant must pay applicable provincial sales tax, ancillary taxes, and any commodity tax, on taxable goods or services used or consumed in the performance of the contract (in accordance with applicable legislation), including for material incorporated into real property.
4. In those cases where *Applicable Taxes*, customs duties, and excise taxes are included in the *Contract Price*, the *Contract Price* will be adjusted to reflect any increase, or decrease, of *Applicable Taxes*, customs duties, and excise taxes that will have occurred between bid submission and contract award. However, there will be no adjustment for any change to increase the *Contract Price* if public notice of the change was given before bid submission date in sufficient detail to have permitted the Consultant to calculate the effect of the change.
5. Tax Withholding of 15 Percent - Canada Revenue Agency

Pursuant to the Income Tax Act, 1985, c. 1 (5th Supp.) and the Income Tax Regulations, Canada must withhold 15 percent of the amount to be paid to the Consultant in respect of services provided in Canada if the Consultant is not a resident of Canada, unless the Consultant obtains a valid waiver from the Canada Revenue Agency. The amount withheld will be held on account for the Consultant in respect to any tax liability which may be owed to Canada.

GC 23 Changes in the *Consultant* team

1. Should an entity or person named in the Consultant's proposal as an entity or person who is to perform the *Services* or part of the *Services* be unable to perform or complete the *Services*, the *Consultant* shall obtain the concurrence of the *Departmental Representative* prior to performing or completing the *Services*, or entering into an agreement with another equally qualified entity or person to perform or complete the *Services*, such concurrence not to be unreasonably withheld.
2. In seeking to obtain the concurrence of the *Departmental Representative* referred to in paragraph 1, the *Consultant* shall provide notice in writing to the *Departmental Representative* containing:
 - (a) the reason for the inability of the entity or person to perform the *Services*;
 - (b) the name, qualifications and experience of the proposed replacement entity or person, and
 - (c) if applicable, proof that the entity or person has the required security clearance granted by *Canada*.
3. The *Consultant* shall not, in any event, allow performance of any part of the *Services* by unauthorized replacement entities or persons, and acceptance of a replacement entity or person by the *Departmental Representative* shall not relieve the *Consultant* from responsibility to perform the *Services*.
4. The *Departmental Representative*, with the authority of Canada, may order the removal from the *Consultant* team of any unauthorized replacement entity or person and the *Consultant* shall

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immediately remove the entity or person from the performance of the *Services* and shall, in accordance with paragraphs 1 and 2, secure a further replacement.

5. The fact that the *Departmental Representative* does not order the removal of a replacement entity or person from the performance of the *Services* shall not relieve the *Consultant* from the Consultant's responsibility to meet all the Consultant's obligations in the performance of the *Services*.

GC 24 Joint and Several Liability

If at any time there is more than one legal entity constituting the *Consultant*, their covenants under the Standing Offer and/or Call-Up shall be considered to be joint and several and apply to each and every entity. If the *Consultant* is or becomes a partnership or joint venture, each legal entity who is a member or becomes a member of the partnership or joint venture or its successors is and continues to be jointly and severally liable for the performance of the work and all the covenants of the *Consultant* pursuant to the Standing Offer and/or Call-Up, whether or not that entity ceases to be a member of the partnership, joint venture or its successor.

GC 25 Performance evaluation - contract

1. The performance of the Consultant during and upon completion of the services will be evaluated by Canada. The evaluation includes all or some of the following criteria:
 - a. design
 - b. quality of Results
 - c. management
 - d. time
 - e. cost
2. A weighting factor of 20 points will be assigned to each of the five criteria as follows:
 - a. unacceptable: 0 to 5 points
 - b. not satisfactory: 6 to 10 points
 - c. satisfactory: 11 to 16 points
 - d. superior: 17 to 20 points
3. The consequences resulting from the performance evaluation are as follows:
 - a. For an overall rating of 85% or higher, a congratulation letter is sent to the Consultant.
 - b. For an overall rating of between 51% and 84%, a standard "meets expectations", letter is sent to the Consultant.
 - c. For an overall rating of between 30% and 50%, a warning letter is sent to the Consultant indicating that if, within the next two years from the date of the letter, they receive 50% or less on another evaluation, the Consultant may be suspended from any new Public Works and Government Services Canada (PWGSC) solicitations for construction services, architectural and engineering services or facility maintenance services, of real property projects, for a period of one year.

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- d. For an overall rating of less than 30%, a suspension letter is sent to the Consultant indicating that the Consultant is suspended from any new PWGSC solicitations for construction services, architectural and engineering services or facility maintenance services, of real property projects, for a period of one year from the date of the letter.
 - e. When general average is between 30% and 50% and one of the rating is of 5 points or less on any one criterion, a suspension letter is sent to the Consultant indicating that the Consultant is suspended from any new PWGSC solicitations for construction services, architectural and engineering services or facility maintenance services, of real property projects, for a period of one year from the date of the letter.

The form PWGSC-TPSGC 2913-1, Select - Consultant Performance Evaluation Report (CPERF), is used to record the performance.

GC 26 International Sanctions

1. Persons in Canada, and Canadians outside of Canada, are bound by economic sanctions imposed by Canada. As a result, the Government of Canada cannot accept delivery of goods or services that originate, either directly or indirectly, from the countries or persons subject to economic sanctions (<http://www.international.gc.ca/sanctions/index.aspx?lang=eng>).
2. The Consultant must not supply to the Government of Canada any goods or services which are subject to economic sanctions.
3. The Consultant must comply with changes to the regulations imposed during the period of the Call-Up. The Consultant must immediately advise Canada if it is unable to perform the Services as a result of the imposition of economic sanctions against a country or person or the addition of a good or service to the list of sanctioned goods or services. If the parties cannot agree on a work around plan, the Call-Up will be terminated for the convenience of Canada in accordance with terms and conditions of the Standing Offer and/or Call-Up.

GC 27 Integrity Provisions - Standing Offer

The Ineligibility and Suspension Policy (the "Policy") and all related Directives incorporated by reference into the Request for Standing Offers on its closing date are incorporated into, and form a binding part of the Standing Offer and any resulting contracts. The Consultant must comply with the provisions of the Policy and Directives, which can be found on Public Works and Government Services Canada's website at <http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>.

GC 28 Code of Conduct for Procurement – Standing Offer

The Consultant agrees to comply with the Code of Conduct for Procurement (<http://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/contexte-context-eng.html>) and to be bound by its terms for the period of the Standing Offer and any resulting contracts.

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0000DA SUPPLEMENTARY CONDITIONS

SC 1 Language Requirements

1. Communication between *Canada* and the *Consultant* shall be in the language of choice of the *Consultant* team, which shall be deemed to be the language of the Consultant's proposal submitted in response to the RFSO.
2. The Consultant's *services* during construction tender call (such as addenda preparation, tenderers' briefing meetings, technical answers to questions by bidders, including translation of bidder's questions) shall be provided expeditiously in both languages, as necessary.
3. The Consultant's *services* during construction shall be provided in the language of choice of the *Contractor*. The successful Contractor will be asked to commit to one or other of Canada's official languages upon award of the *Construction Contract* and, thereafter construction and contract administration services will be conducted in the language chosen by the *Contractor*.
4. Other required services in both of Canada's official languages (such as construction documentation) are described in detail in the Standing Offer Brief.
5. The *Consultant* team, including the Prime *Consultant*, Sub-Consultants and Specialists Consultants shall ensure that the *services* being provided in either language shall be to a professional standard.

SC2 Federal Contractors Program for Employment Equity - Setting aside and Default by the Consultant

The Consultant understands and agrees that, when an Agreement to Implement Employment Equity (AIEE) exists between the Consultant and Employment and Social Development Canada (ESDC)-Labour, the AIEE must remain valid during the entire period of the Standing Offer and contract. If the AIEE becomes invalid, the name of the Consultant will be added to the "FCP Limited Eligibility to Bid" list. The imposition of such a sanction by ESDC may result in the setting aside of the Standing Offer and will constitute the Consultant in default as per the terms of the contract.

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9998DA TERMS OF PAYMENT

TP 1 Fees

1. Subject to the terms and conditions of the Standing Offer, and in consideration for the performance of the *Services*, Canada shall pay to the Consultant a sum of money calculated in accordance with the fee arrangements identified herein and in 2000DA.
2. The *Consultant's* fees are only payable when the *Consultant* has performed the *Services* as determined by the *Departmental Representative*. Payment in respect of a *Service*, or part of a *Service*, is not to be deemed a waiver of *Canada's* rights of set-off at law or under this Standing Offer for costs or expenses arising from default or negligence of the *Consultant*.
3. The maximum amount payable under a Call-Up, including fees and disbursements, shall not be exceeded, without the prior written authorization of the Contracting Authority.

TP 2 Payments to the Consultant

1. The *Consultant* shall be entitled to receive progress payments at monthly or other agreed intervals, subject to the limitations of the Call-up, if applicable. Such payments shall be made not later than the due date. The due date shall be the 30th day following receipt of an acceptable invoice.
2. An acceptable invoice shall be an invoice delivered to the *Departmental Representative* in the agreed format with sufficient detail and information to permit verification. The invoice shall also identify, as separate items:
 - (a) the amount of the progress payment being claimed for *Services* satisfactorily performed,
 - (b) the amount for any tax calculated in accordance with the applicable federal legislation, and
 - (c) the total amount which shall be the sum of the amounts referred to in TP 2.2(a) and TP 2.2(b).
3. The amount of the tax shown on the invoice shall be paid by *Canada* to the *Consultant* in addition to the amount of the progress payment for *Services* satisfactorily performed.
4. The *Departmental Representative* shall notify the *Consultant* within fifteen (15) days after the receipt of an invoice of any error or missing information therein. Payment shall be made not later than thirty (30) days after acceptance of the corrected invoice or the required information.
5. Upon completion of each Call-up, the *Consultant* shall provide a Statutory Declaration evidencing that all the *Consultant's* financial obligations for *Services* rendered to the *Consultant* or on the *Consultant's* account, in connection with the Call-up, have been satisfied.
6. Upon written notice by a *Sub-Consultant*, with whom the *Consultant* has a direct contract, of an alleged non-payment to the *Sub-Consultant*, the *Departmental Representative* may provide the *Sub-Consultant* with a copy of the latest approved progress payment made to the *Consultant* for the *Services*.
7. Upon the satisfactory completion of all *Services*, the amount due, less any payments already made, shall be paid to the *Consultant* not later than thirty (30) days after receipt of an acceptable invoice, together with the Statutory Declaration in accordance with TP 2.5.

TP 3 Delayed Payment

1. If *Canada* delays in making a payment that is due in accordance with TP 2, the *Consultant* will be entitled to receive interest on the amount that is overdue for the period of time as defined in TP 3.2 including the day previous to the date of payment. Such date of payment shall be deemed to be the date on the cheque given for payment of the overdue amount. An amount is overdue when it is unpaid on the first day following the due date described in TP 2.1.
2. Interest shall be paid automatically on all amounts that are not paid by the due date or fifteen (15) *days* after the *Consultant* has delivered a Statutory Declaration in accordance with TP 2.5 or TP 2.7, whichever is the later.
3. The rate of interest shall be the *Average Bank Rate* plus 3 percent per year on any amount which is overdue pursuant to TP 3.1.

TP 4 Claims Against, and Obligations of, the Consultant

1. *Canada* may, in order to discharge lawful obligations of and satisfy lawful claims against the *Consultant* by a *Sub-Consultant*, with whom the *Consultant* has a direct contract, for *Services* rendered to, or on behalf of, the *Consultant*, pay an amount from money that is due and payable to the *Consultant* directly to the claimant *Sub-Consultant*.
2. For the purposes of TP 4.1 a claim shall be considered lawful when it is so determined:
 - (a) by a court of legal jurisdiction, or
 - (b) by an arbitrator duly appointed to arbitrate the said claim, or
 - (c) by a written notice delivered to the *Departmental Representative* and signed by the *Consultant* authorizing payment of the said claim or claims.
3. A payment made pursuant to TP 4.1 is, to the extent of the payment, a discharge of *Canada's* liability to the *Consultant* under a specific Call-up and will be deducted from any amount payable to the *Consultant* under any active Call-up.
4. TP 4.1 shall only apply to claims and obligations
 - (a) The notification of which has set forth the amount claimed to be owing and a full description of the *Services* or a part of the *Services* for which the claimant has not been paid. The notification must be received by the *Departmental Representative* in writing before the final payment is made to the *Consultant* and within one hundred twenty (120) *days* of the date on which the claimant
 - (1) should have been paid in full under the claimant's agreement with the *Consultant* where the claim is for an amount that was lawfully required to be held back from the claimant; or
 - (2) performed the last of the *Services* pursuant to the claimant's agreement with the *Consultant* where the claim is not for an amount referred to in TP 4.4(a)(1), and
 - (b) the proceedings to determine the right to payment of which shall have commenced within one year from the date that the notification referred to in TP 4.4(a) was received by the *Departmental Representative*.

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5. *Canada* may, upon receipt of a notification of claim referred to in TP 4.4(a), withhold from any amount that is due and payable to the *Consultant* pursuant to a Call-up the full amount of the claim or any portion thereof.
 6. The *Departmental Representative* shall notify the *Consultant* in writing of receipt of any notification of claim and of the intention of *Canada* to withhold funds pursuant to TP 4.5. The *Consultant* may, at any time thereafter and until payment is made to the claimant, post with *Canada*, security in a form acceptable to *Canada* in an amount equal to the value of the said claim. Upon receipt of such security *Canada* shall release to the *Consultant* any funds which would be otherwise payable to the *Consultant*, that were withheld pursuant to the provision of TP 4.5.
 7. The *Consultant* shall discharge all lawful obligations and shall satisfy all lawful claims against the *Consultant* for *Services* rendered to, or on behalf of, the *Consultant* in respect of this Standing Offer at least as often as this Standing Offer requires *Canada* to discharge its obligations to the *Consultant*.

TP 5 No Payment for Errors and Omissions

The *Consultant* shall not be entitled to payment in respect of costs incurred by the *Consultant* in remedying errors and omissions in the *Services* that are attributable to the *Consultant*, the *Consultant's* employees, or persons for whom the *Consultant* had assumed responsibility in performing the *Services*.

TP 6 Payment for Changes and Revisions

1. Payment for any additional or reduced *Services* authorized by the Departmental Representative, prior to their performance, and for which a basis of payment has not been established at the time of execution of the Call-up, shall be in an amount or amounts to be determined by the Departmental Representative, acting reasonably, subject to these Terms of Payment.
2. Payment for additional *Services* not identified at the time of execution of the Call-up shall be made only to the extent that
 - (a) the additional *Services* are *Services* that are not included in stated *Services* in the Call-Up; and
 - (b) The additional *Services* are required for reasons beyond the control of the Consultant.

TP 7 Extension of Time

If, and to the extent that, the time for completion of the *Construction Contract* is exceeded or extended through no fault of the *Consultant* in the opinion of *Canada*, payment for the *Services* required for such extended period of the contract administration shall be subject to review and equitable adjustment by *Canada*.

TP 8 Suspension Costs

1. During a period of suspension of the *Services* pursuant to GC 7 of clause 0220DA, General Conditions, the *Consultant* shall minimize all costs and expenses relating to the *Services* that may occur during the suspension period.
2. Within fourteen (14) *days* of notice of such suspension, the *Consultant* shall submit to the *Departmental Representative* a schedule of costs and expenses, if any, that the *Consultant*

expects to incur during the period of suspension, and for which the *Consultant* will request reimbursement.

3. Payment shall be made to the *Consultant* for those costs and expenses that, in the opinion of *Canada*, are substantiated as having been reasonably incurred during the suspension period.

TP 9 Termination Costs

1. In the event of termination of any Call-up pursuant to GC 8 of clause 0220DA, General Conditions, *Canada* shall pay, and the *Consultant* shall accept in full settlement, an amount based on these Terms of Payment, for *Services* satisfactorily performed and any reasonable costs and expenses incurred to terminate the Call-Up.
2. Within fourteen (14) *days* of notice of such termination, the *Consultant* shall submit to the *Departmental Representative* a schedule of costs and expenses reasonably incurred. The *Consultant* must ensure that it has mitigated its costs to the best of its ability.
3. Payment shall be made to the *Consultant* for those costs and expenses that in the opinion of *Canada* are substantiated as having been reasonably incurred after the date of termination.
4. The *Consultant* has no claim for damages, compensation, loss of profit, loss of opportunity, allowance or otherwise by reason of, or directly or indirectly arising out of, any action taken or termination notice given by *Canada* under GC8 Termination.

TP 10 Disbursements

1. Subject to any provisions specifically to the contrary in the Supplementary Conditions, the following costs shall be included in the fees required to deliver the consultant services and shall not be reimbursed separately;
 - (a) reproduction and delivery costs of drawings, CADD files, specifications and other Technical Documentation specified in the Standing Offer Brief;
 - (b) standard office expenses such as any photocopying, computer costs, Internet, cellular phone costs, long distance telephone and fax costs, including that between the *Consultant's* main office and branch offices or between the *Consultant's* offices and other team members offices;
 - (c) courier and delivery charges for deliverables specified in the Standing Offer Brief;
 - (d) plotting;
 - (e) presentation material;
 - (f) parking fees;
 - (g) taxi charges;
 - (h) travel time;
 - (i) travel expenses; and
 - (j) local project office.

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2. Subject to any provisions specifically to the contrary in the Supplementary Conditions, the following disbursements reasonably incurred by the Consultant, that are related to the Services and approved by the Departmental Representative, shall be reimbursed to the Consultant at actual cost:
- (a) reproduction and delivery costs of drawings, CADD files, specifications and other Technical Documentation additional to that specified in the Standing Offer Brief;
 - (b) transportation costs for material samples and models additional to that specified in the Standing Offer Brief;
 - (c) project related travel and accommodation additional to that specified in the Standing Offer Brief shall be reimbursed in accordance with current National Joint Council (NJC) Travel Directive (<http://www.njc-cnm.gc.ca/directive/index.php?dlabel=travel-voyage&lang=eng&did=10&merge=2>); and
 - (d) other disbursements made with the prior approval and authorization of the Departmental Representative.
3. Disbursements shall be Project related and shall not include expenses that are related to the normal operation of the Consultant's business. The amounts payable, shall not exceed the amount entered in the Call-up, without the prior authorization of the Departmental Representative.

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9999DA CONSULTANT SERVICES

CS 1 Services

The *Consultant* shall perform the *Services* described herein and in any subsequent Call-up, in accordance with the terms and conditions of this Standing Offer.

CS 2 Standard of Care

In performing the services, the Consultant shall provide and exercise the standard of care, skill and diligence required by customarily accepted professional practices and procedures developed by professional bodies in the performance of the services at the time when and the location in which the *Services* are provided.

CS 3 Time Schedule

The *Consultant* shall:

- (a) submit in a timely manner to the *Departmental Representative*, for approval, a time schedule for the *Services* to be performed, in detail appropriate to the size and complexity of the Project, and in a format as requested by the *Departmental Representative*;
- (b) adhere to the approved time schedule and, if changes in the approved time schedule become necessary, indicate the extent of, and the reasons for such changes, and obtain the approval of the *Departmental Representative*.

CS 4 Project Information, Decisions, Acceptances, Approvals

1. The *Departmental Representative* shall provide, in a timely manner, project information, written decisions and instructions, including acceptances and approvals relating to the *Services* provided by the *Consultant*.
2. No acceptance or approval by the *Departmental Representative*, whether expressed or implied, shall be deemed to relieve the *Consultant* of the professional or technical responsibility for the *Services* provided by the *Consultant*.

CS 5 Changes in Services

The *Consultant* shall:

- (a) make changes in the *Services* to be provided for the Project, including changes which may increase or decrease the original scope of *Services*, when requested in writing by the *Departmental Representative*; and
- (b) prior to commencing such changes, advise the *Departmental Representative* of any known and anticipated effects of the changes on the *Construction Cost Estimate*, *Consultant fees*, *Project Schedule*, and other matters concerning the Project.

CS 6 Codes, By-Laws, Licences, Permits

The *Consultant* shall comply with all statutes, codes, regulations and by-laws applicable to the design and where necessary, shall review the design with those public authorities having jurisdiction in order that the consents, approvals, licences and permits required for the project may be applied for and obtained.

CS 7 Provision of Staff

The *Consultant* shall, on request, submit to the *Departmental Representative* for approval, the names, addresses, qualifications, experience and proposed roles of all persons, including principals, to be employed by the *Consultant* to provide the *Services* identified in the Call-up and, on request, submit any subsequent changes to the *Departmental Representative* for approval.

CS 8 Sub-Consultants

1. The *Consultant* shall:

- (a) prior to any Call-up notify the *Departmental Representative* of any other sub-consultants with whom the *Consultant* intends to enter into agreements for part of the *Services* and, on request, provide details of the terms, and *Services* to be performed under the said agreements and the qualifications and names of the personnel of the *Sub-Consultants* proposed to be employed on any Call-up;
- (b) include in any agreements entered into with sub-consultants such provisions of this Standing Offer as they apply to the *Sub-Consultants'* responsibilities; and
- (c) upon written notice by a *Sub-Consultant*, with whom the *Consultant* has a direct contract, inform the *Sub-Consultant* of the *Consultant's* obligations to the *Sub-Consultant* under this Standing Offer.

2. The *Departmental Representative* may object to any *Sub-Consultant* within six (6) days of receipt of notification given in accordance with CS 8.1(a) and, on notification of such objection, the *Consultant* shall not enter into the intended agreement with the *Sub-Consultant*.

3. Neither an agreement with a *Sub-Consultant* nor the *Departmental Representative's* consent to such an agreement by the *Consultant* shall be construed as relieving the *Consultant* from any obligation under this Standing Offer or subsequent Call-ups, or as imposing any liability upon *Canada*.

CS 9 Cost Control

If the *services* required under a call-up are for a construction project, the following will apply:

1. Throughout Project development, the *Construction Cost Estimate* prepared by the *Consultant* shall not exceed the *Construction Cost Limit*.
2. In the event that the *Consultant* considers that the *Construction Cost Estimate* will exceed the *Construction Cost Limit*, the *Consultant* shall notify the *Departmental Representative* and
 - (a) if the excess is due to factors under the control of, or reasonably foreseeable by the *Consultant*, the *Consultant* shall, if requested by the *Departmental Representative*, and at no additional cost to *Canada*, make such changes or revisions to the design as may be necessary to bring the *Construction Cost Estimate* within the *Construction Cost Limit*; or

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- (b) if the excess is due to factors that are not under the control of the *Consultant*, changes or revisions may be requested by the *Departmental Representative*. Such changes or revisions shall be undertaken by the *Consultant* at *Canada's* expense, and the cost involved shall become an amount to be mutually agreed, prior to performance of the said changes or revisions.
3. If the lowest price obtained by bid process or negotiation exceeds the *Construction Cost Limit*, and if the excess is due to reasons within the control of, or reasonably foreseeable by the *Consultant*, the *Consultant* shall, if requested by the *Departmental Representative*, and without additional charge, be fully responsible for revising the Project scope and quality as required to reduce the construction cost and shall modify the construction documents as necessary to comply with the *Construction Cost Limit*.

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2000DA CALCULATION OF FEES

CF 1 Fee Arrangement(s) for Services

1. The fee to be paid to the *Consultant* for the *Services* pursuant to any Call-up, shall be determined by one or more of the following methods:
 - (a) Fixed Fee:
The fixed fee will be established by multiplying the applicable hourly rate(s) by the number of hours, negotiated and agreed to by the *Departmental Representative* and the *Consultant*.
 - (b) Time Based Fee to an Upset Limit:
An upset limit will be established by the *Departmental Representative*, and the *Consultant* will be paid for actual work performed using the applicable hourly rate(s) for such work.
2. Maximum Amount(s) Payable
The maximum amount(s) that applies (apply) to *the Services* to be carried out at the fixed hourly rates shall be as specified in the Call-up, which amount(s) shall not be exceeded without the prior authorization of *the Departmental Representative* with the approval of Canada.

CF 2 Payments for Services

1. Payments in respect of the fixed fee shall be made upon satisfactory performance of the *Services* but such payments shall not exceed the amount(s) as specified in the Call-up, for each *Service*.
2. Payments in respect of the time based fee arrangement shall be made upon satisfactory performance of the *Services* but such payments shall not exceed the amount(s) as specified in the Call-up, for each *Service*.
3. Progress payments, in respect of all fee arrangements, shall be made in accordance with TP 2 in clause 9998DA, Terms of Payment, of the Standing Offer, but such payments shall not exceed the value of the fee indicated for each *Service* under consideration.
4. If, for reasons attributable to the *Consultant*, a price cannot be obtained by a tender or negotiation within the *Construction Cost Limit*, or acceptable to the *Departmental Representative* for the award of the *Construction Contract*, the *Consultant* shall be entitled to receive payment for the tender call, bid evaluation and construction contract award *Services*, only when the requirements of CS 9.3, in clause 9999DA, Consultant Services and Departmental Responsibilities, have been met.

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GENERAL PROJECT OBJECTIVES (GPO)

GPO 1 Project Objective

ESAP is a PWGSC initiative to modernize PWGSC heating and cooling infrastructure within the National Capital Area (NCA). PWGSC operates six central heating and/or cooling (CHCP) plants that serve over 80 buildings within the NCA.

Five heating plants operate on high pressure steam and one operates on high temperature hot water. Based on a review of best practices and on technical and economic analysis of central heating systems worldwide, it is clear that the government can achieve greater efficiency, savings for taxpayers and a greener more sustainable solution through modernization and converting all of the heating systems to low temperature hot water. The Energy Service Acquisition Program (ESAP) will use a Design, Build, Finance, Operate and Maintain contract that will involve a Public-Private Partnership (PPP). In anticipation of conversion of all the central heating plants and distribution systems to low temperature hot water, PWGSC is now in the process of preparation of converting the buildings connected to these systems. Cooling technology and medium will likely remain unchanged except for life cycle equipment replacement and that chillers must be changed from steam driven to electrical and to eliminate chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) refrigerants in consideration of the Montreal Protocol. The selected Consultants should be familiar with best practices in district heating and cooling and potential innovations that will facilitate improved financial, energy efficiency and environmental performance.

It is recognized that modern district energy equipment including, but not limited to, piping, valves, metering etc., is frequently sourced from Europe where modern district energy is well established. For some of this equipment, European standards have been developed and are used where similar standards do not exist in Canada. These include EN-253 for pre-insulated piping systems and EN-1434 for thermal metering performance. It is expected that the selected Consultant will be familiar with such standards in addition to North American standards that apply.

The Work to be performed by the Consultant under the Call-ups resulting from this Standing Offer is related to the preparation of documentation related to the Energy Services Acquisitions Program ("ESAP") and may include, but is not limited to, implementation of technical studies, the drafting of statements of work, statements of requirements and materials in support of solicitation documents and/or Treasury Board Submissions and/or Memorandum to Cabinet, preparation of bid evaluation criteria, evaluation of the bids and verification of successful ESAP proponent performance. The Consultant agrees that, in order to avoid any conflict of interest or appearance of conflict of interest, the Consultant, its Sub-Consultants and their respective employees or affiliates involved in the Work, will not be eligible to bid, either as prime Consultant or Sub-Consultants, on any requirement resulting from the ESAP Work. Furthermore, any bid that would involve the Consultant, any of its Sub-

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Consultants and their respective employees, affiliates or former employees involved in the Work will be declared non-responsive. The Consultant agrees to advise its employees and its Sub-Consultants of this requirement.

The selected Consultant shall provide a range of investigation and recommendation reports, as well as design and construction services for industrial projects in the National Capital Area. **The selected Consultant shall not be, in any capacity, part of the ESAP Design, Build, Finance, Operate and Maintain PPP contract.**

Projects will include the renovation, rehabilitation and new construction of the following types of projects:

- Power, steam, hot water and chilled water generation plants and distribution systems;
- District heating and cooling systems;
- Water treatment plants;
- Marine water intake and outflow systems;
- Service tunnel construction;
- Plant life cycle evaluation and maintenance requirements;
- Evaluation and comparison of alternate district energy technologies;
- Industrial plant Standard Operating Procedures (SOP);
- Plant mass balance modelling;
- Controls and energy metering upgrades;
- High voltage substations;
- Electrical co-ordination studies;
- Environmental evaluation and assessments including noise abatement and emission dispersion modelling.
- Carbon neutral fuel (e.g. biomass, renewable fuel oil)

Each Call-up issued under this Standing Offer will elaborate on the specific objectives for individual projects; however, the following broader government objectives will apply to all Call-ups:

GPO 1.1 Design Principles - General

- PWGSC (the Department) expects the Consultant to maintain a high standard of design, based upon recognized contemporary design principles. All design elements, planning, architectural, and engineering, must be fully coordinated, and consistent in adherence to good design

principles, including the application of integrated design process principles;

- The level of quality is to be consistent with other Government of Canada buildings;
- The project is to be implemented in a sustainable environmentally responsible manner;
- Quality of materials and construction methods shall be commensurate with the type of building and the budget. Take into account the total life-cycling of the facility;
- Operating costs must be kept to a minimum and reflect the projected operating costs in the cost plan. This is to be achieved by compliance with the Energy Budget, selection of equipment, requiring the minimum of operating personnel, and building finishes for easy maintenance, etc.;
- Design for maximum flexibility in immediate and future use of space. Where possible, devise a building grid with column spacing, fenestration and service runs suited to flexible interior space arrangements.

GPO 1.2 Sustainable Development

In its Sustainable Development Strategy (SDS), PWGSC has committed to meet the requirements of LEED Gold for the construction of new office buildings, and of LEED Silver or equivalent for its major renovations or the construction of new buildings other than office buildings. The department also made commitments for key environmental aspects (e.g., energy, water, waste). In addition to the objectives vis-à-vis LEED or equivalent green building rating systems, the following sustainable design objectives should be targeted for PWGSC projects.

1.2.1 Energy Management

- Design should result in a building that exceeds the energy performance of a comparable building designed to meet the Model National Energy Code for Buildings (MNECB) by a minimum of 35%, and preferably by 50%;
- Design shall consider the inclusion of renewable energy design features (e.g., passive solar, air and water, bio-mass energy supply, etc.) as part of its energy management strategy. The RETScreen® Clean Energy Project Analysis Software (<http://www.etscreen.net/>) of Natural Resources Canada may be used to evaluate options and assess feasibility.

1.2.2 Water Management

- Designed water consumption for the building shall not exceed 70% of the industry average for the previous year as published by the Building Owners and Managers Association (BOMA). If applicable, design landscape to be water efficient, as per the LEED credits WE 1, 2 and 3 or equivalent;
- Design shall investigate and report on the feasibility of incorporating a "grey water" system as part of the plumbing facilities for the building;

- Design shall investigate and report on the feasibility of incorporating on-site waste water treatment for sanitation and/or domestic waste water the facilities;
- Design shall incorporate storm water management strategies, where applicable, such as roof top temporary storm water retention features, landscaped retention ponds, green roofs, and permeable (pervious) ground surface treatments (including paving).

1.2.3 Resource Use and Product Selection

- Design must have undergone an assessment for embodied energy, resource consumption and environmental impacts and may use the Athena™ Life-Cycle Assessment Model of the Athena Sustainable Materials Institute;
- Where available, feasible and meet the performance requirements, products will be specified that meet the requirements necessary for certification by the Environmental Choice (EcoLogo) Program or other equivalent programs;
- Products are specified that eliminate hazardous materials in their content, manufacture, application, and use;
- Where available, feasible and meet the performance requirements, products such as paints, adhesives and sealant that will be specified will have no or low levels of emissions of volatile organic compounds (VOCs);
- Where available, feasible and meet the performance requirements, products will be specified that contain a minimum 10% of post-consumer recycled product;
- Where feasible, design will incorporate the concept of "designing for disassembly" to promote reuse and to reduce waste.

1.2.4 Indoor Environmental Quality

- Indoor air quality must meet the standards as required by the Canada Labor Code Part II as well as the latest edition of ASHRAE Standards 62 and 55 as a minimum;
- The design shall ensure that there are no instances that will promote the accumulation of moisture in the heating, ventilation, and air conditioning (HVAC) system or the collection of standing water;
- Passive ventilation systems shall be investigated to replace or supplement mechanical HVAC systems;
- All noxious or unpleasant odors arising as a result of construction activities shall be purged from the space/facility prior to occupancy and filters replaced;
- Design options such as CO2 sensors, humidity sensors, and individual air volume controls shall be examined for their feasibility;

-
- Lighting levels shall meet the minimum requirements of the Canadian Occupational Safety and Health (COSH) Regulations, the National Building Code, the Canadian Electrical Code (CEC) and PWGSC's "Office Lighting Standard";
 - Lighting strategies shall be designed to apply the minimum for way-finding and to employ task lighting to the maximum extent feasible and consistent with functional requirements;
 - Lighting strategies shall be designed to maximize the availability of natural light while effectively addressing the adverse effects of lighting glare (both natural and artificial) on video display terminals (VDTs);
 - The most current industry standards for indoor environmental controls for air and light quality shall be specified;
 - The project design and finishing materials specified shall be reviewed for their impact on the acoustical quality of the space after fit-up.

GPO 1.3 Waste Management

The Construction, Renovation, and Demolition (CRD) Non-hazardous Solid Waste Management Protocol to which Real Property Branch (RPB) is bound, provides directions on the undertaking of non-hazardous solid waste management actions for CRD projects. The protocol is designed to meet the requirements of federal and provincial policies and the objectives of the (RPB) Sustainable Development Strategy (SDS) as these relate to non-hazardous solid waste generated in CRD projects.

For all Real Property Branch projects where the area exceeds 2,000 m², a solid waste management program must be implemented. This requirement exists by regulation in the province of Ontario and by policy for the rest of Canada. A minimum landfill diversion rate of 75% is to be achieved where local recycling facilities exist. For projects where the area is less than 2,000 m², a preliminary waste management evaluation of the economic feasibility of a waste management program must be carried out. The results from the RPB CRD waste management pilot projects have been very positive. Based on these results and results obtained from similar projects that have been completed by other organizations, the following can be said:

- Approximately 50% to 95% of the waste generated during CRD projects can be diverted from landfill through reduction, reuse, and recycling initiatives;
- Approximately 40,000 tons of waste are produced for every one billion dollars that is spent on construction projects.

Contractors and projects managers must plan for extra project time when implementing CRD waste diversion initiatives. However, added labor hours costs can be recuperated and a savings of up to 30% of the waste management costs (approximately 10% of the total project budget) can be achieved through reduced tipping fees, avoided haulage costs, and the sale of reusable and recyclable materials.

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The Departmental Representative will provide details of waste management delivery strategies. Details for specifying deliverables are provided in "Required Services" - Waste Management.

GPO 1.4 Code Compliance

Codes, regulations, by laws and decisions of "authorities having jurisdiction" will be observed. In cases of overlap, the most stringent will apply. The Consultant shall identify other jurisdictions appropriate to the project.

GPO 1.5 Risk Management

A risk management strategy is crucial for PWGSC Project Management and integrates project planning into procurement planning. All the stakeholders of a project will be an integral part of the risk management strategy, culminating in an integrated product team. Specific services required for project delivery are outlined in Required Services.

GPO 1.6 Health and safety

PWGSC recognizes the responsibility to ensure the health and safety of all persons on Crown construction projects and the entitlement of both federal employees and private sector workers to the full protection afforded them by occupational health and safety regulations.

In keeping with the responsibility and in order to enhance health and safety protection for all individuals on federal construction sites, PWGSC will voluntarily comply with the applicable provincial/territorial construction health and safety acts and regulations, in addition to the related Canada Occupational Safety and Health Regulations. PWGSC also has a departmental policy, DP 007, Health and Safety Policy (2007-12-19), which applies to all projects.

GPO 1.7 PWGSC Standards and Procedure

For standards relating to the service provisions herein please refer to "Doing Business" which is the new document which replaces "Doing Business with AES". The standards in PWGSC document "Doing Business" (Appendix C) and at project delivery stage as described in each individual Call-up must be adhered to in conjunction with this scope of services.

GPO 2 Issues

GPO 2.1 Major Cost Issues

Issue: Budget Limitations

Effective cost estimating and cost control is of prime importance and shall be provided by Professional Quantity Surveyors. The class C and Class B cost estimates shall be submitted in elemental cost analysis format. The standard of acceptance for this format is the current issue of the elemental cost analysis format issued by the Canadian Institute of Quantity Surveyors.

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The class a cost estimate shall be submitted in trade cost breakdown format. Cost estimates shall have a summary plus full back-up showing items of work, quantities, unit prices and amounts.

GPO 2.2 Major Time Issues

Issue: "out of service time frame"

It is imperative that the out of service time frame for the various projects as a result of construction be minimized as much as possible. Program operations and time frames will govern the particular allotted time frame for construction through the identified Call-up.

GPO 2.3 Major Operational Issues

Issue: Adjacent Programs

Sustainability of adjacent programs is mandatory and therefore design decisions must be sensitive to that requirement. Additional factors recognized as affecting adjacent programs are the following: reliability of systems and equipment, redundancy to ensure continued operation, and prolonged commissioning issues.

DESCRIPTION OF SERVICES

PA 1 Project Administration

Intent

The following administrative requirements apply during all phases of project delivery and will be stipulated in each Call-up.

PA 1.1 Coordination with PWGSC

The Project Manager assigned to the project is the Departmental Representative.

The Departmental Representative is directly concerned with the project and responsible for its progress. The Departmental Representative is the liaison between the Consultant, Public Works and Government Services Canada and the Client Departments.

Public Works and Government Services Canada administers the project and exercises continuing control over the Consultant's work during all phases of development. Unless directed otherwise by the Departmental Representative, the Consultant obtains all Federal requirements and approvals necessary for the work.

The Consultant shall:

- Carry out services in accordance with approved documents and directions given by the Departmental Representative;
- Ensure all communications carry the PWGSC's Project Title, Project Number and File Number;
- Advise the Departmental Representative of any changes that may affect schedule or budget or are inconsistent with instructions or written approvals previously given. The Consultant shall detail the extent and reasons for the changes and obtain written approval before proceeding.

PA 1.2 Coordination with Sub-consultants

The Consultant shall:

- Throughout all stages of the Project, coordinate and assume responsibility for the work of any Sub-consultants and specialists retained by the Consultant;
- Ensure clear, accurate and ongoing communication of concept, budget, and scheduling issues (including changes) as they relate to the responsibilities of all Sub-consultants and specialists from initial base building reviews to post construction reports;
- Ensure Sub-Consultants provide adequate site inspection services and attend all required meetings.

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PA 1.3 General Project Deliverables

Where deliverables and submissions include summaries, reports, drawings, plans or schedules, provide six (6) hard copies of all deliverables plus two in electronic format. All documents (drawings and specification) are to be produced in accordance with PWGSC document "Doing Business" (Appendix H) and at project delivery stage as described in each individual Call-up.

PA 1.4 Lines of Communication

Correspond only with the Departmental Representative at the times and in the manner dictated by the Departmental Representative. The Consultant shall not communicate with the client department unless so authorized in writing by the Departmental Representative.

During construction tender call, Public Works and Government Services Canada conducts all correspondence with bidders and makes the contract award.

PA 1.5 Media

The Consultant shall not respond to requests for project related information or questions from the media. Such inquiries are to be directed to the Departmental Representative.

PA 1.6 Meetings

The Departmental Representative may arrange meetings every 2 weeks throughout the entire project development period, for all members of project team, including representatives from:

- Client Department;
- Public Works and Government Services Canada ;
- Consultants.

The Consultant shall attend the meetings, record the issues and decisions and prepare and distribute minutes within 48 hours of the meeting.

PA 1.7 Project Response Time

It is a requirement of all projects covered under this Standing Offer that the prime Consultant and their proposed Sub-consultants should be personally available to attend meetings and respond to inquiries within half (½) a day of the Departmental Representative's request, in the locality of the place of the work from the date of the award of the Consultant Call-up until final inspection and turnover.

The Consultant must be able to demonstrate the availability of adequate resources within their proposed team(s) to deliver the scope of services required by a Call-up and as outlined in this Standing Offer in a timely fashion.

PA 1.8 Submissions, Reviews and Approvals

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For each Call-up, work in progress may be reviewed by the Departmental Representative as well as, but not limited to, the following:

PWGSC in-house services

- Submission Format: drawings and specifications;
- Submission Schedule: submissions are reviewed at a time to be arranged. Give 10 days notice when work will be completed and delivered to the Departmental Representative;
- Expected Turnaround Time: 2 weeks;
- Number of Submissions: until approval has been received.

Design review committee - client

- Submission Format: reports, drawings and specifications, and oral presentations;
- Submission Schedule: submissions are reviewed at a time to be arranged. Give 10 days notice when work will be completed and delivered to the Departmental Representative;
- Expected Turnaround Time: 2 weeks;
- Number of Submissions: until approval has been received.

Chart of Revision & Approvals: R = Review; A = Approval	PWGSC		Client	
	R	A	R	A
Project Scope of Services Report		x		x
Class 'D' Estimate		x		x
Design Options	x		x	
Recommended Design Option		x		x
Class 'C' Estimate(s)		x		x
Design Development Documents		x		x
Class 'B' Estimate(s)		x		x
33% Construction Drawings		x	x	
66% Construction Drawings and Specs		x	x	
99% Construction Drawings and Specs		x		x
Class 'A' Estimate(s)		x		x
Final Tender Documents		x		x

PA 1.9 Bilingual Construction Documents

Construction Documents are required to be available in both official languages.

Bilingual Requirements:

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- The Consultant shall prepare all construction documents in Canada's two official languages. The languages are considered equal in status; neither is considered to be a translation of the other;
 - The Consultant shall be responsible for the accuracy and completeness of translations and the consistency of documents;
 - It is standard practice to produce a single set of drawings (originals) on which written information is shown in both languages and separate written documents for each language for tendering, records drawings, operating and maintenance documentation.

REQUIRED SERVICES (RS)

RS 1A Pre-Design Services (Stage 1A)

The purpose of this stage is to develop:

1. Feasibility Studies / Options Analysis;
2. Functional Requirements;
3. Implementation Strategy and Schedule;
4. Detailed Investigation Reports;
5. Sustainable Development Strategies and Report;
6. Hazardous Waste Disposal Strategies and Report;
7. Facility Equipment Evaluation and Recommendations Report;
8. Telecommunications Requirements Report N/A;
9. Security Requirements Report;
10. Environmental Clean-up Report;
11. Decommissioning Report;
12. Order of Magnitude Cost Report.

RS 1.1A Feasibility Studies / Options Analysis

1.1.1A Intent

Feasibility Study:

A report which outlines the research and subsequent analysis to determine the viability and practicability of a project. A feasibility study analyzes economic, financial, market, regulatory, environmental/sustainable and technical issues. The purpose at this stage is to: investigate and analyze site conditions, including soil conditions, zoning, bylaws, traffic reports, service capacities, base building support systems, special purpose support systems etc. and to provide recommendations.

Options Analysis:

A design test (in schematic form) for the feasibility study recommendations to determine that the recommendations can be accommodated in a minimum of three (3) distinctly different options.

Cost Estimate:

Complete with class 'D' "Order of Magnitude" costs (see RS 1.12A).

1.1.2A Scope and Activities

Feasibility Study (including but not limited to):

- Visit the building/site, investigate and analyze the availability and capacity of building services needed for the project, including renewable energy;
- Investigate the requirements for the particular facility, including existing and new technologies;
- Analyze the project requirements/program;
- Review all available existing material related to the type of facility;
- Investigate and analyze all applicable codes, regulations standards, including but not limited to: National Building Code, Canada Labor Code, Model National Energy Code, National Fire Protection Association, Ontario and Québec Occupational Health and Safety;
- Evaluate existing facilities including: building envelop, mechanical, electrical and structural systems, functional adaptability, code compliance, hazardous and non-hazardous waste;
- Identify and verify all authorities having jurisdiction over the project;
- Establish a policy for this project to minimize environmental impacts consistent with the project objectives and economic constraints, and the application of the Canadian Environmental Assessment Act (CEAA);
- Prepare recommendations on the feasibility of the project.

Options Analysis (including but not limited to):

- Test the feasibility study recommendations on a minimum of three (3) options, schematic (sketch) only;
- Bubble and flow diagrams;
- Adjacencies and functional relationships;
- Horizontal and vertical stacking relationships;
- Orientation and renewable energy;
- Indication of the preferred option.

Class 'D' Order of Magnitude Cost (for each option). See RS 1.12A

1.1.3A Deliverables

Comprehensive summary of the existing conditions, feasibility and options analysis (including but not limited to):

- Report on existing base building system elements including their condition, deficiencies and life expectancy;
- Report on existing facility systems requirements;
- Report on all applicable codes, regulation, standards and authorities having jurisdiction;
- Report on environmental impact, sustainability, preliminary environmental assessment and CEAA screening report;
- Report on recommendations and options analysis;
- Written identification of the problems, conflicts or other perceived information/clarifying assumptions for the acknowledgment of the Departmental Representative;
- Report on Class 'D' Order of Magnitude Cost for each option.

RS 1.2A Functional Requirements

Note that PWGSC has put in place a number of Functional Programming RFPs which service the NCA. Thus, it is not likely that this RFSO will be used for a full-fledged functional program.

If such service is required, it will be at a high strategic level.

When requested, the Consultant shall: develop floor plates which outline rentable areas, mechanical areas and electrical areas, identify volumes of space needed, identify circulation requirements and finally, identify usable m².

1.2.1A Intent

"A problem well-stated is already half-solved."

For any interior work related to office fit-up, the consultant shall follow the Government of Canada Fit-up Standards:

- www.tpsgc-pwgsc.gc.ca/biens-property/amng-ftp/index-eng.html

Functional Requirements (Program):

- A written statement which describes various criteria and data for a building (facility) project including design objectives, site requirements and constraints, spatial requirements and relationships, building systems and equipment, facility systems and equipment, and future expandability. The purpose of this stage is to describe the requirements which a building (facility) must satisfy in order to support and enhance human activities.

The programming process seeks to answer the following questions:

- What is the nature and scope of the problem?
- What information is required to develop a proper architectural solution to the problem?
- How much and what type of space is needed?
- What space will be needed in the next five to ten years to continue to operate efficiently?
- How can sustainability be addressed at this stage?

Options Analysis:

A design test (in schematic form) for the functional program recommendations is meant to determine that the recommendations can be accommodated in a minimum of three (3) options.

Cost Estimate:

Complete with class 'D' "Order of Magnitude" costs. (See RS 1.12A)

1.2.2A Scope and Activities

In preparing a functional program, the consultant's main task is to examine the client's world in detail so as to define the client's needs and objectives. These requirements will establish criteria for evaluating potential design solutions and other strategic alternatives.

The consultant must understand:

- The impacts of a building's occupants and processes (facilities) on the built environment;
- The social and environmental impacts of the building's program on the community;
- The planning impacts of its function on the local infrastructure.

To prepare a functional program, consultant's shall identify, research, and observe the Users of the proposed building (facility) and their work activities (including but not limited to):

Research and information gathering through information sessions with employees, focus group sessions etc;

- Function-by-function, room-by-room, or branch by branch activity plans;
- Staffing plans (current/future);
- Office standards; open vs. closed;
- Special purpose space;
- Support space;
- Storage requirements;

- The volume of activity planned for specific facility components, such as:
 - o Throughput (amount of material put through experimentation, analysis);
 - o Flow patterns (proximity /circulation).

The Consultant shall then develop approximate floor areas and technical requirements for the proposed facility (including but not limited to):

- Details of the space, facility, or of the workstation;
- Special facility equipment or furniture configurations;
- Environmental criteria;
- Must be based on the Government of Canada (GoC) Fit-up Standards.

The Consultant shall also advise the client on alternatives, such as the architectural and financial implications of various building options. Functional programs for buildings (facilities) are future oriented - alternative scenarios and may be based on high-, medium-, and low-growth projections, or on fast, medium or slow roll-outs of anticipated events. The Consultant shall assist the client in assessing the advantages or benefits - and the disadvantages or costs - of each alternative.

1.2.3A Deliverables

- Depending on the size/scope of work, the Consultant shall submit record documentation at the 33%, 66% and final stages of delivery as required;
- The final Functional Program (including but not limited to):
 - o The client's philosophy, values, goals, and desired "image";
 - o Site requirements, such as parking, circulation orientation;
 - o Explicit space requirements for the future building (facility), including:
 - Definition of the activities which will take place in each space in the building;
 - The functional relationships of the spaces;
 - "Bubble" diagrams and flow diagrams;
 - The size of each of the spaces;
 - Sketch (schematic) design options;
 - Special technical requirements of each of the spaces and the building

systems.

- Financial requirements and a preliminary "Order of Magnitude" budget;
- Scheduling and time frame for the project;
- Other requirements including:
 - o Regulatory issues such as zoning and building code requirements;
 - o Other requirements from Authorities Having Jurisdiction;
 - o Community goals and concerns;
 - o Ecological and environmental concerns.
- A recommended construction delivery method (traditional design-bid-build, design-build, construction management).

RS 1.3A Implementation Strategy and Schedule

1.3.1A Intent

The purpose of this stage is to detail an implementation strategy to meet the project goals and objectives.

1.3.2A Scope and Activities

The Consultant shall provide a detailed implementation strategy and schedule (including but not limited to):

- Prepare a detailed implementation strategy that documents, in a report, all activities, milestones and deliverables required for the effective delivery of the project including time frames for submissions, reviews and approvals;
- Prepare a project schedule that identifies, in a graphic format such as Critical Path Method (CPM) or Program Evaluation and Review Technique (PERT), all activities, milestones including critical deadlines, long lead delivery items and drop dead dates, required for the effective delivery of the project deliverables, including time frames for submissions, reviews and approvals;
- The Implementation Strategy and Schedule described above shall include, but not be limited to the following:
 - o Space acquisition strategy, building master plan;
 - o Decommissioning and environmental clean-up strategy;
 - o Move sequencing;

- Swing space requirements;
 - Procurement of facility equipment and furniture strategy; and
 - Construction strategy.
- Advise the Departmental Representative of any changes to the scope that may affect schedule or are inconsistent with instructions or written approvals previously given. The consultant shall detail the extent and reasons for the changes and obtain written approval before proceeding;
 - Submit the Implementation Strategy and Schedule for review. Revise as required.
 - Resubmit for final approval. The original approved schedule will become the "Baseline" schedule to monitor project progress;
 - Throughout the project, monitor critical path and deadlines for submissions, revisions and approvals. Submit weekly Progress Reports identifying completed deliverables, slippage and upcoming activities.

1.3.3A Deliverables

- Implementation strategy;
- Time Plan (Schedule).

RS 1.4A Detailed Investigation Reports

1.4.1A Intent

The purpose of this stage is to provide a more detailed investigation into aspects of findings and recommendations identified at the Building Condition Report (BCR) level.

1.4.2A Scope and Activities

- Structural analysis and testing;
- Detailed building envelope investigation and testing;
- Detailed air-flow analysis and testing;
- Detailed energy analysis and investigation.

1.4.3A Deliverables

- Submit the findings of the detailed investigations for review, in a report;
- Revise as required;
- Resubmit for final approval.

RS 1.5A Sustainability Strategies and Reports

1.5.1A Intent

The purpose is to research and investigate a wide range of strategies to achieve sustainability (including but not limited to):

- Recycling and reuse of materials, systems, equipment;
- Procurement of "green" materials;
- Energy reduction and management;
- Water management;
- Waste reduction and management;
- Life-cycle costing, cost benefit analysis;
- Integrated Design process.

1.5.2A Scope and Activities

The Consultant shall research and investigate sustainable development strategies in the context of the project and make recommendations:

- Prepare a detailed inventory of existing non-contaminated materials, systems, equipment identified for reuse or recycling. Include target markets for recycled material and make recommendations. Verify with client department. Revise as required. Obtain approval;
- Investigate and identify potential "green" building materials and products for the project include sourcing (i.e. In order to meet government objectives sole source is necessary). Verify with client department. Revise as required. Obtain approval;
- Investigate and analyze potential to exceeding the Model National Energy Code by 30% to 50%. Make recommendations for an Energy Reduction and Management plan;
- Investigate and analyze potential to increasing energy efficiency, and strategies to decrease water run-offs. Make recommendations, verify with client department. Revise as required. Obtain approval;
- Develop a non-hazardous and hazardous waste reduction and management plan. Make recommendations, verify with client department. Revise as required. Obtain approval;
- Based on the recommendations included in the above five bullets, perform a cost / benefit and life-cycle costing analysis for the Sustainability Strategy for the project.

1.5.3A Deliverables

- Submit the Sustainability Strategy for review, in a report;

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- Revise as required;
 - Resubmit for final approval.

RS 1.6A Hazardous Waste Disposal Strategies and Reports

1.6.1A Intent

The purpose of this stage is to identify hazardous waste disposal issues and recommend strategies for mitigation.

1.6.2A Scope and Activities

The Consultant shall research and investigate hazardous waste disposal strategies in the context of the project and make recommendations:

- Prepare a detailed inventory of existing contaminated materials, systems, equipment identified for disposal. Verify with client department. Revise as required. Obtain approval;
- Develop a hazardous waste reduction and management plan. Make recommendations, verify with client department. Revise as required. Obtain approval;
- Based on the recommendations included in the above two bullets, perform a cost / benefit and life-cycle costing analysis for the Hazardous Waste Disposal Strategy for the project.

1.6.3A Deliverables

- Submit the Hazardous Waste Disposal Strategy for review, in a report;
- Revise as required;
- Resubmit for final approval.

RS 1.7A Facility Equipment Evaluation and Recommendations Reports

1.7.1A Intent

The purpose of this stage is to identify and evaluate existing facility equipment and to make recommendations for their reuse, recycling, refurbishment and/or replacement.

1.7.2A Scope and Activities

- At such time as the Departmental Representative determines, prepare a detailed inventory of existing equipment. Include drawings identifying existing location and layout. Verify with client department. Revise as required. Obtain approval. Note that the Consultant shall refer to the PWGSC National Project Management System;
- Based on parameters developed in conjunction with the Departmental Representative and the

client department, prepare an equipment evaluation report that assesses the condition of existing equipment. Assess the current inventory against the client department's functional requirements;

- Prepare a detailed cost analysis (Class B) that compares the reuse/refurbishment of existing equipment, with the purchase of new equipment. Consideration should be given to cost effectiveness and time frames required for refurbishment of existing equipment and/or the procurement of new equipment.

1.7.3A Deliverables

- Submit inventory, evaluation report, & cost analysis in a report for review;
- Revise as required;
- Resubmit for final approval.

RS 1.8A Telecommunications Requirements Reports: N/A

RS 1.9A Security Requirements Reports

1.9.1A Intent

The purpose of this stage is to research and investigate the security requirements of the client for the project.

1.9.2A Scope and Activities

- Prepare a report that documents the effect of the client department's functional requirements and proposed planning alternatives on their current and future security requirements. Identify specific security requirements and make appropriate recommendations;
- Recommend any necessary modifications to the base building and that portion of the building to be occupied by the client department. Assess the impact of these modifications on space, time and budget.

1.9.3A Deliverables

- Submit recommendations included in the above item 1.9.2A in a report for review;
- Revise as required;
- Resubmit for final approval.

RS 1.10A Environmental Clean-up Reports

1.10.1A Intent

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The purpose of this stage is to research and investigate the environmental requirements of the client for the project.

1.10.2A Scope and Activities

- Prepare a report that documents the effect of the client department's functional requirements and proposed planning alternatives on their current and future requirements. Identify environmental requirements and make appropriate recommendations;
- Prepare a Waste Management Plan including all non-contaminated material that is to be reused or recycled whenever possible according to the PWGSC, Construction and Demolition Waste Management Protocol.

1.10.3A Deliverables

- Submit recommendations included in the above item 1.10.2 A in a report for review;
- Revise as required;
- Resubmit for final approval.

RS 1.11A Decommissioning Reports

1.11.1A Intent

The purpose of this stage is to research and investigate the decommissioning requirements of the client's specialized equipment and systems.

1.11.2A Scope and Activities

- Prepare a report that documents the effect of the client department's functional requirements and proposed planning alternatives on their current and future requirements. Identify decommissioning requirements and make appropriate recommendations;
- Prepare a Decommissioning Plan including all stand-alone facility equipment and systems that is to be reused or recycled whenever possible according to the PWGSC and Treasury Board Standards.

1.11.3A Deliverables

- Submit recommendations included in the above item 1.11.2A in a report for review;
- Revise as required;
- Resubmit for final approval.

RS 1.12A Order of Magnitude "Class D" (Indicative) Cost Reports

1.12.1A Intent

The purpose of this stage is to provide an indication of the total cost of the project, based on the user's functional requirements to the degree known at the time. It is based on historical cost data for similar work, suitably adjusted for such factors as: effect of inflation, location, risk, quality, size and time. All related factors affecting cost are considered to the extent possible. Such an estimate is strictly an indication (rough order of magnitude) of the project total cost and completion date. This estimate is used to establish the indicative estimate required by Treasury Board for Preliminary Project Approval.

1.12.2A Scope and Activities

Cost Planning

Specific tasks may include, but are not limited to:

- Prepare (life-cycle) cost plans from project briefs, preliminary concepts or other preliminary information;
- Prepare cost analysis;
- Prepare option analysis and "what if" scenarios;
- Provide advice and recommendations on project planning in order to achieve the most cost effective project sequence;
- Identify and quantify potential risks and make contingency recommendations in order to minimize negative cost impacts;
- Advise on alternative procurement and construction strategies to create efficiencies wherever possible;
- Identify, forecast and analyze project-related issues including possible market shortages and potential price fluctuations.

Cost Estimating

Develop cost estimates of projects:

- Prepare order of magnitude "class D" cost estimates;
- Quantify design and construction costs, contingencies and risks;
- Prepare and investigate costing alternatives to assist in the identification of the most cost-effective design and/or construction approach;
- Investigate and report on life-cycle costs;
- Document all unit pricing, analysis, and valuation.

1.12.3A Deliverables

Cost Planning

- Cost plans;
- Cost analyses and "what if" scenarios;
- Cash flows; and / or
- Reports on alternative procurement and construction strategies or other project-related issues.

Cost Estimating

- Fully detailed cost estimate. Order of magnitude "Class D" accuracy;
- Documentation of the methodology of the estimate and any assumptions made;
- Documentation of all pricing and valuation calculations;
- Reports on investigation of costing alternatives;
- Reports on life-cycle costs.

RS 1B Pre-Design Services (Stage 1B) - Verification

(When RS 1A has been prepared by others)

Based on the Project Brief prepared by the PWGSC Departmental Representative at the time of Call-up, the scope of services will either be based on Section RS 1A "Pre-Design Services (Stage 1A)" or "Pre-Design Services (Stage 1B) - Verification".

- Analysis of Project Requirements;
- Review Pre-Design deliverables (Stage 1A) prepared by others.

RS 1.1B Analysis of Project Requirements

1.1.1B Intent

The purpose of this stage is to ensure the Consultant has reviewed and integrated all the project requirements, identified and evaluated conflicts or problems, provided alternative strategies, presented and received approval on a Project scope, delivery process, schedule and estimate required to deliver a cohesive quality project. This approved deliverable will become the Project Scope of Services and will be utilized throughout the project to guide the delivery.

1.1.2B Scope and Activities

- Visit the building/site and verify the availability and capacity of services needed for the project;

- Attend project start up meeting;
- Analyze the project requirements/program;
- Review all available existing material related to the project;
- Review the proposed project schedule for verification that all milestone dates are achievable;
- Review the cost plan/budget for verification that the costs are realistic and achievable;
- Identify and verify all authorities having jurisdiction over the project;
- Identify the codes, regulations and standards that apply;
- Establish a policy for this project to minimize environmental impacts consistent with the project objectives and economic constraints.

1.1.3B Deliverables

- Comprehensive summary of the project requirements/program demonstrating understanding of the scope of work including:
 - o Report on existing base building system elements including their condition, deficiencies and life expectancy;
 - o Confirmed or adjusted project cost and time plans;
 - o Written identification of the problems, conflicts or other perceived information/clarifying assumptions for the acknowledgment of the Departmental Representative.

RS 1.2B Review of Pre-Design Deliverables - Stage 1A (prepared by others)

1.2.1B Intent

The purpose of this stage is to ensure the Consultant has reviewed and integrated all the pre-design deliverables prepared by others required to deliver a cohesive quality project. This approved deliverable will become the Project Scope of Services and will be utilized throughout the project to guide the delivery.

1.2.2B Scope and Activities

Ensure Pre-Design (Stage 1A) prepared by others include the following deliverables, and that those are still current, up-to-date and are approved

1. Feasibility Studies / Options Analysis;
2. Functional Requirements;

3. Implementation Strategy and Schedule;
4. Detailed Investigation Reports;
5. Sustainable Development Strategies and Report;
6. Hazardous Waste Disposal Strategies and Report;
7. Facility Equipment Evaluation and Recommendations Report;
8. Telecommunications Requirements Report N/A;
9. Security Requirements Report;
10. Environmental Clean-up Report;
11. Decommissioning Report;
12. Order of Magnitude Cost Report.

For a more detailed description of the content requirements of Pre-Design Services, see Section RS 1A "Pre-Design Services (Stage 1A)".

1.2.3B Deliverables

- Update the Pre-Design deliverables if required;
- Submit for review;
- Revise;
- Resubmit for final approval.

RS 2 Schematic Design

2.1 Intent

The purpose of a schematic design is to translate the project requirements into space perimeters in the most environmentally and sustainable manner as well as to explore design options and analyze them with respect to priorities and program objectives previously identified. Out of this process, one option will be recommended to proceed to Design Development

2.2 Scope and Activities

- Obtain written approval from Departmental Representative for development of schematic design options based on the analysis of the Project Brief;
- Provide alternative design options exploring possible technical and environmental strategies which are viable and have potential for development;

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- Analyze each solution with regard to the project goals including cost and schedule;
 - Write a preliminary project-description report outlining the various components and system options;
 - Produce an environmental assessment and CEAA Screening Report;
 - Minimize the use of hazardous/toxic materials and products made from endangered or rare species (i.e. tropical hardwoods);
 - Recommend one option for further development with all supporting background and technical justifications;
 - Produce a Class 'C' cost estimate for the various options;
 - Produce an implementation schedule, including alternative procurement and construction strategies.

2.3 Details

2.3.1 Architectural Drawings:

- Site plan showing proposed building outlines, orientation, main accesses and traffic patterns;
- Schematic building plans of alternatives showing relative disposition of main accommodation areas, circulation patterns, numbers of floors, etc;
- Sketch elevations and sections indicating the basic design approach and aesthetic philosophy;
- Sketch perspectives or massing studies;
- Outside gross building areas and summary of main accommodation areas required and proposed;
- Horizontal and vertical space relationships.

2.3.2 Structural Drawings:

- Proposed or alternative structural systems including foundation methods, explanatory sketches, etc. and a copy of the site report on which the design is based;
- Initial seismic analysis.

2.3.3 Mechanical Drawings

- The schematic design submission shall include a description of specific mechanical requirements

and function for each area (room) in the project. Identify any unique or specialized equipment required by the subject facility. Incorporate in the submission a schedule of requirements listing all rooms and identify the mechanical building services to be provided;

- Explain in the concept submission the manner in which the proposed mechanical systems correlate with user requirements;
- Identify the volume of outdoor air to be supplied per person;
- Identify the delivery rate of supply air to occupied spaces;
- Identify whether full time operating staff will be needed for operating any of the mechanical equipment. Differentiate between staff that is needed by code requirements versus that staff which is needed because of the nature and size of the facility;
- Identify location of entry point into the building of all mechanical services into the building. Identify in square meters the area to be provided for mechanical rooms, and then identify what percentage of total building area this represents. Identify location of mechanical spaces in the building;
- Analysis of alternative mechanical schemes at the schematic design stage shall reveal energy consumption of building systems, operating and maintenance costs on a month by month basis for a time span of one year. Accordingly the estimated energy, operating and maintenance costs shall be used in life cycle cost analyses in order to determine the most beneficial mechanical systems alternative. Life cycle cost analyses shall be based on a projected building life of 25 years;
- Carry out energy analysis on system alternatives;
- Establish an energy budget for the building and compare it to energy consumption of other similar buildings. Total energy consumed in the building shall be expressed in kWh/m². Submit a complete energy analysis;
- Identify the type of equipment to be used and provide an economic and technical explanation of the reason for the type of equipment to be used;
- List of non-Canadian products and materials proposed for the project with written justification.

2.3.4 Electrical Drawings

- Proposed basic electrical systems of significance to the early design;
- Site plan showing location of service entrances;
- Distribution diagram showing single line diagrams to distribution centers;
- Floor plans complete with locations of major electrical equipment, distribution centers and lighting layouts;

- Power outlets;
- Ceiling distribution systems for lighting, power and telecommunications;
- List of standard PWGSC details to be utilized;
- Telephone rooms, conduits and telecommunication cable systems requirements and layout;
- Provide an electrical design synopsis, describing the electrical work in sufficient detail for assessment and approval by the Department. Include feasibility and economic studies of proposed systems complete with cost figures and loads;
- List of non-Canadian products and materials proposed for the project with written justification.

2.3.5 Commissioning

- Define Commissioning Requirements;
- Identify in square meters the area to be provided to maintenance personnel, including storage and workshops for mechanical, electrical and housekeeping;
- Define project verification archives (data storage and retrieval system).

2.3.6 Sustainable Development

- Design and evaluate Schematic Design Options exploring positive environment strategies;
- Environmental Assessment and the CEAA Screening Report (to include comment on all the design options).

2.3.7 Specifications

Preliminary outline specification in Unifomat must indicate main building components and options for use of "Green" components and systems.

2.3.8 Cost Plan

- Prepare preliminary cost plan from the schematic design;
- Prepare preliminary cost analysis;
- Prepare options analysis and "what if" scenarios;
- Provide advice and recommendations on project planning in order to achieve the most cost effective project sequence;
- Identify and quantify potential risks and make contingency recommendations in order to minimize negative cost impacts;
- Advise on alternative procurement and construction strategies to create efficiencies wherever possible;

- Identify, forecast and analyze project-related issues including possible market shortages and potential price fluctuations.

2.3.9 Cost Estimate

- Prepare "class C" cost estimates;
- Quantify design and construction costs, contingencies and risks;
- Prepare and investigate costing alternatives to assist in the identification of the most cost-effective design and/or construction approach;
- Investigate and report on life-cycle costs;
- Document all unit pricing, analysis, and valuation.

2.3.10 Time Plan (Schedule)

- Prepare project master schedule;
- Identify potential risks to schedule;
- Advise on alternative procurement and construction strategies to create efficiencies wherever possible.

2.4 Deliverables

Provide the following:

- Schematic Design Drawings;
- Description of the options with recommendation of preferred solution;
- Waste management report;
- Audit plan and Phase II Waste Division Action Plan;
- Project specification amendment;
- Environmental Design Modification Report;
- Indoor Air Quality Report;
- Environmental Assessment Report and recommendations of decisions for the CEAA;
- Cost Plan, including cost analysis, "what if" scenarios, potential risks, alternative procurement and construction strategies;
- Class 'C' Cost Estimate, including methodology of the estimate, assumptions made, costing alternatives and life cycle costs;
- Report on deviation from schedule and recommend corrective measures or updated time line.

RS 3 Design Development

3.1 Intent

To further develop one of the options presented at the Schematic Design stage. The Design Development documents consist of drawings and other documents to describe the size and character of the entire project as to mechanical and electrical systems, materials and such other elements as may be appropriate.

3.2 Scope and Activities

- Obtain written approval from Departmental Representative for development of one of the proposed Schematic Design options;
- If any alterations are demanded, document all required changes, analyze the impact on all project components, and resubmit for approval if required;
- Expand and clarify the Schematic Design intent for each design discipline;
- Present the design materials to the client, design review or other committees as indicated by the Departmental Representative;
- Present the design to the government or local authorities where required;
- Ensure coordination of all disciplines' design development;
- Analyze the constructability of the project and advise on the construction process and duration;
- Based on all material available at the time, prepare a milestone schedule for the consideration with special attention to the impact on tenants;
- Continue to review all applicable statutes, regulations, codes and by-laws in relation to the design of the project;
- Provide a list of all National Master Specification (NMS) sections to be used, complete with a full draft specification, catalogue cuts and sustainable development/green choices.

3.3 Details

3.3.1 Architectural Drawings:

- Floor Plans of each floor showing all accommodation required with room names and calculated areas, including all necessary circulation areas, stairs, elevators, etc., and ancillary spaces anticipated for service use. Indicate building grids, modules, etc., and key dimensions;
- Furniture and Equipment plans;
- Cross Sections through the building(s) to show floor levels, room heights, inner corridor or court elevations, etc;
- Detail Sections of walls, building envelope design features or other special design features

- requiring illustration and explanation at this stage, including fireproofing methods;
- Demolition plans, partition plans, reflected ceiling plans, finish schedules, door/window schedules etc.

3.3.2 Structural Drawings:

- Drawings indicating the proposed structural framing system, structural materials, and other significant or unusual details proposed. Drawings may be separated or incorporated on the Architectural sheets. Include a copy of the site report on which the design is based;
- Update seismic report.

3.3.3 Mechanical Drawings

Provide drawings showing advanced development of the following:

- Site Plan showing service entrances for water supply, sanitary and storm drains and connections to public utility services, including all key invert elevations;
- Drawings showing preliminary sizing of ventilation, cooling and heating systems showing locations, and all major equipment layouts in mechanical rooms;
- Drawings of plumbing system, showing routing and sizing of major lines and location of pumping and other equipment where required;
- Drawings of the fire protection systems showing major components;
- Produce preliminary designs based on the approved schematic design. Update the energy analysis and energy budget established at the schematic design stage;
- Update the schedule of requirements;
- Provide information of all internal and external energy loads in sufficient detail to determine the compatibility of the proposal with existing services, approved concept and energy budget;
- Analysis of selected equipment and plant with schematics and calculations sufficient to justify the economy of the selected systems;
- Describe the mechanical systems to be provided and the components of each system;
- Describe the perceived operation of the mechanical systems;
- Explain what operating staff will be needed to operate the building systems and the expected functions of the operation staff;
- Describe the building systems control architecture. Provide preliminary Building Automation System (BAS) network architecture, mechanical control schematics, and sequence of operation;
- Explain what acoustical and sound control measures are to be included in the design.

3.3.4 Electrical drawings

Provide drawings showing advanced development of the following:

- Single line diagram of the power circuits with their metering and protection, including:
 - o Complete rating of equipment;
 - o Ratios and connections of Current Transformer (CT's) and Power Transformer (PT's);
 - o Description of relays when used;
 - o Maximum short circuit levels on which design is based;
 - o Identification and size of services;
 - o Connected load and estimated maximum demand on each load centre.

- Electrical plans with:
 - o Floor elevations and room identification;
 - o Legend of all symbols used;
 - o Circuit numbers at outlets and control switching identified;
 - o All conduit and wire sizes except for minimum sizes which should be given in the specification;
 - o A panel schedule with loadings for each panel;
 - o Telephone conduits system layout for ceiling/floor distribution.

- Riser diagrams for lighting, power, telephone and telecommunication cable systems, fire alarm and other systems;
- Elementary control diagrams for each system;
- Schedule for motor and controls;
- Complete lighting layout and fixture schedule clearly indicating methods of circuiting, switching and fixture mounting;
- Electric heating layout and schedule;
- Provide the following data:
 - o Total connected load;
 - o Maximum demand and diversity factors;
 - o Sizing of standby load;
 - o Short-circuit requirements and calculations showing the ratings of equipment used.

3.3.5 Commissioning

- Define operational requirements;
- Define Commissioning Requirements;
- Prepare a Commissioning Brief describing major commissioning activities for mechanical, electrical and integrated system testing;
- Define and establish project specific archives.

3.3.6 Sustainable Development

- Develop design and evaluate options exploring positive environment strategies;
- Environmental Assessment and the CEAA Screening Report (to include comment on all the design options).

3.3.7 Specifications

- Provide a list and draft specification sections of all NMS sections to be used;
- Submit outline specifications for all systems and principal components and equipment;
- Provide in the outline specifications manufacturers literature about principal equipment and system components proposed for use in this project;
- Highlight proposed "Green" materials, components and systems.

3.3.8 Cost Plan

- Update cost plan;
- Highlight changes from preliminary cost plan;
- Include cash flow analysis.

3.3.9 Cost Estimate

- Provide class "B" (substantive) cost estimate;
- Highlight changes from class "C" (indicative) cost estimate.

3.3.10 Time Plan (Schedule)

- Update time plan (Schedule);
- Highlight changes to the time plan.

3.4 Deliverables

- Floor plans including all disciplines showing all floor elements and services to detail necessary to make all design decisions and to substantially estimate the cost of the project;
- Two (2) or three (3) building sections;
- Demolition Plans;
- Architectural, structural, engineering, millwork and finishing details to determine choice of materials and finishes;
- Elevations;
- Site and building models as required;
- Outline specifications for all systems and principal components or equipment;
- Updated cost plan and cash flow;
- Class 'B' cost estimate;
- Preliminary construction schedule including long term delivery items;
- Fire Protection Engineers Report including requirements, strategies or interventions for protection of the building and its occupants;
- Project dossier detailing the basic assumptions of the project and the justifications for all major decisions;
- Commissioning Plan;
- Updated sustainable development strategy report.

RS 4 Construction Documents

4.1 Intent

To prepare bilingual coordinated architecture and engineering (A&E) drawings and specifications setting forth in detail the requirements for the construction and final cost estimate of the project.

- 33% indicates technical completeness of all working documents;
- 66% indicates substantial technical development of the project - well advanced architectural and engineering plans, details, schedules and specifications;
- 99% is the submission of complete Construction Documents ready for tender call and submission to local authorities for pre-permit purposes;
- Develop project specific Systems Operations Manual (SOM);

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- Final Submission incorporates all revisions required in the 99% version and is intended to provide PWGSC with complete construction documents for tender call.

4.2 Scope and Activities

Activities are similar at all three stages; completeness of the project development should reflect the stage of a submission.

Scope and Activities:

- Obtain Project Manager's approval for Design Development submissions (33%, 66%, 99% and final);
- Confirm format of drawings and specifications;
- Clarify special procedures (i.e. phased construction);
- Submit drawings and specifications at the required stages. (33%, 66%, 99%);
- Provide written response to all review comments and incorporate them into Construction Documents where required;
- Advise as to the progress of cost estimates and submit updated cost estimates as the project develops;
- Update the project time plan (schedule);
- Prepare a final Class 'A' (substantive) estimate. Review and approve materials and construction processes specifications to meet sustainable development objectives.

4.3 Details

4.3.1 Technical and Production Meetings

- Production of construction documents at the 33%, 66%, and 99% submissions will be reviewed during the meetings arranged by Project Manager and Consultant;
- Representatives from Client Department(s) and PWGSC support staff will be present as arranged by the Project Manager;
- Consultant shall ensure that his staff and the sub-consultant representatives attend the technical and production meetings as required;
- Consultant shall ensure all documents are coordinated with all sub-consultants and disciplines;
- Consultant shall arrange for all necessary data, progress prints, etc.;
- Consultant shall prepare minutes of the meetings and distribute copies to all participants.

4.3.2 Progress Review

- As work progresses on construction drawings, submit drawings, schedules, details, pertinent design data and updated Cost Plan and Project Schedule as required.

4.4 Deliverables

- Deliverables are similar at all three stages;
- Completeness of the project development should reflect the stage of a submission.

4.4.1 99% Submission

- Complete specification and working drawings;
- 99% Commissioning plan and Systems Operations manual;
- One copy of the complete color schedules, including textures, sheens, super-graphics, color chips and material samples;
- One copy of site information, soil investigating report, borehole logs, etc.;
- One copy of support data, studies, calculations, etc., required by PWGSC Engineering disciplines for final checking and record;
- One copy of updated Cost Plan and Project Schedule.

4.4.2 Final Submission

- This submission incorporates all revisions required by the review of the 99% submission. Provide the following:
 - o Complete set of originals of the working drawings;
 - o Complete sets of original specifications;
 - o Class 'A' estimate;
 - o Complete Commissioning Plan;
 - o Complete Systems Operations manual;
 - o One set of designated substance survey report (provided by PWGSC).
- As a safeguard against loss or damage to the originals, retain a complete set of drawings in reproducible form and one copy of specification;
- Inspection Authorities Submission (i.e. Municipal Building Departments);
- Submit and obtain approval on plans and specifications required by Inspection Authorities before tender call (i.e. Consultant is to apply for Building Permit(s)).

RS 5 Tender Call, Bid Evaluation & Construction Contract Award

5.1 Intent

To evaluate bids from qualified contractors to construct the project as per the Tender Documents.

5.2 Scope and Activities

- Attend tenderers briefing meeting(s) (i.e. Job Showing);
- Prepare addenda based on questions arising in such meetings for issue by the Contracting Authority;
- Provide the Departmental Representative with all information required by tenderers to fully interpret the Construction Documents. PWGSC will issue the addenda to all participants;
- Keep full notes of all inquiries during the bidding period and submit same to Departmental Representative at the end, for PWGSC records;
- Assist in tender evaluation by providing advice on the following:
 - o The completeness of tender documents in all respects;
 - o The technical aspects of the tenders;
 - o The effect of alternatives and qualifications which may have been included in the tender;
 - o The tenderers capability to undertake the full scope of work;
 - o The availability of adequate equipment to carry out the work.
- If PWGSC decides to re-tender the project, provide advice and assistance to the Departmental Representative;
- Revise and amend the construction documents to bring the cost of the work within the limits stipulated;
- Examine and report on any cost and schedule impact created by the issue of tender / contract addenda.

5.3 Deliverables

- Originals of drawings and specifications;
- Electronic copies of drawings and specifications;
- Addenda where needed;
- Changes to the documents, if re-tendering is necessary;
- Updated cost estimate or schedule.

RS 6 Construction & Contract Administration & Post Construction Warranty Review

6.1 Intent

To implement the project in compliance with the Contract Documents and to direct and monitor all necessary or requested changes to the scope of work during construction.

6.2 Scope and Activities

- During the implementation of the project, act on PWGSC's behalf to the extent provided in this document;
- Carry out the review of the work at intervals appropriate to determine if the work is in conformity with the Contract Documents;
- Keep PWGSC informed of the progress and quality of the work and report any defects or deficiencies in the work observed during the course of the site review;
- Ensure compliance with Commissioning Plan, update plan as necessary;
- Determine the amounts owing to the Contractor based on the progress of the work and certify payments to the contractor;
- Act as interpreter of the requirements of the Contract Documents;
- Provide cost advice during construction;
- Advise the Departmental Representative of all potential changes to scope for the duration of the implementation;
- Review the Contractor's submittals;
- Prepare and justify change orders for issue by the Departmental Representative;
- Indicate any changes or material/equipment substitutions on Record Documents;
- During the twelve (12) month warranty period investigate all defects and alleged defects and issue instructions to the Contractor;
- Prepare Systems Operating Instructions;
- Finalize Systems Operations Manual;
- Conduct a final warranty review.

6.3 Details

6.3.1 Construction Meetings

- Immediately after contract award arrange a briefing meeting with the Contractor and the Departmental Representative. Prepare minutes of the meeting and distribute copies to all

participants and to other persons agreed upon with the Departmental Representative;

- Call job meetings every 2 weeks, commencing with the construction briefing meeting. The meetings should include the job superintendent, Inspector of Construction, main sub-contractors, affected sub-consultants and Government of Canada representatives as necessary. Prepare minutes of the meeting and distribute copies to all participants within 48 hours. The Departmental Representative may invite client Departments to attend any of these meetings.

6.3.2 Project Schedule

- Obtain Project Schedule with detailed commissioning component shown separately, as soon as possible after contract award and ensure proper distribution;
- Monitor the approved construction schedule, take necessary steps to ensure that the schedule is maintained and submit a detailed report to the Departmental Representative concerning any delays;
- Keep accurate records of causes of delays;
- Make every effort to assist the Contractor to avoid delays.

6.3.3 Time Extensions

- Only the Department may approve any request for Time Extensions. Approval will be issued in writing by the Departmental Representative.

6.3.4 Cost Breakdown

- Obtain from the Contractor detail cost breakdown on standard PWGSC form and submit to the Department with the first Progress Claim.

6.3.5 Labor Requirements

- The Contractor is bound by the Contract to maintain competent and suitable workmen on the project and to comply with the Canada Department of Labor - Labor Conditions. Inform the Department of any labor situations that appear to require corrective action by the Department;
- The Consultant shall ensure that a copy of the Labor Conditions for the Contract is posted in a conspicuous place on site.

6.3.6 Bylaw Compliance

- Ensure that construction complies with applicable bylaws and regulations;
- Matters pertaining to the Department of Labour shall be referred to the Departmental Representative.

6.3.7 Construction Safety

- All construction projects that are occupied by federal employees during construction are subject to the Canada Occupational Safety and Health Act and Regulations as administered by Health and Welfare Canada and/or Provincial Regulations - whichever is more restrictive;
- In addition to the above, the Contractor must comply with the provincial and municipal safety laws and regulations, and with any instructions issued by the officers of these authorities having jurisdiction relating to construction safety;
- Ensure the Contractor is mandated to provide all required coordination, isolation, protection and reinstatement of the fire protection and suppression systems throughout construction. Notify the Property Manager each time the fire protection and suppression systems are bypassed and advise of estimated reinstatement time;
- Ensure the Contractor is mandated to provide Watchman Service as defined in FCC 301 and by the Fire Commissioner.

6.3.8 Site Visits

- Provide non-resident construction inspection services. Ensure compliance with contract documents;
- Provide services of qualified personnel who are fully knowledgeable with technical and administrative requirements of project;
- Establish a written understanding with Contractor as to what stages or aspect of the work are to be inspected prior to being covered up;
- Assess quality of work and identify in writing to the Contractor and to the Department all defects and deficiencies observed at time of such inspections;
- Inspect materials and prefabricated assemblies and components at their source or assembly plant, as necessary for the progress of the project;
- Any directions, clarifications or deficiency list shall be issued in writing to PWGSC.

6.3.9 Clarifications

- Provide clarifications on Plans and Specifications or site conditions, as required in order that the project will not be delayed.

6.3.10 Progress Reports

- Report to the Departmental Representative regularly on the progress of the work;
- Submit weekly reports.

6.3.11 Work Measurement

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- If work is based on unit prices, measure and record the quantities for verification of monthly progress claims;
 - When Contemplated Change Notice is to be issued based on Unit Prices, keep accurate account of the work. Record dimensions and quantities.

6.3.12 Detail Drawings

- Provide for the Department's information any additional detail drawings as and when required to properly clarify or interpret the contract documents.

6.3.13 Shop Drawings

- On completion of project forward three copies of reviewed shop drawings to the Department. Ensure that shop drawings include the project number and are recorded in sequence;
- Verify the number of copies of shop drawings required. Consider additional copies for Client's departmental review;
- Shop drawings shall be stamped: "Checked and Certified Correct for Construction" by the Contractor and stamped: "Reviewed" by the Consultant before return to the Contractor;
- Expedite the processing of Shop Drawings.

6.3.14 Inspection and Testing

- Prior to tender, provide Department with recommended list of tests to be undertaken, including on site and factory testing;
- Ensure all testing is detailed within Commissioning Plan;
- When Contract is awarded, assist Departmental Representative in briefing testing firm on required services, distribution of reports, communication lines etc;
- Review all test reports and take necessary action with Contractor when work fails to comply with Contract;
- Immediately notify Departmental Representative when tests fail to meet project requirements and when corrective work will affect schedule.

6.3.15 Construction Changes

- The Consultant does not have authority to change the work or the price of the Contract.
- However, the Consultant will prepare Contemplated Changes Notices (CCNs) and Change Orders (COs);
- Changes which affect cost or design concept must be approved by the Department;

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- Upon Departmental approval obtain quotations from the Contractor in detail. Review prices and forward promptly recommendations to the Department;
 - The Department will issue Consultant-prepared CCNs and COs to the Contractor, with copy to Consultant;
 - All changes, including those not affecting the cost of the project, will be covered by Change Orders;
 - The practice of "trade-offs" is not allowed.

6.3.16 Contractor's Progress Claims

- Each month the Contractor submits a progress claim for work and materials as required in the Construction Contract;
- The claims are made by completing the following forms where applicable:
 - o Request for Progress Payment;
 - o Cost Breakdown;
 - o Statutory Declaration Progress Claim.
- Review and sign designated forms and promptly forward claims to the Departmental Representative for processing;
- Submit with each progress claim:
 - o Updated schedule of the progress of the work;
 - o Photographs of the progress of the work.

6.3.17 Materials on Site

- The Contractor may claim for payment of material on site but not incorporated in the work;
- Materials must be stored in a secure place designated by the Department;
- A detailed list of materials with supplier's invoices showing the price of each item must accompany a claim; the Consultant shall check and verify this list (Detail Sheet);
- Items shall be listed separately on the Detail Sheet after the break-down list and total;
- As material is incorporated in the work the cost must be added to the appropriate Detail item and removed from the material list.

6.3.18 Acceptance Board

Inform the Department when satisfied that the project is substantially completed. The Consultant shall ensure that his/her representative, his/her sub-consultant representative, Resident On-Site Reviewer,

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Contractor and major sub-trades representatives shall form part of the Project Acceptance Board and attend all meetings as organized by the Department.

6.3.19 Interim Inspection

The Acceptance Board shall inspect the work and list all unacceptable and incomplete work on a designated form. The Board shall accept the project from the Contractor subject to the deficiencies and uncompleted work listed and priced.

6.3.20 Interim Certificates

- Payment requires completion and signing, by the parties concerned, of the following documents:
 - o Certificate of Substantial Performance (Interim);
 - o Statutory Declaration;
 - o Worker's Compensation Board Certificate.

- Verify that all items are correctly stated and ensure that completed documents and any supporting documents are supplied to the Department for processing.

6.3.21 Building Occupation

The Department or Client Department may occupy the building after the date of acceptance of the building by the Acceptance Board. The acceptance date is normally that of the Interim Certificate of Completion issued to the Contractor. As of the acceptance date, the Contractor may cancel the Contract Insurance, and the Department or Client Department (as the case may be) assumes responsibility for:

- Security of the work(s);
- Fuel and utility charges;
- Proper operation and use of equipment installed in the project;
- General maintenance and cleaning of the work(s);
- Maintenance of the site (except any landscaping maintenance covered by the contract).

6.3.22 Operation and Maintenance Data Manual

Operation and Maintenance Data Manual: 4 sets of each volume produced by Contractor in accordance with project specification and verified for completeness, relevance and format by the Mechanical and Electrical Consultants and submitted to PWGSC Departmental Representative prior to interim acceptance or actual start of operation and instruction period, whichever occurs sooner. The Contractor shall retain one copy of each volume for his record and use during the instruction period.

6.3.23 Instruction of Operating Personnel

- Make arrangements and ensure that Department's operating personnel is properly instructed on the operation of all services and systems using the final manuals as reference;

-
- Consultant to provide training sessions, as required, on the subject of design intent and systems operations. Utilize Systems operations manual for training sessions.

6.3.24 Keys

Ensure that all keys and safe combinations are delivered to the Departmental Representative and/or the Client Department as applicable.

6.3.25 Final Inspection

Inform the Departmental Representative when satisfied that all work under the contract has been completed, including the deficiency items, inspection and Acceptance as a result of the Interim Inspection. The Department reconvenes the Acceptance Board which makes a final inspection of the project. If everything is satisfactory the Board makes final acceptance of the project from the Contractor.

6.3.26 Final Certificate

- The final payment requires completion and signing, by the parties concerned, of the following documents:
 - o Certificate of Completion (Final);
 - o Statutory Declaration;
 - o Workmen's Compensation Clearance Certificate;
 - o Hydro Certificate.
- Verify that all items are correctly stated and ensure that completed documents and any supporting documents are furnished to the Department for processing.

6.3.27 Take-over

- The official take-over of the project, or parts of the project, from the Contractor is established by the PWGSC Project Team which includes the Consultant and the Client Department. The date of Interim Certificate of Completion and the Final Certificate of Completion signifies commencement of the 12 month warranty period for work completed on the date of each certificate in accordance with the General Conditions of the Contract;
- Provide Department with original copy of Contractor's warranties for all materials and work covered by an extended warranty or guarantee, according to the conditions of the specifications. Verify their completeness and extent of coverage.

6.3.28 As-Built and Record Drawings and Specifications

- Following the take-over, obtain as-built marked-up hard copy from the Contractor;
- Show significant deviations in construction from the original Contract drawings, including changes shown on Post-Contract Drawings, changes resulting from Change Orders or from On Site Instructions;

- Check and verify all as-built records for completeness and accuracy and submit to PWGSC;
- Produce Record Drawings by incorporating As-Built information into project drawings;
- Submit Record Drawings and Specifications in number and format required by the Consultant Agreement within 8 weeks of final acceptance;
- Provide a complete set of final shop drawings.

6.4 Deliverables

- Written reports from site visits including persons involved;
- Written reports on the progress of the work and the cost of the project at the end of each month;
- Additional detail drawings when required to clarify, interpret or supplement the Construction Documents;
- Post contract drawings;
- Interim or Final certificates;
- Debrief of Commissioning Activities;
- As built records;
- Warranty deficiency list;
- Report on Final Warranty Review.

RS 7 Risk Management (all stages)

7.1 Intent

The consultant is to provide support to the Departmental Representative in identifying risks throughout the project life cycle.

7.2 General

Risk Management Process:

- Identify risk events based on past experience and using proposed checklist or other available lists;
- Qualify/quantify probability of risk event (Low, Medium, High) and their impact (Low, Medium, High);
- Prioritize risk events (i.e. concentrate efforts on risk events with High probability and Medium to High impact);
- Develop risk response (i.e. evaluate alternatives for mitigation. This is the real added-value of risk management);

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- Implement risk mitigation.

7.3 Deliverables

- Prepare Risk Management Reports at Design Development, 66% Design Documents, and 100% Design Documents stages;
- Include input from all sub-consultants, and from Client;
- Take steps to implement risk mitigation as required. This may include (but is not limited to) further recommendations, analysis, investigations, site meetings, site supervision, etc.

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SUBMISSION REQUIREMENTS AND EVALUATION (SRE)

- SRE 1 General Information
- SRE 2 Proposal Requirements
- SRE 3 Submission Requirements and Evaluation
- SRE 4 Price of Services
- SRE 5 Total Score
- SRE 6 Submission Requirements - Checklist

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SUBMISSION REQUIREMENTS AND EVALUATION

SRE 1 GENERAL INFORMATION

1.1 Reference to the Selection Procedure

An 'overview of the selection procedure' can be found in General Instructions to Proponents (GI 9).

1.2 Submission of Proposals

The Proponent is responsible for meeting all submission requirements. Please follow detailed instructions in "Submission of Proposals", General Instructions to Proponents (GI 10).

1.3 Calculation of Total Score

For this Standing Offer the Total Score will be established as follows:

Technical Rating x 90%	=	Technical Score (Points)
<u>Price Rating x 10%</u>	=	<u>Price Score (Points)</u>
Total Score		Max. 100 Points

SRE 2 PROPOSAL REQUIREMENTS

2.1 Requirement for Proposal Format

The following proposal format information should be implemented when preparing the proposal.

1. Submit one (1) bound original plus three (3) bound copies of the proposal
2. Paper size should be - 216mm x 279mm (8.5" x 11")
3. Minimum font size - 11 point Times or equal
4. Minimum margins - 12 mm left, right, top, and bottom
5. Double-sided submissions are preferred
6. One (1) 'page' means one side of a 216mm x 279mm (8.5" x 11") sheet of paper
7. 279mm x 432mm (11" x 17") fold-out sheets for spreadsheets, organization charts etc. will be counted as two pages.
8. The order of the proposals should follow the order of the Request for Standing Offer SRE 3 section.

2.2 Specific Requirements for Proposal Format

The maximum number of pages (including text and graphics) to be submitted for the Rated Requirements under SRE 3.2 is thirty-one (31) pages.

The following are not part of the page limitation mentioned above;

- Covering letter
- Declaration/Certifications Form (Appendix A)
- Integrity Provisions –Required Documentation
- Front page of the Request for Standing Offer document
- Front page of revision(s) to the Request for Standing Offer document
- Price Proposal Form (Appendix B)

Consequence of non-compliance: any pages which extend beyond the above page limitation and any other attachments will be extracted from the proposal and will not be forwarded to the PWGSC Evaluation Board members for evaluation.

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SRE 3 SUBMISSION REQUIREMENTS AND EVALUATION

3.1 MANDATORY REQUIREMENTS

Failure to meet the mandatory requirements will render the proposal as non-responsive and no further evaluation will be carried out.

3.1.1 Declaration/Certifications Form

Proponents must complete, sign and submit the following:

A. Appendix A, Declaration / Certifications Form as required.

3.1.2 Licensing, Certification or Authorization

The Proponent shall be authorized to provide engineering services and must include a mechanical and electrical engineer licensed certified or otherwise authorized to provide the necessary professional services to the full extent that may be required by provincial or territorial law in the provinces of Ontario and Quebec. If the Proponent is licensed to practise in only one of the two provinces then that Proponent must be eligible and willing to be licensed in the province in which they are not licensed.

You must indicate current license or how you intend to meet the provincial licensing requirements.

3.1.3 Integrity Provisions – Required documentation

In accordance with the Ineligibility and Suspension Policy (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Proponent must provide, **as applicable**, to be given further consideration in the procurement process, the required documentation as per General instructions to Proponents (GI), Integrity Provisions – Proposal, **section 3a**.

3.2 RATED REQUIREMENTS

Proposals meeting the mandatory requirements will be evaluated in accordance with the following criteria. The clarity of the proposal writing will form part of the evaluation (use of language, document structure, conciseness and completeness of the response):

Please note that category levels referred to in this section are defined as:

- Senior: having minimum fifteen (15) years of professional experience,
- Intermediate: having six (6) to fifteen (15) years of professional experience, and
- Junior: having three (3) to six (6) years of professional experience.
- Experience means experience in district heating and cooling engineering.

3.2.1 Comprehension of the Scope of Services (suggested # of pages: 2)

1. *What we are looking for:*
A demonstration of the understanding of the overall requirements for services, including specific deliverables, expected approaches, technical expectations, and coordination requirements, especially in delivering government projects.

-
2. *What the Proponent should provide:*
 - a) scope of services - detailed list of services;
 - b) summary of your proposed typical work breakdown structure, i.e. resources assigned, time schedule, level of effort in hours;
 - c) broader goals (federal image, sustainable development, sensitivities);
 - d) risk management strategy;
 - e) project management approach to working with PWGSC (understanding of PWGSC management structure, client environment, standing offer process, working with the government in general);

3.2.2 Team Approach / Management of Services (suggested # of pages: 2)

1. *What we are looking for:*

How the team will be organized in its approach and methodology in the delivery of the Required Services.
2. *What the Proponent should provide:*

A description of:

 - a) Management and organization (reporting structure);
 - b) Assignment of the resources with description of their roles, responsibilities and proposed category levels of the personnel who will perform the services resulting from individual call-ups.
 - c) Availability of back-up personnel for all resources listed under item (2b);
 - d) Description of the firm's approach to responding to the individual call-ups which will arise as a result of this standing offer;
 - e) The design technologies which the firm will apply to develop design documents;
 - f) How the proponent will manage the quality of their work;
 - g) Demonstration of how the team intends to meet the 'Project Response Time Requirements' ;
 - h) Conflict resolution methods.

3.2.3 Past Experience (suggested # of pages: 5)

1. *What we are looking for:*

Demonstration that over at least the past five (5) years, the Proponent has participated in a range of projects requiring a full scope of services in accordance with the Required Services (RS) section. The Proponent's participation in these projects should have involved the scope of services listed in the Required Services (RS) section.
2. *What the Proponent should provide:*
 - a) A brief description of a maximum of five (5) significant projects completed during the last five (5) years by the proponent, or its senior personnel;
 - b) For the above projects, include the names of senior personnel and project personnel who were involved as part of the project team and their respective responsibilities, as well as the scope, engineering fee and construction budget per discipline;
 - c) Indicate the dates the services were provided for the listed projects;
 - d) Scope of services rendered, project objectives, constraints and deliverables; and
 - e) Client references - name, address, phone and fax of client contact at working level. Reference checks may be completed if deemed necessary.

-
3. The Proponent (as defined in General Instructions GI 1) must possess the knowledge on the above projects. Past project experience from entities other than the Proponent will not be considered in the evaluation unless these entities form part of a joint venture Proponent.
 4. Please indicate those projects which were carried out in joint venture and the responsibilities of each of the involved entities in each project.

3.2.4 Senior Personnel Expertise and Experience (suggested # of pages: 2)

1. *What we are looking for:*
A demonstration that the Proponent has senior personnel in-house with the capability, capacity and expertise in each area listed in the Required Services (RS) section.
2. *What the Proponent should provide:*
 - a) Submit a maximum of two (2) curriculum vitae (C.V.) of senior personnel.
 - b) Each c.v. should clearly indicate:
 - i. The years of experience the senior personnel has in the provision of the services specified in the Required Services (RS) section,
 - ii. The number of years with the firm,
 - iii. Professional accreditation,
 - iv. Their permanent location of work, and
 - v. Accomplishments/achievements/awards.
3. In-house personnel means personnel within the Proponent's organization (see definition of Proponent in General Instructions GI 1). Past expertise and experience of personnel not within the Proponent's (or joint venture Proponent's) organization will not be considered in the evaluation.

3.2.5 Project Personnel Expertise and Experience (suggested # of pages: 4)

1. *What we are looking for:*
A demonstration that the Proponent has project personnel in-house with the capability, capacity and expertise to provide the required services and deliverables listed in the Required Services (RS) section.
2. *What the Proponent should provide:*
 - a. Submit a maximum of four (4) C.V.'s of project personnel which will perform the majority of the work resulting from the individual Call-ups.
 - b. Each c.v. should clearly indicate:
 - i. The years of experience the project personnel has in the provision of the services specified in the Required Services (RS) section,
 - ii. The number of years with the firm,
 - iii. Their proposed category level,
 - iv. Professional accreditation,
 - v. Their permanent location of work; and
 - vi. Accomplishments/achievements/awards.
3. In-house personnel means personnel within the Proponent's organization (see definition of Proponent in General Instructions GI 1). Past expertise and experience of personnel not within the Proponent's (or joint venture Proponent's) organization will not be considered in the evaluation.

3.2.6 Hypothetical Projects (suggested # of pages: 16)

1. *What we are looking for:*
Describe the approach and methodology that you would employ to deliver the project in a general written response only.

The clarity of the report writing will form part of the evaluation (use of language, document structure, conciseness and completeness of the response).

2. *What the Proponent should provide for each hypothetical project:*
 - a. Description of the approach and methodology that you would employ to solve the problem. Where applicable, consideration should be given to:
 - i. Applicable codes, standards and regulations; including European Standards that may apply and where such standards are not available in Canada;
 - ii. Work sequencing and prioritization;
 - iii. Involvement and specific needs of PWGSC and other potential stakeholders;
 - iv. PWGSC priorities such as sustainability, heritage conservation, etc.;
 - b. Summary of your proposed work breakdown structure, i.e. scope of work, resources assigned, time schedule, level of effort in terms of number of hours of all identified resources and their proposed category level;
 - c. Appropriateness of assigned resources;
 - d. A description of third party sub-consultant requirements to effectively complete the required services;
 - e. Identification of areas of concern, issues or risks that may affect the project implementation along with proposed management options.
 - f. Problem-solving methodology (client involvement, PWGSC involvement, other government agency involvement, creative approaches to solving problems).

Calculation of a fee for the provision of these services is not required.

3. *The Facts:*
When responding to the following hypothetical fact situations, be advised that the hypothetical is to be used for evaluation purposes only. Areas and details in the hypothetical are provided only to give the Proponent sufficient material from which to develop an outline of their approach and methodology to the resolution of the issues. Proponents are supposed to make all necessary assumption required for proper analysis. All such assumptions shall be clearly identified.

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MECHANICAL PROJECT 1

Project Title: Steam distribution system evaluation and recapitalization

High pressure steam is distributed from a central heating plant to roughly 40 buildings via an underground network of steam and condensate distribution piping. The steam is primarily used for space heating and humidification with the exception of certain buildings that also use the steam to produce domestic hot water. Most of the pipe mains are located in underground walkable tunnels; however some branch piping is located in various types of underground trench. The buildings served by the system vary in size (e.g., single story to 10 floors) and are primary office buildings with small portion of commercial shops. All buildings operate throughout the year during regular office hours and cannot have their operations disrupted for extended periods of time. Three buildings have partial 24/7 operation. The distribution system was originally designed and installed 60 years ago. Over time the size of the campus facility increased and the distribution system was modified accordingly. Overall the distribution system is described by operating personal as being in "bad shape," having areas with significant pipe corrosion and decaying tunnel structure. Additionally, due to the ongoing expansion of the campus over the years it's been suggested that the parts of the system may be significantly undersized. Some operations personal are claiming the tunnels are nearing unsafe conditions. The system needs to be thoroughly evaluated and repaired/replaced as deemed necessary. The installed plant steam production capacity is 75 000 kg/hr at 1275kPa.

Services required:

- Pre-Design Services
- Schematic Design
- Design Development
- Construction Documents
- Tender Call, Bid Evaluation and Construction Contract Award
- Construction and Contract Administration
- Post-Construction Warranty Review
- Risk Management

MECHANICAL PROJECT 2

Project Title: District Heating Conversion

A government office complex, built in the 1960s serves about 15 buildings with a peak load of about 12 MWth. The system operates on high temperature hot water, about 145°C supply temperature. The central heating plant has three 10MWth boilers. During the past 20 years, a number of buildings have disconnected or been demolished and the heating plant has excess capacity for the current load. The future of the campus demand is uncertain at this time as several buildings will be either demolished or replaced by significantly larger buildings. Most of the distribution piping is direct buried with unknown condition. The boilers are near end of life. Some buildings have low pressure steam, generated from the high temperature hot water through heat exchangers, for laundry or kitchen applications. All buildings have heat exchangers to isolate the in-building mechanical systems from the district heating system hot water.

Based on a review of best practices, PWGSC has decided to transform the district heating system to hot water that will operate with supply temperatures of less than 95C.

Services required:

- Pre-Design Services

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Schematic Design
Design Development
Construction Documents
Tender Call, Bid Evaluation and Construction Contract Award
Construction and Contract Administration
Post-Construction Warranty Review
Risk Management

MECHANICAL PROJECT 3

Project Title: Boiler replacement

A Central heating and cooling plant has identified the requirement to replace a 12 500 kW superheated steam boiler that is beyond its service life. The plant currently has four boilers, with a total installed steam production capacity of 62 500 kW. Three of the boilers are between ten and twenty years old. Half of the steam produced by the boilers is superheated to supply existing (1970's era) steam turbine driven chillers. Present winter demand for saturated steam is 25 000 kW. The boiler is located between a chiller and electrical vault, with partial mezzanine above. The plant has a mix of modern and outdated ancillary equipment and electrical services. Some saturated steam is required throughout the summer for domestic water and process loads. There are several new client buildings planned to be commissioned within the next five years that will increase peak steam demand by 20 000 kW. The plant is situated in an urban environment and was constructed in the late 1950's, with few structural or architectural upgrades. Client buildings are a mix of high profile office and commercial retail.

Services required:

- Analysis of Project Scope of Work
- Investigation and Report
- Design Concept
- Design Development
- Construction Documents, Pre-Tender Construction Cost Estimate and Project Schedule
- Tender Call, Bid Evaluation and Construction Contract Award
- Construction and Contract Administration
- Post-Construction Warranty Review
- Commissioning
- Bilingual Construction Documents

ELECTRICAL PROJECT 1

Project Title: Plant Electrical System Evaluation and Upgrade

An aged central heating and cooling plant recently had new equipment installed (e.g., a new heat pump) that significantly increased the overall electrical load. Future mechanical upgrades will be done in three phases over next 3 to 8 years. Total estimated mechanical loads for each phase are identified, but may be revised to closely reflect the future loads. The project to install the equipment did not give ample consideration to the plant's emergency back-up generators and ancillary equipment, more specifically the total electrical load on the plant now exceeds the generators output capacity. Part of electrical system (diesel generation set and medium 4.16 kV electrical distribution) is brand new, but not sufficient for 100% of new mechanical loads. After further investigation it's discovered the plant's electrical system is in a general state of disarray: panels are filled with equipment that isn't labelled or worse incorrectly so; there are areas having clusters of unlabeled wires that may or may not be in use; some critical operational controls equipment is supported by UPS devices (of questionable size) while

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some isn't; the plant is filled with conduit having an unknown purpose. Adding to the general confusion is the plants operating controls whose upgrades through the years has left behind remains of intermingling control wiring and equipment that is not consistently labelled or in use. The plant's electrical system requires a complete evaluation and upgrade where required to meet long term mechanical requirements. The disruption from this upgrade must be kept to an absolute minimum given the plant has been mandated to provide continuous service to a number of critical building. The electrical system upgrades must clearly show flexibility and reliability of the new system, allowing future ease of systems expansion and maintenance.

Services required:

Pre-Design Services

Schematic Design

Design Development

Construction Documents

Tender Call, Bid Evaluation and Construction Contract Award

Construction and Contract Administration

Post-Construction Warranty Review

Risk Management

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3.3 EVALUATION AND RATING

Proposals that are responsive (i.e. which meet all the mandatory requirements set out in the Request for Standing Offer) will be reviewed, evaluated and rated by a PWGSC Evaluation Board. In the first instance, price envelopes will remain sealed and only the technical components of the proposal will be evaluated in accordance with the following to establish Technical Ratings:

Criterion	Weight Factor	Rating	Weighted Rating
Comprehension of the Scope of Services	0.5	0-10	0 - 5
Team Approach / Management of Services	1.0	0 - 10	0 - 10
Past Experience	2.0	0 - 10	0 - 20
Senior Personnel Expertise and Experience	1.5	0 - 10	0 - 15
Project Personnel Expertise and Experience	1.5	0 - 10	0 - 15
Hypothetical Projects	3.5	0 - 10	0 - 35
Total	10.0		0 - 100

To be considered further, proponents must achieve a minimum weighted rating of sixty (60) out of the hundred (100) points available for the rated technical criteria as specified above.

No further consideration will be given to proponents not achieving the pass mark of sixty (60) points.

Generic Evaluation Table

PWGSC Evaluation Board members will evaluate the strengths and weaknesses of the Proponent's response to the evaluation criteria and will rate each criterion with even numbers (0, 2, 4, 6, 8 or 10) using the generic evaluation table below:

	INADEQUATE	WEAK	ADEQUATE	FULLY SATISFACTORY	STRONG
0 point	2 points	4 points	6 points	8 points	10 points
Did not submit information which could be evaluated	Lacks complete or almost complete understanding of the requirements.	Has some understanding of the requirements but lacks adequate understanding in some areas of the requirements.	Demonstrates a good understanding of the requirements.	Demonstrates a very good understanding of the requirements.	Demonstrates an excellent understanding of the requirements.

	Weaknesses cannot be corrected	Generally doubtful that weaknesses can be corrected	Weaknesses can be corrected	No significant weaknesses	No apparent weaknesses
	Proponent do not possess qualifications and experience	Proponent lacks qualifications and experience	Proponent has an acceptable level of qualifications and experience	Proponent is qualified and experienced	Proponent is highly qualified and experienced
	Team proposed is not likely able to meet requirements	Team does not cover all components or overall experience is weak	Team covers most components and will likely meet requirements	Team covers all components - some members have worked successfully together	Strong team - has worked successfully together on comparable projects
	Sample projects not related to this requirement	Sample projects generally not related to this requirement	Sample projects generally related to this requirement	Sample projects directly related to this requirement	Leads in sample projects directly related to this requirement
	Extremely poor, insufficient to meet performance requirements	Little capability to meet performance requirements	Acceptable capability, should ensure adequate results	Satisfactory capability, should ensure effective results	Superior capability, should ensure very effective results

SRE 4 PRICE OF SERVICES

All price proposal envelopes corresponding to responsive proposals which have achieved the pass mark of sixty (60) points are opened upon completion of the technical evaluation. When there are four or more responsive proposals, an average price is determined by adding all the price proposals together and dividing the total by the number of price proposals being opened. This calculation will not be conducted when one, two or three responsive proposals are received.

All price proposals which are greater than 25 percent above the average price will cause their respective complete proposals to be set aside and receive no further consideration.

The remaining price proposals are rated as follows:

1. The lowest price proposal receives a Price Rating of 100
2. The second, third, fourth and fifth lowest prices receive Price Ratings of 80, 60, 40, and 20 respectively. All other price proposals receive a Price Rating of 0.
3. On the rare occasions where two (or more) price proposals are identical, the matching price proposals receive the same rating and the corresponding number of following ratings are skipped.

The Price Rating is multiplied by the applicable percentage to establish the Price Score.

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SRE 5 TOTAL SCORE

Total Scores will be established in accordance with the following:

Rating	Possible Range	% of Total Score	Score (Points)
Technical Rating	0 - 100	90	0 - 90
Price Rating	0 - 100	10	0 - 10
Total Score		100	0 - 100

The proposals will be ranked in order from the highest to the lowest using the total score (technical plus price). The proponents submitting the highest ranked proposals will be recommended for issuance of a standing offer. In the case of a tie, the Proponent submitting the lower price for the services will be selected. Canada reserves the right to issue a single Standing Offer.

SRE 6 SUBMISSION REQUIREMENTS - CHECKLIST

The following list of documents and forms is provided with the intention of assisting the Proponent in ensuring a complete submission. The Proponent is responsible for meeting all submission requirements.

Please follow detailed instructions in "Submission of Proposals", General Instructions to Proponents (GI 10).

- Declaration / Certifications Form - completed and signed form provided in Appendix A
- Integrity Provisions – Required documentation – **as applicable**, in accordance with the [Ineligibility and Suspension Policy](http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>) and as per General instructions to Proponents (GI), Integrity Provisions – Proposal, **section 3a**.
- Integrity Provisions - Declaration of Convicted Offences – **with its bid, as applicable**, in accordance with the Ineligibility and Suspension Policy (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>) and as per General instructions to Proponents (GI), Integrity Provisions – Proposal, **section 3b**.
- Proposal - 1 original + 3 copies
- Front page of Request for Standing Offer
- Front page of Revision(s) to a Request for Standing Offer

In a separate envelope:

- Price Proposal Form - one (1) completed and submitted in a separate envelope

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APPENDIX A

Declaration/Certifications Form

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Declaration / Certifications Form (page 1 of 5)

Name of Proponent:

Street Address:

Mailing Address (if different than street address)

City:

City:

Prov./Terr./State:

Prov./Terr./State:

Telephone Number: ()

Fax Number: ()

E-Mail:

Procurement Business Number:

Type of Organization

Sole Proprietorship

Partnership

Corporation

Joint Venture

Size of Organization

Number of Employees _____

Graduate Architects/ _____

Prof. Engineers: _____

Other Professionals _____

Technical Support _____

Other _____

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Declaration / Certifications Form (page 2 of 5)

Federal Contractors Program for Employment Equity - Certification

I, the Proponent, by submitting the present information to the Contracting Authority, certify that the information provided is true as of the date indicated below. The certifications provided to Canada are subject to verification at all times. I understand that Canada will declare a proposal non-responsive, or may set-aside a Standing Offer, or will declare a consultant in default, if a certification is found to be untrue, whether during the proposal evaluation period, during the Standing Offer period, or during the contract period. Canada will have the right to ask for additional information to verify the Proponent's certifications. Failure to comply with any request or requirement imposed by Canada may render the proposal non-responsive, may result in the Standing Offer set-aside, or constitute a default under the contract.

For further information on the Federal Contractors Program for Employment Equity visit [Employment and Social Development Canada \(ESDC\)-Labour's website](#).

Date: _____ (YY/MM/DD) (If left blank, the date will be deemed to be the RFSO closing date.)

Complete both A and B.

A. Check one of the following:

- A1. The Proponent certifies having no work force in Canada.
- A2. The Proponent certifies being a public sector employer.
- A3. The Proponent certifies being a federally regulated employer being subject to the *Employment Equity Act*.
- A4. The Proponent certifies having a combined work force in Canada of less than 100 permanent full-time and/or permanent part-time employees.

A5. The Proponent certifies having a combined workforce in Canada of 100 or more employees; and

- A5.1. The Proponent certifies already having a valid and current Agreement to Implement Employment Equity (AIEE) in place with ESDC-Labour.

OR

- A5.2. The Proponent certifies having submitted the Agreement to Implement Employment Equity (LAB1168) to ESDC-Labour. As this is a condition to issuance of a standing offer, proceed to completing the form Agreement to Implement Employment Equity (LAB1168), duly signing it, and transmit it to ESDC-Labour.

B. Check only one of the following:

- B1. The Proponent is not a Joint Venture.

OR

- B2. The Proponent is a Joint venture and each member of the Joint Venture must provide the Contracting Authority with a completed Federal Contractors Program for Employment Equity - Certification. (Refer to the Joint Venture section of the General Instructions to Proponents)

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Declaration / Certifications Form (page 3 of 5)

Former Public Servant (FPS) - Certification

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to FPS, proponents must provide the information required below before the issuance of a standing offer. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of proposals is completed, Canada will inform the Proponent of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the proposal non-responsive.

Definitions

For the purposes of this clause,

"former public servant" is any former member of a department as defined in the *Financial Administration Act*, R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- (a) an individual;
- (b) an individual who has incorporated;
- (c) a partnership made of former public servants; or
- (d) a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

"lump sum payment period" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"pension" means a pension or annual allowance paid under the *Public Service Superannuation Act* (PSSA), R.S., 1985, c. P-36, and any increases paid pursuant to the *Supplementary Retirement Benefits Act*, R.S., 1985, c. S-24 as it affects the PSSA. It does not include pensions payable pursuant to the *Canadian Forces Superannuation Act*, R.S., 1985, c. C-17, the *Defence Services Pension Continuation Act*, 1970, c. D-3, the *Royal Canadian Mounted Police Pension Continuation Act*, 1970, c. R-10, and the *Royal Canadian Mounted Police Superannuation Act*, R.S., 1985, c. R-11, the *Members of Parliament Retiring Allowances Act*, R.S., 1985, c. M-5, and that portion of pension payable to the *Canada Pension Plan Act*, R.S., 1985, c. C-8.

Former Public Servant in Receipt of a Pension

As per the above definitions, is the Proponent a FPS in receipt of a pension? YES () NO ()

If so, the Proponent must provide the following information, for all FPS in receipt of a pension, as applicable:

- (a) name of former public servant;
- (b) date of termination of employment or retirement from the Public Service.

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Declaration / Certifications Form (page 4 of 5)

By providing this information, proponents agree that the successful Proponent's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with Contracting Policy Notice: 2012-2 and the Guidelines on the Proactive Disclosure of Contracts.

Declaration / Certifications Form

Work Force Adjustment Directive

Is the Proponent a FPS who received a lump sum payment pursuant to the terms of a Work Force Adjustment Directive? YES () NO ()

If so, the Proponent must provide the following information:

- (a) name of former public servant;
- (b) conditions of the lump sum payment incentive;
- (c) date of termination of employment;
- (d) amount of lump sum payment;
- (e) rate of pay on which lump sum payment is based;
- (f) period of lump sum payment including start date, end date and number of weeks;
- (g) number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including the Goods and Services Tax or Harmonized Sales Tax.

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Declaration / Certifications Form (page 5 of 5)

Name of Proponent:

This Declaration forms part of the offer.

Education, Professional Accreditation and Experience:

All statements made with regard to the education, professional accreditation and the experience of individuals proposed for providing services under the Standing Offer are accurate and factual, and we are aware that Canada reserves the right to verify any information provided in this regard and that untrue statements may result in the proposal being declared non-responsive. Should a verification by Canada disclose untrue statements, Canada shall have the right to treat any standing offer resulting from this solicitation as being in default and to terminate it accordingly.

DECLARATION:

I, the undersigned, being a principal of the Proponent, hereby certify that the information given on this form and in the attached Proposal is accurate to the best of my knowledge.

Name (print): _____

Capacity: _____

Signature _____

Telephone Number: () _____

Fax Number: () _____

E-mail: _____

Date: _____

During proposal evaluation period, PWGSC contact will be with the above named person.

This Appendix A should be completed and submitted with the proposal, but may be submitted afterwards as follows: if any of these required certifications is not completed and submitted with the proposal, the Contracting Authority will inform the Proponent of a time frame within which to provide the information. Failure to comply with the request of the Contracting Authority and to provide the certifications within the time frame provided will render the proposal non-responsive.

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APPENDIX B

Price Proposal Form

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APPENDIX B - PRICE PROPOSAL

INSTRUCTIONS

1. Complete price proposal form and submit in a separate sealed envelope, with the Proponent's name, Solicitation Number, and "Price Proposal Form" typed on the outside.
2. Price proposals are not to include Applicable Taxes and will be evaluated in Canadian Dollars.
3. Proponents are not to alter or add information to the form.
4. In order to ensure that fair and competitive hourly rates are received for each of the positions listed, the following requirement must be strictly adhered to: proponents must provide an hourly rate for each listed position. In the event that the firm consists of fewer personnel than listed, provide an hourly rate that corresponds with each position listed. The hourly rate provided must be equal to or greater than the hourly rate provided for the position listed below it. For example, if the firm does not have an Intermediate Personnel, the hourly rate provided must be equal to or greater than the hourly rate provided for the Junior Personnel. The hourly rate for any given category of personnel cannot be \$0 or nil value. Failure to insert an hourly rate for each position listed will render your proposal non-responsive.
5. Offeror shall provide a single fixed hourly all-inclusive rate for each category of personnel.
 - a. Fixed hourly all-inclusive rate for each category of personnel provided by the offeror will be used for years 1 and 2 of the Standing Offer.
 - b. The Standing Offer rates for years 3 and 4 will be determined by using the rates provided for years 1 and 2 adjusted by a percentage increase of 2.0%
 - c. The Standing Offer rates for year 5 and 6 will be determined by using the rates provided for years 3 and 4 adjusted by a percentage increase of 2%.
6. Travel and Living Expenses: Firms are advised that any travel time and travel-related expenses associated with the delivery of services within a 50 km radius of Parliament Hill are to be calculated as an integral part of the hourly rates. For delivery of services outside of this 50 km radius, travel-related expenses will be paid (with prior approval of the Departmental Representative) in accordance with current National Joint Council Travel Directive.
7. Training: Firms are advised that all training time is to be calculated as an integral part of the hourly all-inclusive rates, for all training provided by PWGSC.
8. Fixed hourly rates for each Category of Personnel are to be provided in columns B and multiplied by the weight factor % in column A (provided for evaluation purpose only). Sub-totals of columns C are added for evaluation purposes.
9. In the event that a mathematical error occurs in carrying over the totals, PWGSC will correct the totals to ensure the fairness of the Offers.

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APPENDIX B - PRICE PROPOSAL

Name of Proponent: _____

Address: _____

	A	B	C
Category of Personnel	Weight Factor	Fixed Hourly Rate	Total A X B
Partners or principals of the firm	5%	\$	\$
Senior Personnel	25%	\$	\$
Intermediate Personnel	45%	\$	\$
Junior Personnel	25%	\$	\$
Total	100%		\$

END OF PRICE PROPOSAL FORM



Doing Business with the National Capital Area (NCA)



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Appendices

Appendix 'A'	Checklist for the Submission of Construction Documents
Appendix 'B'	Sample Addendum Format
Appendix 'C'	Sample Index for Drawings and Specifications
Appendix 'D'	User Manual on Directory Structure and Naming Conventions Standards for Construction Tender Documents on CDROM, dated May 2005
Appendix 'E'	Basic Reference Guide on Converting Construction Drawings into Portable Document Format (PDF), dated May 2005

SECTION 1 INTRODUCTION

This document must be used in conjunction with the Terms of Reference (TOR), as the two documents are complimentary. The TOR describes project-specific requirements while this document deals with information common to all projects. In case of a conflict between the two documents, the requirements of the TOR override this document.

SECTION 2 PWGSC NATIONAL CADD STANDARD

Drawings shall be in accordance with PWGSC National CADD Standards and Canadian Standards Association (CSA) B78.3.

Refer to:

<http://www.tpsgc-pwgsc.gc.ca/biens-property/cdao-cadd/index-eng.html>

The above link is subject to change. The Consultant shall check with the Project Manager to ensure that the link and related information are current and relevant with regards to PWGSC National CADD Standards.

SECTION 3 GUIDE TO PREPARATION OF CONSTRUCTION DOCUMENTS FOR PWGSC

1 Purpose

This document provides direction in the preparation of construction contract documents (namely specifications, drawings and addenda) for Public Works and Government Services Canada (PWGSC).

Drawings, specifications and addenda must be complete and clear, so that a contractor can prepare a bid without guesswork. Standard practice for the preparation of construction contract documents requires that:

- drawings are the graphic means of showing work to be done, as they depict shape, dimension, location, quantity of materials and relationship between building components.
- specifications are written descriptions of materials and construction processes in relation to quality, colour, pattern, performance and characteristics of materials, installation and quality of work requirements.
- Addenda are changes to the construction contract documents or tendering procedures, issued during the tendering process.

2 Principles of PWGSC Contract Documents

PWGSC's contract documents are based on common public procurement principles. PWGSC does not use Canadian Construction Document Committee (CCDC) documents.

The terms and conditions are prepared and issued by PWGSC as well as other related bidding and contractual documents. For information, the clauses are available on the following web site: <http://sacc.pwgsc.gc.ca/sacc/query-e.jsp>. Any questions should be directed to the Project Manager.

3 Quality Assurance

Consultants are required to undertake their own quality control process and must review, correct and coordinate (between disciplines) their documents before sending them to PWGSC.

SPECIFICATIONS

1 National Master Specification

The National Master Specification (NMS) is a master construction specification available in both official languages, which is divided into 48 Divisions and used for a wide range of construction and/or renovation projects. In preparing project specifications, the Consultant must use the current edition of the NMS in accordance with the "NMS User's Guide".

The Consultant retains overriding responsibility for content and shall edit, amend and supplement the NMS as deemed necessary to produce an appropriate project specification free from conflict and ambiguity.

2 Specification Organization

Narrowscope sections describing single units of work are preferred for more complex work, however, broadscope sections may be more suitable for less complex work. Use either the NMS 1/3 - 2/3 page format or the Construction Specifications Canada full-page format.

Start each Section on a new page and show Project Number, Section Title, Section Number and Page Number on each page. Specification date, project title, and consultant's name are not to be indicated.

3 Terminology

Use the term "Departmental Representative" instead of Engineer, PWGSC, Owner, Consultant or Architect. "Departmental Representative" means the person designated in the Contract, or by written notice to the Contractor, to act as the Departmental Representative for the purposes of the Contract, and includes a person, designated and authorized in writing by the Departmental Representative to the Contractor.

Notations such as: "verify on site", "as instructed", "to match existing", "example", "equal to" or "equivalent to", "to be determined on site by "Departmental Representative", should not be indicated in the specifications as this promotes inaccurate and inflated bids. Specifications must permit bidders to calculate all quantities and bid accurately. If quantities are impossible to identify (i.e. cracks to be repaired) give an estimated quantity for bid purposes (unit prices). Ensure that the terminology used throughout the specifications is consistent and does not contradict the applicable standard construction contract documents.

4 Dimensions

Dimensions are to be in metric only (no dual dimensioning).

5 Standards

As references in the NMS may not be up to date, it is the responsibility of the consultant to ensure that the project specification uses the latest applicable edition of all references quoted. The following is a list of some of the Internet websites which provide the most current publications of standards for reference in the construction specification document.

- CSA standards: <http://www.csa.ca>
- CGSB standards: <http://www.pwgsc.gc.ca/cgsb>
- ANSI standards: <http://www.ansi.org>
- ASTM Standards: <http://www.astm.org>
- ULC standards: <http://www.ulc.ca>
- General reference of standards: <http://www.cssinfo.com>

The NMS website (<http://www.tpsgc-pwgsc.gc.ca/biens-property/ddn-nms/index-eng.html>) also links to other documents references in the NMS under its "Links" feature.

6 Specifying Materials

The practice of specifying actual brand names, model numbers, etc., is against departmental policy except for special circumstances. The method of specifying materials shall be by using recognized standards such as those produced by Canadian Gas Association (CGA), Canadian General Standards Board (CGSB), Canadian Standards Association (CSA), and Underwriters' Laboratories of Canada (ULC), or by trade associations such as Canadian Roofing Contractors' Association (CRCA) and Terrazzo, Tile, Marble Association of Canada (TTMAC). Canadian standards should be used wherever possible.

If the above method cannot be used and where no standards exist, specify by a non-restrictive, non-trade name "prescription" or "performance" specifications.

In exceptional or justifiable circumstances or if no standards exist and when a suitable non-restrictive, non-trade name "prescription" or "performance" specification cannot be developed, specify by trade name. Include all known materials acceptable for the purpose intended, and in the case of equipment, identify by type and model number.

Acceptable Materials: set up the paragraph format as follows:

Acceptable Materials:

1. ABC Co. Model [_____].
2. DEF Co. Model [_____].
3. GHI Co. Model [_____].

Alternative materials to those specified may be considered during the solicitation period, however, the onus will be on the Consultant to review and evaluate all requests for approval of alternative materials.

The term "Acceptable Manufacturers" should not be used, as this restricts competition and does not ensure the actual material or product will be acceptable. A list of words and phrases that should be avoided is included in the NMS User's Guide.

Sole Sourcing: Sole sourcing for materials and work can be used for proprietary systems (ie. fire alarm systems, EMCS systems). **Substantiation and/or justification will be required.**

Wording for the sole source of work should be in Part 1 as:

Designated Contractor

- .1 Hire the services of [_____] to do the work of this section."

Wording for the sole source of EMCS systems should be in Part 1 as

Designated Contractor

- .1 Hire the services of [_____] or its authorized representative to complete the work of all EMCS sections."

and in Part 2 as Materials

- .1 There is an existing [_____] system presently installed in the building. All materials must be selected to ensure compatibility with the existing [_____] system.

Wording for the sole source of materials (ie. fire alarm systems) should be in Part 2 as:

Acceptable materials

.1 The only acceptable materials are [] .”

Prior to including sole source materials and/or work, the Consultant should contact the Project Manager to obtain the approval for the sole sourcing.

7 Unit Prices

Unit prices are used where the quantity can only be estimated (eg. earth work) and the approval of the Project Manager must be sought in advance of their use.

Use the following wording:

[The work for this section] or [define the specific work if required, e.g. rock excavation] will be paid based on the actual quantities measured on site and the unit prices stated in the Bid and Acceptance Form.

In each applicable NMS section, replace paragraph title "Measurement for Payment" with "Unit Prices".

Sample of Unit Price Table:

The Unit Price Table designates the Work to which a Unit Price Arrangement applies.

- (a) The Price per Unit and the Estimated Total Price must be entered for each Item listed.
- (b) Work included in each item is as described in the referenced specification section.

Item	Specification Reference	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity	Price per Unit GST/HST extra	Estimated Total Price GST / HST extra
TOTAL ESTIMATED AMOUNT						
Transfer amount to subparagraph 1)(b) of BA03						

8 Cash Allowances

Construction contract documents should be complete and contain all of the requirements for the contractual work. Cash allowances are to be used only under exceptional circumstances (ie. utility companies, municipalities), where no other method of specifying is appropriate. Obtain approval from the Project Manager in advance to include cash allowances and then use "Section 01 21 00 - Allowances" of the NMS to specify the criteria.

9 Warranties

It is the practice of PWGSC to have a 12 month warranty and to avoid extending warranties for more than 24 months. When necessary to extend beyond the 12 month warranty period provided for in the General Conditions of the contract, use the following wording in Part 1 of the applicable technical sections, under the heading "Extended Warranty":

- "For the work of this Section [], the 12 month warranty period is extended to 24 months.
- Where the extended warranty is intended to apply to a particular part of a specification section modify the above as follows: "For [] the 12 month ... [] months."

Delete all references to manufacturers' guarantees.

10 Scope of Work

No paragraphs noted as "Scope of Work" are to be included.

11 Summary and Section Includes in Part -1 General of Section

Do not use "Summary" and "Section Includes."

12 Related Sections

In every section of the specification at 1.1 "Related Sections": coordinate the list of related sections and appendices. Ensure co-ordination among the sections of the specification and ensure not to reference any section or appendices which do not exist.

13 Index

List all the plans and specification sections with correct number of pages, section names and correct drawing titles in the format shown in Appendix A.

14 Regional Guide

The Consultant should contact the Project Manager to obtain the region's requirements for Division 01 or other short form specifications as might be appropriate. For example, it is required in the National Capital Region that regional Section 01 00 10 - General Instructions be used on all projects.

15 Health and Safety

It is required that all project specifications include "Section 01 35 29.06 - Health and Safety Requirements." Confirm with the Project Manager to determine if there are any instructions to meet regional requirements.

16 Designated Substances Report

Include "Section 01 14 25 - Designated Substances Report"

17 Subsurface Investigation Reports

Subsurface Investigation Report(s) are to be included after Section 31 and the following paragraph should be added to Section 31:

Subsurface investigation report(s)

.1 Subsurface investigation report(s) are included in the specification following this section.

When the Project Manager determines that it is not practical to include the subsurface investigation report(s), alternate instructions will be provided.

Where tender documents are to be issued in both official languages, the subsurface investigation report(s) shall be issued in both languages.

In addition to the provision of the Subsurface Investigation Report, the foundation information required by the National Building Code of Canada 2005 (Division C, Part 2, 2.2.4.6) shall be included on foundation drawings.

18 Experience and Qualifications

Remove experience and qualification requirements from specification sections.

19 Prequalification and Pre-award submissions

Do not include in the specification any mandatory contractor and/or subcontractor prequalification or pre-award submission requirements that could become a contract award condition. If a prequalification process or a pre-award submission is required, contact the Project Manager.

There should be no references to certificates, transcripts or license numbers of a trade or subcontractor being included with the bid.

20 Contracting Issues

Specifications describe the workmanship and quality of the work. Contracting issues should not appear in the specifications. Division 00 of the NMS is not used for PWGSC projects.

Remove all references within the specifications, to the following:

- General Instructions to Bidders
- General Conditions
- CCDC documents
- Priority of documents
- Security clauses
- Terms of payment or holdback
- Tendering process
- Bonding requirements
- Insurance requirements
- Alternative and separate pricing
- Site visit (Mandatory or Optional)
- Release of Lien and deficiency holdbacks

DRAWINGS

1 Title Blocks

Use PWGSC title block for drawings and sketches (including addenda).

2 Dimensions

Dimensions are to be in metric only (no dual dimensioning).

3 Trade Names

Trade names on drawings are not acceptable. Refer to SECTION 3, SPECIFICATIONS, 6.0 Specifying Materials for specifying materials by trade name.

4 Specification Notes

No specification type notes are to appear on any drawing.

5 Terminology

Use the term "Departmental Representative" instead of Engineer, PWGSC, Owner, Consultant or Architect. "Departmental Representative" means the person designated in the Contract, or by written notice to the Contractor, to act as the Departmental Representative for the purposes of the Contract, and includes a person, designated and authorized in writing by the Departmental Representative to the Contractor.

Notations such as: "verify on site", "as instructed", "to match existing", "example", "equal to" or "equivalent to", "to be determined on site by "Departmental Representative", should not be indicated in the specifications as this promotes inaccurate and inflated bids. Specifications must permit bidders to calculate all quantities and bid accurately. If quantities are impossible to identify (i.e. cracks to be repaired) give an estimated quantity for bid purposes (unit prices). Ensure that the terminology used throughout the specifications is consistent and does not contradict the applicable standard construction contract documents.

6 Information to be included

Drawings should show the quantity and configuration of the project, the dimensions and details of how it is constructed. There should be no references to future work and no any information that will be changed by future addenda. The scope of work should be clearly detailed and elements not in contract should be eliminated or kept to an absolute minimum.

7 Drawing Numbers: Number drawings in sets according to the type of drawing and the discipline involved as follows (The requirements of SECTION 2 PWGSC NATIONAL CADD STANDARD will supercede these requirements, where warranted).

During the Design Phase of the project each submission and review must be noted on the Notes block of the drawing title, but at the time of construction document preparation, all revision notes should be removed.

Discipline	Drawing
Demolition	D1, D2, etc.
Architectural	A1, A2, etc.
Civil	C1, C2, etc.
Landscaping	L1, L2, etc.
Mechanical	M1, M2, etc.
Electrical	E1, E2, etc.
Structural	S1, S2, etc.
Interior Design	ID1, ID2, etc.

- 8 Presentation Requirements:** Present drawings in sets comprising the applicable demolition, architectural, structural, mechanical and electrical drawings in that order. All drawings should be of uniform standard size.
- 9 Prints:** Print with black lines on white paper. Blue prints are acceptable for document submissions at 33%, 66% and 99% stages. Confirm with Project Manager the size of prints to be provided for review purposes.
- 10 Binding:** Staple or otherwise bind prints into sets. Where presentations exceed 20 sheets, the drawings for each discipline may be bound separately for convenience and ease of handling.
- 11 Legends:** Provide a legend of symbols, abbreviations, references, etc., on the front sheet of each set of drawings or, in large sets of drawings, immediately after the title sheet and index sheets.
- 12 Schedules:** Where schedules occupy entire sheets, locate them next to the plan sheets or at the back of each set of drawings for convenient reference. *See CGSB 33-GP-7 Architectural Drawing Practices for schedule arrangements.*
- 13 North Points:** On all plans include a north point. Orient all plans in the same direction for easy cross-referencing. Wherever possible, lay out plans so that the north point is at the top of the sheet.
- 14 Drawing Symbols:** Follow generally accepted drawing conventions, understandable by the construction trades, and in accordance with PWGSC publications.

ADDENDA

1 Format

Prepare addenda using the format shown in Appendix B. No signature type information is to appear.

Every page of the addendum (including attachments) must be numbered consecutively. All pages must have the PWGSC project number and the appropriate addendum number. Sketches shall appear in the PWGSC format, stamped and signed.

No Consultant information (name, address, phone #, consultant project # etc.) should appear in the addendum or its attachments (except on sketches).

2 Content

Each item should refer to an existing paragraph of the specification or note/detail on the drawings. The clarification style is not acceptable.

DOCUMENTATION

Translation

When required, all documentation included in the construction contract documents shall be in both official languages.

Ensure that English and French documents are equal in all respects. There can be no statement that one version takes precedence over the other.

Consultant shall provide:

- Per construction document submission, a completed and signed Checklist for the Submission of Construction Documents. See Appendix 'A'.
- Specification: originals printed one side on 216 mm x 280 mm white bond paper.
- Index: as per Appendix 'C'
- Addenda (if required): as per Appendix 'B' (to be issued by PWGSC).
- Drawings: reproducible originals, sealed and signed by the design authority.
- Tender information:
 - Including a description of all units and estimated quantities to be included in unit price table.
 - Including a list of significant trades including costs. PWGSC will then determine which trades, if any, will be tendered through the Bid Depository.
 - Government Electronic Tendering System (MERX): Consultants to provide an electronic true copy of the final documents (specifications and drawings) on one or multiple CD-ROM in Portable Document Format (PDF) without password protection and printing restrictions. The electronic copy of drawings and specifications is for bidding purposes only and do not require to be signed and sealed. See Appendix 'D' and Appendix 'E'.

PWGSC shall provide:

- General and Special Instructions to Bidders
- Bid and Acceptance Form
- Standard Construction Contract Documents



SECTION 4 CLASSES OF CONSTRUCTION COST ESTIMATES USED BY PWGSC

DESCRIPTION OF THE CLASSES OF ESTIMATES USED BY PWGSC FOR CONSTRUCTION COSTING OF BUILDINGS PROJECTS

Class 'D' (Indicative) Estimate:

Based upon a comprehensive statement of requirements, and an outline of potential solutions, this estimate is to provide an indication of the final project cost, and allow for ranking all the options being considered.

Submit Class D cost estimates in elemental cost analysis format latest edition issued by the Canadian Institute of Quantity Surveyors with cost per m² for current industry statistical data for the appropriate building type and location. Include a summary in the cost estimate, plus full back up, showing items of work, quantities, unit prices, allowances and assumptions.

The level of accuracy of a class D cost estimate shall be such that no more than a 20% contingency allowance is required.

Class 'C' Estimate:

Based on a comprehensive list of requirements and assumptions, including a full description of the preferred schematic design option, construction/design experience, and market conditions. This estimate must be sufficient for making the correct investment decision.

Submit Class C cost estimates in elemental cost analysis format latest edition issued by the Canadian Institute of Quantity Surveyors with cost per m² for current industry statistical data for the appropriate building type and location. Include a summary in the cost estimate, plus full back up, showing items of work, quantities, unit prices, allowances and assumptions.

The level of accuracy of a class C cost estimate shall be such that no more than a 15% contingency allowance is required.

Class 'B' (Substantive) Estimate:

Based on design development drawings and outline specifications, which include the design of all major systems and subsystems, as well as the results of all site/installation investigations. This estimate must provide for the establishment of realistic cost objectives and be sufficient to obtain effective project approval.

Submit Class B cost estimates in elemental cost analysis format latest edition issued by the Canadian Institute of Quantity Surveyors. Include a summary in the cost estimate, plus full back up, showing items of work, quantities, unit prices, allowances and assumptions.

The level of accuracy of a class B cost estimate shall be such that no more than a 10% design contingency allowance is required.

Class 'A' (Pre-Tender) Estimate:

Based on completed construction drawings and specifications prepared prior to calling competitive tenders. This estimate must be sufficient to allow a detailed reconciliation/negotiation with any contractor's tender.

Submit Class A cost estimates in both elemental cost analysis format and trade divisional format latest edition issued by the Canadian Institute of Quantity Surveyors. Include a summary in the cost estimate, plus full back up, showing items of work, quantities, unit prices, allowances and assumptions.

The level of accuracy of a class A cost estimate shall be such that no more than a 5% design contingency allowance is required.

SECTION 5 TIME MANAGEMENT

1 Time Management, Planning, and Control

The Time Management, Planning, and Control Specialist (scheduler) shall provide a Project Planning and Control System (Control System) for Planning, Scheduling, Progress Monitoring and Reporting and a Time Management, Planning, and Control Report (Progress Report). It is required that a fully qualified and experienced Scheduler play a major role in providing services in the development and monitoring of the project schedule.

The scheduler will follow good industry practices for schedule development and maintenance as recognized by the Project Management Institute (PMI).

PWGSC presently utilizes the Primavera Suite software and MicroSoft Project for it's current Control Systems and any software used by the consultant should be fully integrated with these, using one of the many commercially available software packages.

1.1 Schedule Design

Project Schedules are used as a guide for execution of the project as well as to communicate to the project team when activities are to happen, based on network techniques using Critical Path Method (CPM).

When building a Control System you must consider:

1. The level of detail required for control and reporting;
2. The reporting cycle- monthly and what is identified in the Terms of Reference, but also includes Exception Reports;
3. That the duration must be in days;
4. What is required for reporting in the Project Teams Communications Plan and
5. The nomenclature and coding structure for naming and reporting requirements of activities, schedules and reports.

1.2 Schedule Development

For purposes of monitoring and reporting of project progress and ease of schedule review it is important to maintain a standard for all schedules and reports starting with the Work Breakdown Structure (WBS), identification of Milestones, naming of activities as well as schedule outputs and paper sizing and orientation.

Work Breakdown Structure

When developing the schedule the consultant needs to use PWGSC standards and practices. Two basic requirements are the National Project Management System

(NPMS) and a Work Breakdown Structure (WBS), structured supporting the NPMS (Levels 1-4).

The WBS is as follows:

- Level 1 Project Title (NPMS)
- Level 2 Project Stage (NPMS)
- Level 3 Project Phase (NPMS)
- Level 4 Processes to meet Deliverables/Control Points Milestones (NPMS)
- Level 5 Sub-Processes and Deliverables in support of Level 4
- Level 6 Discrete activities. (Work Package)

Not all the Stages, Phases and Processes in the NPMS will be required on all the projects, however the structure remains the same.

Major and Minor Milestones

The Major Milestones are standard Deliverables and Control Points within NPMS and are required in all schedule development. These Milestones will be used in Management Reporting within PWGSC as well as used for monitoring project progress using Variance Analysis. The Minor milestones are process deliverables (Level 4) or sub-process deliverables (level 5) also used in Variance Analysis.

Each Milestone will also be assigned appropriate coding for Status Reporting and Management Reporting.

Milestones must have zero duration and are used for measuring project progress.

Milestones may also be external constraints such as the completion of an activity, exterior to the project, affecting the project.

Activities

All activities will need to be developed based on Project Objectives, Project Scope , Major and Minor Milestones, meetings with the project team and the scheduler's full understanding of the project and it's processes.

Subdivide the elements down into smaller more manageable pieces that organize and define the total scope of work in Levels 5-6 that can be scheduled, costed, monitored and controlled. This process will develop the Activity List for the project.

Each activity is a discrete element of work and is the responsibility of one person to perform.

Each activity will describe the work to be performed using a verb and noun combination (i.e. Review Design Development Report).

Activities should not have durations longer than 2 update cycles, with exception of activities not yet defined in a "Rolling Wave".

Each activity will be assigned at WBS level 6 and appropriately coded for Status Reporting and Management Reporting.

These elements will become activities, interdependently linked in Project Schedules.

Project Logic

Once the WBS, Milestones and Activity List have been developed the activities and milestones can be linked in a logical manner starting with a Project Start Milestone. Every activity and milestone must be linked in a logical manner using either a Finish to Start (FS), Finish to Finish (FF), Start to Start (SS) or Start to Finish (SF) relationship. There can be no open-ended activities or milestones.

A Finish to Start (FS) is the preferred relationship.

When developing relationships avoid the use of lags and constraints in place of activities and logic.

Activity Duration

The activity duration (in days) is the estimated length of time it will take to accomplish a task.

Consideration needs to be taken in how many resources are needed and are available, to accomplish any activity. (Example: availability of Framers during a “Housing Boom”.) Other factors are the type or skill level of the available resources, available hours of work, weather etc.

There will be several types of lists and schedules produced from this process, which will form part of the Progress Report.

Activity List

An Activity List identifies all activities including milestones required to complete the whole project.

Milestone List

A Milestone List identifies all project Major and Minor milestones.

Master Schedule

A Master Schedule is a schedule used for reporting to management at WBS level 4 and 5 that identifies the major activities and milestones derived from the detailed schedule. Cash Flow projections can be assigned at WBS level 5 for monitoring the Spending Plan.

Detailed Project Schedule

A Detailed Project Schedule is a schedule in reasonable detail (down to WBS Level 6 and 7) for progress monitoring and control, this will ensure that the schedule shall be in sufficient detail to ensure adequate planning and control.

1.3 Schedule Review and Approval

Once the scheduler has identified and properly coded all the activities; put them into a logical order and then determined the appropriate durations. The scheduler can then analyze the schedule to see if the milestone dates meet the contractual requirements and then adjust the schedule accordingly by changing durations, resource leveling or changing logic.

When the schedule has been satisfactorily prepared the scheduler can present the detailed schedule to the Project Team for approval and be Baseline. There may be several iterations before the schedule meets with the Project Teams agreement and the contractual requirements.

The final agreed version must be copied and saved as the Baseline to monitor variances for reporting purposes.

1.4 Schedule Monitoring and Control

Once Baseline the schedule can be better monitored, controlled and reports can be produced.

Monitoring is performed by, comparing the baseline activities % complete and milestone dates to the actual and forecast dates to identify the variance and record any potential delays, outstanding issues and concerns and provide options for dealing with any serious planning and scheduling issues in report form.

Analyze and report from early start sequence on all activities due to start, underway, or finished for the complete project.

There will be several reports generated from the analysis of the baseline schedule and will form part of the Time Management Report in the Required Services Sections (RS)

Progress Reports

A Progress Report reflects the progress of each activity to the date of the report, any logic changes, both historic and planned, projections of progress and completion the actual start and finish dates of all activities being monitored.

The Progress Report includes:

A Narrative Report, detailing the work performed to date, comparing work progress to planned, and presenting current forecasts. This report should summarize the progress to date, explaining current and possible deviations and delays and the required actions to resolve delays and problems with respect to the Detail Schedule, and Critical Paths.

Narrative reporting begins with a statement on the general status of the project followed by a summarization of delays, potential problems and project status criticality, any

potential delays, outstanding issues and concerns and options for dealing with any serious planning and scheduling issues.

A Variance Report, with supporting schedule documentation, detailing the work performed to date, comparing work progress to planned. This report should summarize the progress to date, explaining all causes of deviations and delays and the required actions to resolve delays and problems with respect to the Detail Schedule, and Critical Paths.

A Criticality Report identifying all activities and milestones with negative, zero and up to five days Total Float used as a first sort for ready identification of the critical, or near critical paths through the entire project.

Included in the Progress Report as attachments are: WBS chart, Activity Lists, Milestone Lists, Master Schedules, Detailed Project Schedule

Exception Report

The Scheduler is to provide continuous monitoring and control, timely identification and early warning of all unforeseen or critical issues that affect or potentially affect the project.

If unforeseen or critical issues arise, the Scheduler will advise the Project Manager and submit proposed alternative solutions in the form of an Exception Report.

An Exception Report will include sufficient description and detail to clearly identify:

1. Scope Change: Identifying the nature, reason and total impact of all identified and potential project scope changes affecting the project.
2. Delays and accelerations: Identifying the nature, the reason and the total impact of all identified and potential duration variations.
3. Options Enabling a Return to the project baseline: Identifying the nature and potential effects of all identified options proposed to return the project within baselined duration.

1.5 Standard Submissions

At each submission or deliverable stage provide a complete and updated Progress Report, the contents of each report will vary with requirements and at each project phase. Typically a Progress Report has:

1. Executive Summary;
2. Narrative Report;
3. Variances Report;
4. Criticality Report;
5. Exception Report (as required)
6. Work Breakdown Structure Chart;
7. Activity List;
8. Milestone List;
9. Master Schedule with Cash Flow Projections;
10. Detail Project Schedule (Network Diagram or Bar Charts);

1.6 Schedule Outputs and Reporting Formats

The sheet sizing and orientation is more a suggestion that a role, changes to the paper format may vary to accommodate the information and column information required.

Progress Reports

Paper Size: Letter

Paper Format: Portrait

Title Format: Project Title; Report Type; Print Date; Data Date; Revision Block

Body Text: Narratives for each report to match other reports generated in the D.S.S.

Variance Report Columns: Activity ID, Activity Name, Planned Finish, Revised Finish, Variance, Activity % Complete,

Criticality Report Columns: Activity ID, Activity Name, Duration, Start, Finish, Activity % Complete, Total Float.

Exception Reports

Paper Size: Letter

Paper Format: Portrait

Title Format: Project Title; Report Type; Print Date; Data Date; Revision

Body Text: Narrative to match other reports generated in the D.S.S.

Paper Size: Letter

Paper Format: Landscape

Title Format: Project Title; Report Type; Print Date; Data Date; Revision

Columns: Activity ID, Activity Name, Duration, Remaining Duration, Start, Finish, Total Float.

Work Breakdown Structure (indent tree):

Paper Size: Letter

Paper Format: Portrait

Columns: WBS Code, WBS Name, Duration, Cost estimate, start and finish dates.

Footer Format: Project Title; Report Type; Print Date; Data Date; Revision Block

Activity Lists

Paper Size: Letter

Paper Format: Portrait

Columns: Activity ID, Activity Name, Start, Finish, Predecessor, Successor.

Footer Format: Project Title; Report Type; Print Date; Data Date; Revision Block

Sort with Early Start, then Early Finish, then Activity ID and with the WBS.

Milestone Lists

Paper Size: Letter

Paper Format: Portrait

Footer Format: Project Title; Report Type; Print Date; Data Date; Revision Block
Columns: Activity ID, Activity Name, Start, Finish.

Sort with Early Start, then Early Finish, then Activity ID and without the WBS.

Master Schedule (Bar Chart)

Paper Size: 11X17
Paper Format: Landscape
Footer Format: Project Title; Report Type; Print Date; Data Date; Revision Block
Columns: Activity ID, Activity Name, Duration, Activity % Complete, Start, Finish,
Total Float.

Sort with Early Start, then Early Finish, then Activity ID and with the WBS.

Detailed Project Schedules (Bar Chart)

Paper Size: 11X17
Paper Format: Landscape
Footer Format: Project Title; Report Type; Print Date; Data Date; Revision Block
Columns: Activity ID, Activity Name, Duration, Activity % Complete, Start, Finish,
Total Float.

Sort with Early Start, then Early Finish, then Activity ID and with the WBS.

APPENDIX 'A' - Checklist for the Submission of Construction Documents to PWGSC

Last updated November 21, 2012

Date:		
Project Title:	Project Location:	
Project Number:	Contract Number:	
Consultant's Name:	PWGSC Project Manager:	
Review Stage:	66%	99%
	100%	

Item	Verified by:	Comments:	Action by:
Specifications:			
1 National Master Specifications			
1a The current edition of the NMS has been used.			
1b Sections have been included for all work identified on drawings and sections edited.			
2 Specification Organization			
2a Either the NMS 1/3 - 2/3 page format or the Construction Specifications Canada full page format is used.			
2b Each Section starts on a new page and the Project Number, Section Title, Section Number and Page Number show on each page.			
2c Specification date and consultant's name are not indicated.			
3 Terminology			
3a The term Departmental Representative is used instead of Engineer, PWGSC, Owner, Consultant or Architect.			
3b Notations such as: "verify on site", "as instructed", "to match existing", "example", "equal to", "equivalent to" and "to be determined on site by" are not used.			
4 Dimensions			
4a Dimensions are provided in metric only.			
5 Standards			
5a The latest edition of all references quoted is used.			

6 Specifications Materials			
6a The method of specifying materials uses recognized standards. Actual brand names and model numbers are not specified.			
6b Materials are specified using standards and performance criteria (if not, the correct form of acceptable materials has been used).			
6c Identify if non-restrictive, non-trade name “prescription” or “performance” specifications are used.			
6d Indicate if a list of acceptable materials have been used.			
6e The term “Acceptable Manufacturers” is not used.			
6f No sole sourcing has been used.			
6g If sole sourcing has been used, the correct wording has been used and a justification provided to RPCD for the sole sourced products.			
7 Unit Prices			
7a Unit prices are used only for work that is difficult to estimate.			
8 Cash Allowances			
8a Indicate if cash allowances have been used.			
9 Warranties			
9a Indicate if warranties extend more than a 12 or 24 months period.			
9b Manufacturers guarantees are not indicated.			
10 Scope of Work			
10 No paragraphs noted as “Scope of Work” are included.			
11 Summary and Section Includes			
11a In part 1 of section, paragraphs “Summary” and “Section Includes” are not used.			
12 Related Sections			
12a The list of related sections and appendices are coordinated.			
13 Index			
13a The index shows a complete list of plans and specification sections with the correct number of pages and correct drawing titles and section names.			
14 Regional Guide Specifications			
14a General Instructions is included (Section 01 00 10 in the NCA).			

15 Health and Safety			
15a Section 01 35 29.06 - Health and Safety Requirements is included.			
16 Designated Substances Report			
16 a Section 01 14 25 - Designated Substances Report is included.			
17 Subsurface Investigation Reports			
17a Subsurface Investigation Reports are included in Division 31.			
18 Experience and qualifications			
18a Experience and qualification requirements do not appear in the specification sections			
19 Pre-qualifications			
19a There are no mandatory contractor and/or subcontractor pre-qualification requirements or references to certificates, transcripts or license numbers of a trade or subcontractor being included in the bid.			
20 Contracting Issues			
20a Contracting issues do not appear in the specifications.			
20b Division 00 of the NMS is not used.			
21 Quality Issues			
21a There are no specification clauses with square brackets “[]” or lines “_” indicating that the document is incomplete or missing information.			

Item	Verified by:	Comments:	Action By:
Drawings:			
1 Title Blocks			
1a The PWGSC title block is used.			
2 Dimensions			
2a Dimensions are provided in metric only.			
3 Trade Names			
3a Trade names are not used.			
4 Specification Notes			
4a There is no specification type notes.			
5 Terminology			
5a The term Departmental Representative is used instead of Engineer, PWGSC, Owner,			

Consultant or Architect.			
5b Notations such as: “verify on site”, “as instructed”, “to match existing”, “example”, “equal to”, “equivalent to” and “to be determined on site by” are not used.			
6 Information to be included			
6a Architectural and Engineering Drawings have been stamped and signed by the design authority.			
6b The project quantity and configuration, dimensions and construction details are included.			
6c References to future work and elements not in contract do not appear or are kept to an absolute minimum and clearly marked.			

I confirm that the plans and specifications have been thoroughly reviewed and that the items listed above have been addressed or incorporated. I acknowledge and accept that by signing, I am certifying that all items noted above have been addressed.

Consultant's Representative: _____

Firm name: _____

Signature: _____ Date: _____

APPENDIX 'B' - Sample of Addendum

Last updated April 22, 2008

ADDENDUM No. _____

Project Number: _____

The following changes in the bid documents are effective immediately. This addendum will form part of the contract documents

DRAWINGS

SPEC NOTE: indicate drawing number and title, then list changes or indicate revision number and date, and re-issue drawing with addendum.

- 1 A1 Architectural
 .1

SPECIFICATIONS

SPEC NOTE: indicate section number and title.

- 1 Section 01 00 10 - General Instructions

SPEC NOTE: list all changes (i.e. delete, add or change) by article or paragraph

- .1 Delete article (xx) entirely.
- .2 Refer to paragraph (xx.x) and change ...
- 2 Section 23 05 00 - Common Work Results - Mechanical
- .1 Add new article (x) as follows:

APPENDIX 'C' - Sample of Index

Last updated April 22, 2008

Project No: _____

Index
Page 1 of _____

DRAWINGS AND SPECIFICATIONS

DRAWINGS:

SPEC NOTE: List all Drawings by number and title.

- C-1 Civil
- L-1 Landscaping
- A-1 Architectural
- S-1 Structural
- M-1 Mechanical
- E-1 Electrical

SPECIFICATIONS:

SPEC NOTE: List all Divisions, Sections (by number and title) and number of pages.

<u>DIVISION</u>	<u>SECTION</u>	NO. OF PAGES
DIVISION 01	01 00 10 - General Instructions.....XX
	01 14 25 - Designated Substances Report.....XX
	01 35 30 - Health and Safety.....XX
DIVISION 23	23 xx xx	
DIVISION 26	26 xx xx	

APPENDIX 'D'

USER MANUAL ON DIRECTORY STRUCTURE AND NAMING CONVENTION STANDARDS FOR CONSTRUCTION TENDER DOCUMENTS ON CD ROM

Issued by:

Real Property Contracting Directorate

PWGSC

May 2005

Last Updated: June 3, 2008

Version 1.0

PREFACE

The Government of Canada (GoC) has committed to move towards an electronic environment for the majority of the services it offers. This covers the advertisement and distribution of contract opportunities, including construction solicitations. As a result, it is necessary to obtain a copy of construction drawings and specifications (in PDF format **without** password protection) on one or multiple CD-ROM to facilitate for the GoC the transfer of the construction drawings and specifications electronically to the Government Electronic Tendering System (GETS).

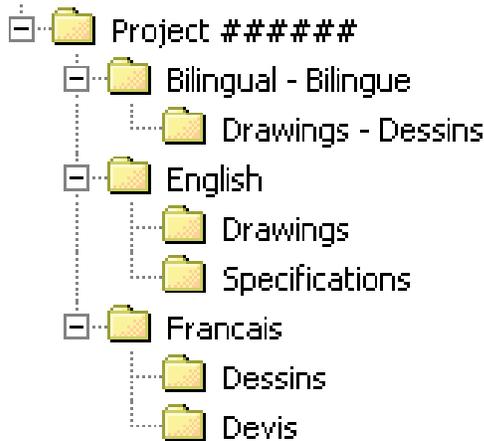
There is therefore a need to adopt a common directory structure and file-naming convention to ensure that the information made available to contractors electronically and in hard (printed) copy is in accordance with the sequence adopted in the real property industries, both for design and construction. This manual defines the standard to be followed by both consultants and print shops at time of formatting and organizing the information, whether drawings and specifications are created by scanning print documents or saved as PDF files from the native software (AutoCAD, NMS Edit, MS-Word, etc...) in which these were created.

It is important to note that the procedure described in this manual is not an indication that consultants are relieved from following the established standards for the production of drawings and specifications. The sole purpose of this manual is to provide a standard for the organization and naming of the electronic files that will be recorded on CD-ROM.

1. DIRECTORY STRUCTURE

1.1 1st, 2nd and 3rd Tier Sub-Folders

Each CD-ROM, whether it is for the original solicitation (tender call) or for an amendment (addendum), must have the applicable elements of the following high-level Directory Structure created:



The following important points are to be noted about the Directory Structure:

- The “*Project #####*” folder is considered the 1st Tier of the Directory Structure where *#####* represents each digit of the Project Number. The Project Number must always be used to name the 1st Tier folder and it is always required. Free text can be added following the Project Number, to include such things as a brief description or the project title;
- The “*Bilingual - Bilingue*”, “*English*” and “*Français*” folders are considered the 2nd Tier of the Directory Structure. The folders of the 2nd Tier **cannot** be given any other names since GETS uses these names for validation purposes. At least one of the “*Bilingual - Bilingue*”, “*English*” and “*Français*” folders is always required, and these must always have one of the applicable sub-folders of the 3rd Tier;
- The “*Drawings - Dessins*”, “*Drawings*”, “*Specifications*”, “*Dessins*” and “*Devis*” folders are considered the 3rd Tier of the Directory Structure. The folders of the 3rd Tier **cannot** be given any other names since GETS also uses these names for validation purposes. There must be always at least one of the applicable 3rd Tier folder in each document.

IMPORTANT: The applicable elements of the Directory Structure (1 st , 2 nd and 3 rd Tier folders) are always required and cannot be modified.

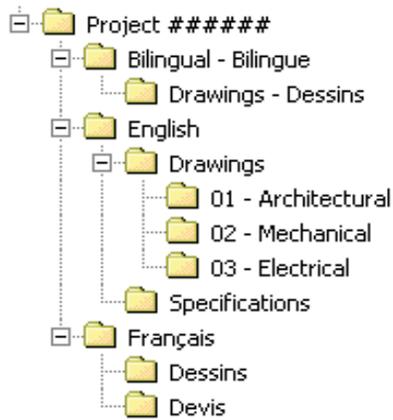
1.2 4th Tier Sub-Folders for Drawings

The “*Drawings – Dessins*”, “*Drawings*” and “*Dessins*” folders must have 4th Tier sub-folders created to reflect the various disciplines of the set of drawings.

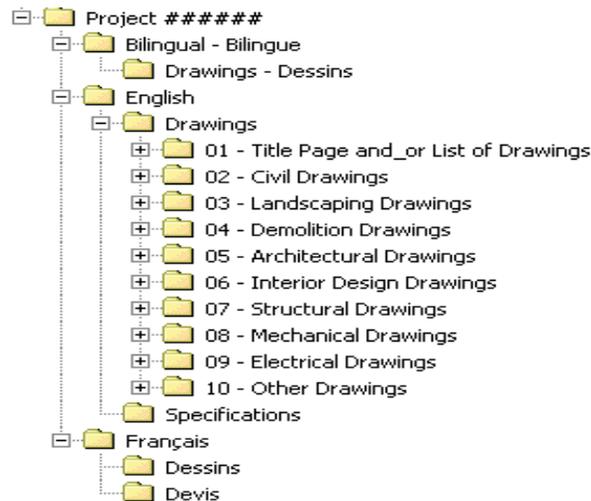
Because the order of appearance of the sub-folders on the screen will also determine the order of printing, it is necessary to start with a number the identification name of the sub-folders in the “Drawings – Dessins”, “Drawings” and “Dessins” folders.

Note: The first sub-folder must be always reserved for the Title Page and/or the List of Drawings unless the first drawing of the set is an actual numbered discipline drawing.

Examples of 4th Tier sub-folders for drawings:



or



1.2.1 Naming Convention

The 4th Tier sub-folders for drawings must adhere to the following standard naming convention.

For the “Drawings” and “Dessins” folders:

- Y

Where:

= A two digit number ranging from 01 to 99 (leading zeros must be included)

Y = The title of the folder

Example: 03 – Mechanical

For the “Drawings - Dessins” folder:

- Y - Z

Where:

= A two digit number ranging from 01 to 99 (leading zeros must be included)

Y = The English title of the folder

Z = The French title of the folder

Example: 04 - Electrical - Électricité

It should be noted that the numbering of the 4th Tier sub-folders is for sorting purposes only and is not tied to a specific discipline. For example, “*Architectural*” could be numbered 05 for a project where there is four other disciplines before “*Architectural*” in the set of drawings or 01 in another project where it’s the first discipline appearing in the set.

It is essential to ensure that the order of the drawings on the CD-ROM be exactly the same as in the hard copy set. GETS will sort each drawing for both screen display and printing as per the following rules:

- The alphanumerical sorting is done on an ascending order;
- The alphanumerical order of the sub-folders determines the order of appearance on the screen as well as the order of printing (as an example: all the drawing PDF files in the 01 sub-folder will be printed in alphanumerical order before the drawings in the 02 sub-folder etc...);
- Each drawing PDF file within each sub-folder will also be sorted alphanumerically. This will determine the order of appearance on the screen as well as the order of printing (i.e. Drawing A001 will be printed before Drawing A002, Drawing M02 before Drawing M03, etc...).

1.3 4th Tier Sub-Folders for Specifications

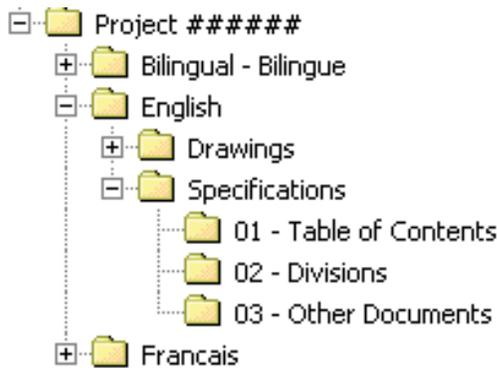
The “*Specifications*” and “*Devis*” folders must have 4th Tier sub-folders created to reflect the various elements of the specifications.

Because the order of appearance of the sub-folders on the screen will also determine the order of printing, it is necessary to start with a number the identification name of the sub-folders in the “Specifications” and “Devis” folders.

Examples of 4th Tier sub-folders for specifications:



or



1.3.1 Naming Convention

The 4th Tier sub-folders for specifications must adhere to the following standard naming convention.

For the “Specifications” and “Devis” folders:

- Y

Where:

= A two digit number ranging from 01 to 99 (leading zeros must be included)

Y = The title of the folder

Example: 02 – Divisions

It should be noted that the numbering of the 4th Tier sub-folders is for sorting purposes only and is not tied to an element of the specifications.

It is essential to ensure that the order of the elements of the specifications on the CD-ROM be exactly the same as in the hard copy. GETS will sort each element of the specifications for both

screen display and printing as per the following rules:

- The alphanumerical sorting is done on an ascending order;
- The alphanumerical order of the sub-folders determines the order of appearance on the screen as well as the order of printing (as an example: all the specifications PDF files in the 01 sub-folder will be printed, in alphanumerical order before the PDF files in the 02 sub-folder, etc...);
- Each specifications PDF file within each sub-folder will also be sorted alphanumerically. This will determine the order of appearance on the screen as well as the order of printing (i.e. Division 01 will be printed before Division 02, 01 - Appendix A before 02 - Appendix B, etc...).

2. NAMING CONVENTION FOR PDF FILES

Each drawing, specifications division or other document that are part of the tender documents must be converted in PDF format (without password protection) in accordance with the following standard naming convention and each PDF file must be located in the appropriate sub-folder of the Directory Structure.

2.1 Drawings

Each drawing must be a **separate single page** PDF file. The naming convention of each drawing must be:

X### - Y

Where:

X = The letter or letters from the drawing title block (“A” for Architectural or “ID” for Interior Design for example) associated with the discipline

= The drawing number from the drawing title block (one to three digits)

Y = **The drawing name from the drawing title block (for bilingual drawings, the name in both English and French is to appear)**

Example: A001 - First Floor Details

Each drawing that will be located in the appropriate discipline 4th Tier sub-folders must be named with the same letter (“A” for Architectural Drawings for example) and be numbered. The drawing number used to name the PDF file must match as much as possible the drawing number of the actual drawing (the exception being when leading zeros are required).

The following important points about drawings are to be noted:

- The drawing PDF files within each sub-folder are sorted alphanumerically for both displaying and printing. If there are more than 9 drawings in a particular discipline the numbering must use at least two numerical digits (i.e. A01 instead of A1) in order to avoid displaying drawing A10 between A1 and A2. The same rule applies when there are more than 99 drawings per discipline i.e. three digits instead of two must be used for the numbering (for example M003 instead of M03);

- If drawing PDF files are included in the “*Bilingual - Bilingue*” folder, these cannot be included as well in the “*English*” and/or “*Français*” folders;
- If drawings not associated with a particular discipline are not numbered (Title Page or List of Drawings for example), these will be sorted alphabetically. While this does not represent a problem if there is only one drawing in the sub-folder, it could disrupt the order when there are two or more drawings. If the alphabetical order of the drawings name does not represent the order on the hard copy set, the drawings are to be named as per the following standard convention when converted in PDF format to ensure proper display and printing order.

- Y

Where:

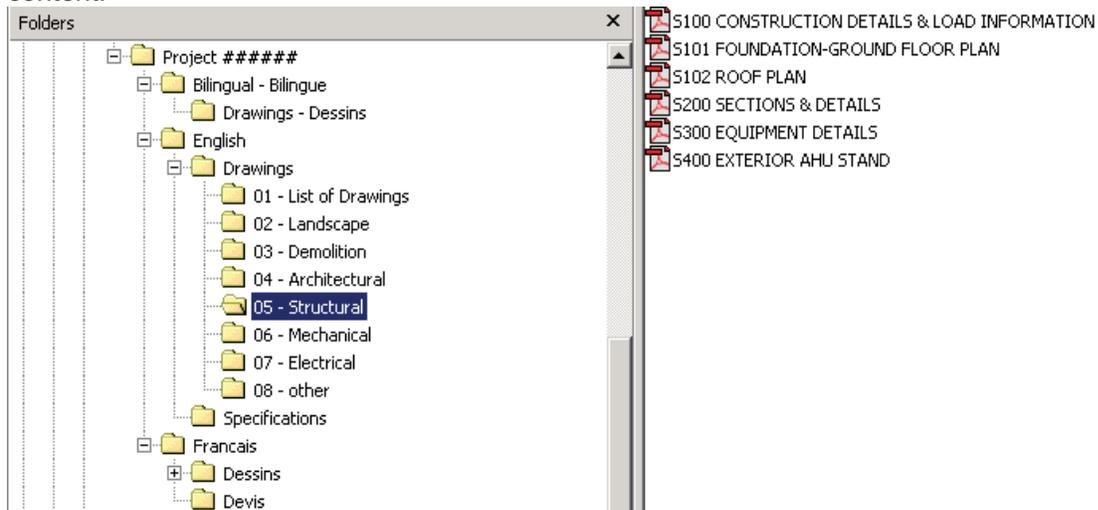
= A two digit number ranging from 01 to 99 (leading zeros must be included)

Y = The name of the drawing

Example: 01 - Title Page
02 - List of Drawings

If numbers are not used in the PDF files name, “*List of Drawings*” will be displayed before “*Title Page*” because “*L*” comes before “*T*” in the alphabet.

Example of a 4th Tier Drawings sub-folder’s content:



2.2. Specifications

Each Specifications Division must be a separate PDF file and all pages contained in each PDF file must have the same physical size (height, width). The Plans and Specifications Index must

also be a separate PDF file. If there are other documents that are part of the Specifications (e.g. Appendix or other) these are to be separate PDF files as well.

2.2.1 Documents other than Specifications Divisions

Because PDF files within the Specifications sub-folders are sorted alphanumerically (in ascending order) for both on screen display and printing order, all files that appear in folders other than the “*Divisions*” sub-folder must be named using a number:

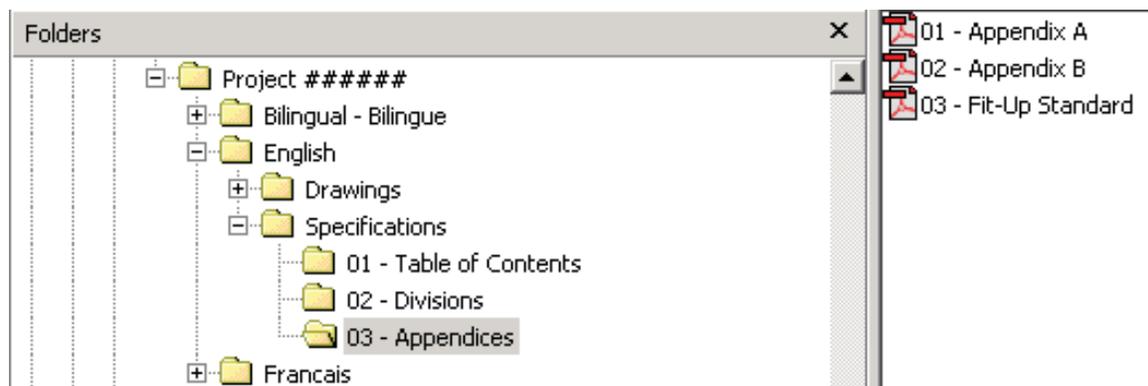
- Y

Where:

= Two digit number ranging from 01 to 99 with leading zeros required
Y = Name of the document

Example: 01 - Plans and Specifications Index

Example of a sub-folder content (sub-folder other than “*Divisions*”):



2.2.2 Specifications Divisions

The Specifications Divisions must be named as follows:

Division ## - Y

Where:

Division ## = The actual word “*Division*” followed by a space and a two digit number ranging from 01 to 99 (with leading zeros required)

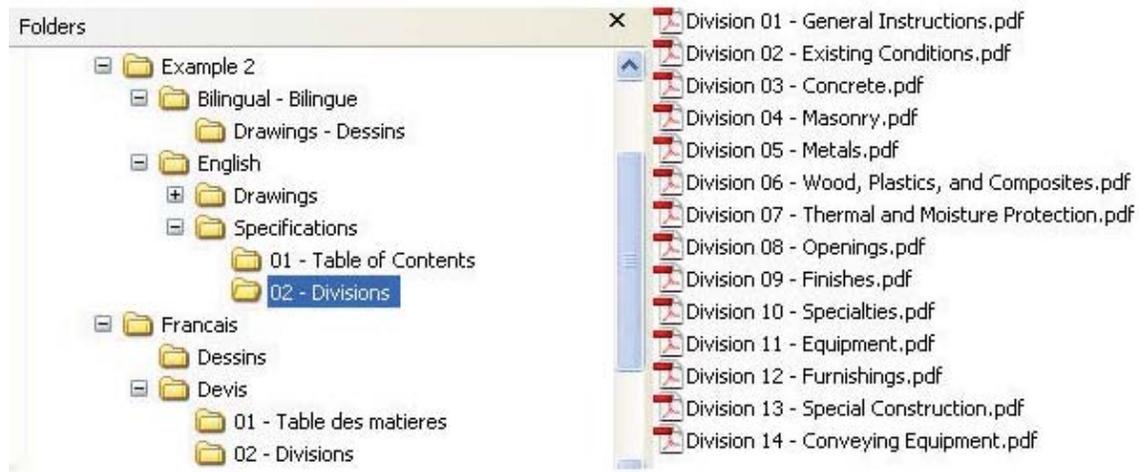
Y = Name of the Specifications Division as per **CSC/CSI MasterFormat™**

Example: Division 05 – Metals

The following important point about specifications is to be noted:

- The Numbering of the Divisions **cannot** be altered from **CSC/CSI MasterFormat™** even if some Divisions are not used in a given project. For example, Division 05 will always remain Division 05 even if Division 04 is not used for a given project.

Example of a “Divisions” sub-folder content:



3. CD-ROM LABEL

Each CD-ROM is to be labeled with the following information:

Project Number / Numéro de projet
Project Title / Titre du projet
Documents for Tender / Documents pour appel d'offres
CD X of/de X

Example:

Project 123456 / Projet 123456
Repair Alexandra Bridge / Réparation du pont Alexandra

Documents for Tender / Documents pour appel d'offres
CD 1 of/de 1

APPENDIX 'E'

BASIC REFERENCE GUIDE ON CONVERTING CONSTRUCTION DRAWINGS INTO PORTABLE DOCUMENT FORMAT (PDF)

Issued by:
Real Property Contracting Directorate
PWGSC

May 2005 Last Updated: May 3, 2005

Version 1.0

PREFACE

Portable Document Format (PDF) is the standard format for documents that are posted on the Government Electronic Tendering System (GETS). There is therefore a need to obtain from architectural and engineering consultants an electronic copy of drawings and specifications in PDF for tendering Government of Canada (GoC) construction projects.

In order to have the highest quality in term of resolution and printing, consultants should to the greatest extent possible have the PDF drawing and specification files derived from the native software in which they were created. Scanning is permissible but only in special circumstances, for example when there is no electronic version of a drawing being included in a construction tender package.

The purpose of this document is to provide basic information on the conversion of Computer Aided Design and Drafting (CADD) drawings in PDF. Creating a PDF file from a CADD drawing is a relatively simple process once all the necessary configurations and settings are in place. It actually should not take any longer than it would take to create a plot file or to send a drawing to a printer. The information in this guide is not intended to cover all technical aspects of the conversion, which can be done using various methods, but rather to highlight important points about the process and file settings. The conversion of specifications is not covered in this basic reference guide since it does not require any special configuration or setting.

The information provided in this basic reference guide is not an indication that consultants are relieved from following the established standards for the production of drawings and specifications. The sole purpose of this guide is to provide basic information on the PDF conversion process bearing in mind that additional detailed technical information is available from the various software manufacturers.

1. PRINTER DRIVERS

Adobe Acrobat provides two different printer drivers that are able to convert CADD drawing into PDF format, Acrobat PDF Writer and Acrobat Distiller. Before creating a PDF file from a CADD drawing, a choice must be made as to which one will be used.

Acrobat PDF Writer is a non-PostScript printer driver that works best with documents that don't contain complex graphics

Acrobat Distiller is a PostScript printer driver that works best with documents that contain PostScript fills, Encapsulated PostScript (EPS) graphics, or other complex elements.

It is recommended that Acrobat Distiller be used to create PDF file of architectural and engineering drawings due to their size and complex graphical nature.

2. PRINTER CONFIGURATION

Before converting a CADD drawing to PDF, an Acrobat printer configuration file for the PDF paper size needs to be created. This function can be done in the CADD software rather than using a custom paper size defined for the Acrobat distiller feature. The recommended method is to add a PostScript Adobe plotter in the CADD software and making the necessary setting in terms of media source and size, scale and orientation. The configuration can then be re-used to simplify the conversion process for future files that use the same page size.

As an alternative, although not recommended, a custom-defined size can be created in Acrobat Distiller in the *properties* menu.

3. CREATING PDF FILES

Once the printer configuration has been done in the CADD software, open up Acrobat Distiller and make the necessary settings in the *preferences* and *job options* sub-menu. Ensure that the page size match the sheet size selected in the CADD software to create the file. Particular settings can be saved under different names for future use.

With the Acrobat Distiller application open, ensure the required sheet size is displayed in the *job options* window. Then it is simply a matter of bringing the CADD file into the Acrobat Distiller creation box.

A progress bar will show during the conversion and the newly converted PDF file should open up and be displayed for verification.

4. PDF FILES SETTINGS

4.1 Security

Adobe Acrobat contains security features that can be used to secure the files by restricting any changes to the files. However, since the files will be posted on GETS and will be used for printing copies, the files **must not** be password protected and **must** allow printing.

4.2 Drawing Orientation

The final PDF drawing files must be displayed on the screen in the same direction that the users are intended to view them. This can be achieved by adjusting the setup of the plotter. If the drawing is not oriented properly after the conversion, it can be rotated manually within Adobe Acrobat.

4.3 Font Type

In order to avoid any problems during the conversion and to minimize the potential for font display errors, the fonts used for the production of construction drawings must be *PostScript or True Type fonts*.

4.4 Resolution

Since the PDF files will be used for printing, it is important that a proper resolution be selected. It is recommended to select 600 dots per inch (dpi).

4.5 Scale

When choosing the Plot scale in Adobe, it is important to choose the 1:1 scale to ensure the integrity of the scale from which the drawings were created in the CADD software.

5. SCANNING

Scanning is not recommended and should be done only when the drawing is not available electronically. When scanning a drawing, it is important that it be done in real size (scale 1:1) to ensure that the scale remains intact in subsequent printing. It is recommended that each scanned drawing be opened and verified to ensure that the resolution, scale and border are of an acceptable quality.

6. FINAL CHECKLIST

When the drawing file has gone through the PDF conversion, it is recommended to open it and verify the following:

- That the sheet size displayed is what was intended to be created (the size is viewable in the lower left corner of the drawing).
- That the orientation of the sheet is correct.
- That the line types, line weights and fonts match the CADD drawing.
- That the PDF file is in black and white.
- That each drawing is a single PDF file.
- That the PDF file is not password protected and printable.

If all the items are verified, the PDF file is useable

7. ADDITIONAL INFORMATION

For more information about the creation of PostScript and EPS files please refer to the User's Guide of the CADD software being used to produce the drawings. For more information about creating PDF file please refer to the Acrobat Distiller User's Guide and/or visit the Adobe Web site at www.adobe.com.



TECHNICAL REFERENCE FOR OFFICE BUILDING DESIGN



Revisions

Version	Date	Description
1.0	May 27, 2016	Original issuance.
1.1	March 6, 2017	Issuance of draft version to Federal / Industry Real Property Advisory Council (FIRPAC) for consultation. The document is renamed to the Technical Reference for Office Building Design, and has a re-written general section, and various edits to the technical content.
2.0	April 3, 2017	Issuance for use under the RPB Policy Framework. Contains edits to technical content of the electrical section, additional requirements for accessible washrooms, improved translations of the French version and minor edits to the scope.

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1 General

1.1 How to Use This Document

This document describes both the general approach to the design of Public Service and Procurement Canada (PSPC) custodial office buildings, and the technical aspects that apply to each major discipline involved in the design. These objectives must always be balanced against all other government objectives including, but not limited to, security, accessibility, sustainability, heritage conservation and end user requirements.

When using this technical reference, apply common sense and ensure best value to Canadians. The application of this document must always be interpreted and considered, both at the scoping stage and throughout design development, by a project team following an integrated design approach to question the validity of each of its components against the problem at hand.

This technical reference is a generic document, while appropriate project-specific requirements can be found in the request for proposal (RFP). The technical reference should be applied to new buildings in their entirety and to renovations of existing buildings, given their constraints, to the greatest extent possible. In its application to renovations of existing buildings, the document is not intended to be applied retroactively. As such, the opportunity to incorporate changes to meet these objectives should be considered as part of the scope of all renovation projects that involve related aspects of planned work. The requirements in this document should not be considered as justification to initiate a project but as minimum requirements.

1.2 Effective Date

April 3, 2017

1.3 Cancellation

This document supersedes *National Performance Standards (NPS)*, and draft Real Property Branch (RPB) *Federal Office Building Standard (FOBS)*.

1.4 Authority

This document is issued under the authority of the Director General (DG) Technical Services, Real Property Branch (RPB), Public Services and Procurement Canada (PSPC).

1.5 Context

This document is issued pursuant to the [Department of Public Works and Government Services Act](#) which states that the roles, duties and functions of the department's minister include:

- the construction, maintenance and repair of public works, federal real property and federal immovable;
- the provision of accommodation and other facilities for departments; and
- the provision to departments of advice on or services related to architectural or engineering matters affecting any public work, federal real property or federal immovable.

The document also supports the PSPC [Sustainable Buildings Policy](#) and complements [Government of Canada Workplace 2.0 Fit-up Standards](#).

1.6 Scope

This technical reference applies to construction projects undertaken by PSPC or by the private sector on behalf of PSPC on crown owned buildings for which PSPC is custodian and for which the predominant

use is office accommodations. This includes buildings predominantly used to offer office space categories such as general administrative, secure administrative, quasi-judicial office space, and call/contact centres. Variances from this technical reference must be justified in writing and submitted for acceptance to the regional PSPC office for Architecture and Engineering Services (AES).

The requirements of this document are not retroactive to existing buildings but do apply to renovation projects to the extent practical given existing conditions.

1.7 Purpose

The purpose of this document is to establish baseline building design and technical requirements for office buildings in order to ensure:

- office buildings are built to a high level of quality that meet operational needs;
- office building requirements are clearly defined and applied consistently by private sector service providers and PSPC staff;
- the design and construction of office buildings contributes to meeting Government and PSPC sustainability targets;
- design excellence;
- sound stewardship of our federal identity; and
- the design and construction of office buildings presents best value to the crown.

1.8 Enquiries

Enquiries about this document should be directed to the Director of Architecture and Engineering Services, Technical Services, Real Property Branch, Public Services and Procurement Canada at: TPSGC.dgbisag-rpbaes.PWGSC@tpsgc-pwgsc.gc.ca.

2 General Design Objectives

Most of the interactions between the federal government and Canadians occur in buildings delivered by PSPC. The quality of these buildings must project a consistent and positive image of the Government of Canada to the public. Design solutions must:

- meet the standards prescribed in this document, and where standards cannot be met, alternative solutions must be provided;
- satisfy the immediate occupancy needs outlined in the functional program and strive to anticipate future building uses; and
- make building systems adaptable to future uses and changing priorities.

The general design objectives noted below must be incorporated and applied to all design solutions for office buildings:

- functional suitability
- health, safety, universal accessibility, and security
- sustainable and enduring development
- creativity, innovation, and technical competence
- inspiring and attractive
- financial performance based on life-cycle costing
- heritage conservation
- environmentally responsible

2.1 Functional Suitability

Ensure design solutions are appropriate to their use and consider the performance of the asset over its entire life.

Design solutions must:

- respond effectively and efficiently to the operational requirements of the project;
- respond effectively to site-specific context and conditions considering urban design and landscape architecture;
- meet local urban design and planning guidelines; and
- be flexible and adaptable.

2.1.1 Code and Standard Versions

The design solutions must comply with all applicable federal laws, regulations and the codes referenced therein. This document references many codes and standards in a dynamic manner, meaning that for all codes and standards referenced, refer to the latest version published. For a full listing of codes and standards referenced in this document, refer to section 13. This is not an exhaustive list of all applicable codes and standards.

2.1.2 Provincial Requirements

When provincially mandated inspections are required in order to facilitate a utility connection or ensure safety of a system through a provincial inspection, the provincially adopted version of a code or standard may be applied to the project.

2.2 Sustainable and Enduring Development

PSPC is committed to the principles of sustainable development in all of its operations. The principles of sustainability must be incorporated in all phases of project delivery, especially in the initial stages when most of the key decisions are made. The building's design for energy use must be optimized through an integrated design approach with all disciplines. It must also meet the performance requirements outlined below as well as those listed throughout this document.

Ensure design solutions maximize a sustainable approach aimed at:

- improving the social value to support more livable communities;
- creating economic efficiencies; and
- reducing our environmental footprint by reducing, recycling, and reusing.

Design solutions must:

- meet the Leadership in Energy and Environmental Design (LEED) Gold for new buildings, alternately Level 4 Green Globes, and meet the *National Energy Code of Canada for Buildings*;
- meet the LEED Silver for renovations, alternately Level 3 Green Globes, and meet the *National Energy Code of Canada for Buildings*;
- utilize passive solar design to maximize the energy performance potential of the building and occupant comfort;
- be tailored to the local climate to ensure the durability and high performance of building systems;
- have an effective choice of building materials and systems to ensure durability and meet pre-determined durability targets set out for each project;
- be consistent with the Federal Sustainable Development Strategy (FSDS); and
- Comply with CSA-S478-95 Guidelines on Durability in Buildings.

2.3 Creativity, Innovation, and Technical Competence

Ensure design solutions demonstrate creativity, innovation, and technical competence in their approach to the functional program and context. However, only proven solutions are acceptable.

Design solutions must:

- maximize project potential as it relates to program requirements for the building and site;
- be innovative and creative in the problem-solving response to program and site constraints;
- demonstrate technical competence in the integration of design, building science, and engineering disciplines; and
- provide best value to the Crown over the life cycle of an asset.

2.4 Inspiring and Attractive

Ensure design solutions take into consideration the physical expression of the asset and contribute positively to the local context.

Design solutions must:

- enhance the immediate environment, both for direct users and the broader community;
- be recognizable as a federal office building, reflecting a positive image of the Crown and its core value of long-term sustainability;
- integrate visually within the unique context of the area; and
- provide clarity and consistency of architectural form and detailing.

2.5 Financial Performance Based on Life-Cycle Costing

Ensure design solutions demonstrate the balance between capital construction costs, operational costs, and sustainability.

Design solutions must:

- demonstrate best value to the Crown from the use of a life-cycle approach to the financial performance of the asset from construction to demolition; and
- be evaluated using life-cycle cost analysis according to industry best practice.

2.6 Heritage Conservation

The requirements of this document are not retroactive, however, major rehabilitation projects of federal heritage buildings should seek to address as many of the principles outlined within this document as possible while still respecting the [Standards and Guidelines for the Conservation of Historic Places in Canada](#).

2.7 Environmentally Responsible

PSPC must meet applicable environmental legislation and policies. PSPC is committed to sustainable development, applying it across all business practices, in compliance with environmental laws and regulations, in using environmentally beneficial products and services, and in using resources in a sustainable manner.

The essential principles of environmentally responsible design and construction include:

- Site - Optimize site potential
- Energy - Minimize non-renewable energy consumption
- Materials - Use efficiently environmentally preferable products
- Water - Protect and conserve water
- Indoor Environmental Quality - Enhance indoor environmental quality
- Operations and Maintenance - Optimize operational and maintenance practices over the full life cycle of the facility

These principles serve as the basis for planning, programming, budgeting, construction, commissioning, operation, maintenance, decommissioning of all new PSPC facilities, and for major renovation and alteration of existing buildings and facilities.

2.7.1 Prohibited Materials

The use of the following materials is prohibited on all PSPC projects:

- products containing asbestos;
- products containing pure formaldehyde;
- products containing polychlorinated biphenyls;
- products containing chlorinated fluorocarbons;
- solder or flux containing more than 0.2 percent lead and domestic water pipe or pipe fittings containing more than 8 percent lead; and
- Surface coatings with a concentration of lead in excess of 0.009 percent by weight, as per the [Hazardous Products Act's Surface Coating Materials Regulations](#).

2.7.2 Demolition/Remediation

Paint must be tested for lead content when alteration or demolition requires sanding, burning, welding or scraping painted surfaces. Do not abate lead-based paint when a painted surface is intact and in good condition, unless required for alteration or demolition. In child care centers, test all painted surfaces for lead and abate surfaces containing lead-based paint.

2.7.3 Removal of Asbestos-Containing Materials

Asbestos abatement is under the jurisdiction of provincial governments and PSPC applies processes and procedures that are consistent with the relevant requirements and regulations. Ensure that the asbestos management plan meets all applicable requirements.

Prior to design in a facility to be renovated, a building evaluation should be performed by a qualified inspector including a review of previous inspection reports and a site inspection. If asbestos damage or the possibility of asbestos disturbance during construction activity is discovered, an asbestos management plan shall be proposed and implemented. (Ref. DP 057, Asbestos Management).

All design drawings and specifications for asbestos abatement shall be produced by a qualified specialist. In general, projects should be designed to avoid or minimize asbestos disturbance. The environmental standards vary in each provincial / territorial jurisdiction and should be supplied by PSPC. All PSPC construction work that disturbs asbestos shall be performed using appropriate controls for the safety of workers and the public.

2.7.4 Fuel Storage Systems

Storage tank systems must comply with applicable *Canadian Environmental Protection Act (CEPA)*. The owner of the storage tank system must identify and register the storage tank system with Environment Canada. Under the Regulations, both the owner and the operators of storage tank systems must comply with the Regulations. The owners and operators both share the responsibility to prevent leaks and spills, report spills, implement emergency response and exercise due diligence in everyday actions.

Storage tank systems are also regulated under one or more of the following federal regulations: the *Canadian Council of Ministers of the Environment (CCME) Code of Practice*, the *National Fire Code of Canada* and the Installation for oil-burning equipment, CSA B-139-09.

If a leak is detected / discovered, the owner or operator (i.e. the property manager or his representative) shall notify Environment Canada and the provincial authority and provide all information requested.

2.7.5 Compliance with the Canadian Environmental Assessment Act (CEAA)

The *Canadian Environmental Assessment Act (CEAA)* assesses the impacts of a project on the surrounding environment which includes the natural environment, health, socio-economic conditions, and the physical and cultural heritage. Its purpose is to promote sustainable development to ensure that environmental impacts of projects are minimized and that the process is open and participatory.

An Environmental Assessment (EA) is a planning and decision making tool which is used to predict and identify environmental effects before they occur, plan mitigation to be incorporated into project design and determine whether a project should proceed. Ensure that EA checklist requirement is completed.

3 Site

The site provides the first impressions to Canadians of a federal office building. The Real Property Branch (RPB) is a custodian of real property assets and a provider of general-purpose office accommodations to federal departments. RPB's goals include:

- meeting the custodial requirements of accommodation as per Treasury Board standards;
- ensuring that provincial and municipal official plans, zoning bylaws, urban design guidelines, and other priorities are considered for the site development in the delivery of the real property program;
- meeting applicable environmental legislation and policies to ensure protection and preservation of ecological zones and habitats; and
- meeting the various site-development requirements of Leadership in Energy and Environmental Design (LEED) or Green Globes pre-established for the project.

3.1 Site-Specific Analysis

A site-specific analysis report must be prepared for each project illustrating that the above goals have been reviewed and evaluated as part of developing an integrated strategy. The site analysis must demonstrate a clear understanding of the existing site conditions.

3.2 Urban Design

The federal government is committed to working closely and collaboratively with Canada's communities in support of local planning priorities while meeting sustainable objectives. The federal government's intent is to support the quality of life of communities with appropriate, sensitive urban design.

3.2.1 Design Objectives

Urban design is important to ensure an appropriate "fit" of the facility within the urban environment. The building's form and adjacent open space areas must be integrated to ensure a cohesive, sensitive solution. Urban design objectives include:

- demonstrating compatibility with the physical characteristics of the area and the environment surrounding it, including neighbouring land uses;
- enhancing the quality of life of the community by:
 - linking, where possible, with the public transit system and including bicycle and pedestrian pathways to reduce stress on the existing transportation system; and
 - preserving and protecting the ecological features and the heritage and cultural values of the community;
- supporting the livable qualities of the neighbourhood and community by:
 - building massing that includes adequate setbacks proportional to the existing neighbourhood, supporting the integration of the building into the local context;
 - providing appropriate pedestrian sidewalk widths to include and support trees, rest areas with benches, and other site features to generate a lively pedestrian culture to ensure accessibility for all users; and
 - illustrating a respect for human scale and use at the street level;
- integrating into the existing streetscape by:
 - orienting the front of the building to the main thoroughfare and providing an open space in front of the façade where the main entrance is located;

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- creating an animated and transparent ground-floor level along commercial street frontages such as maximizing the use of clear glazing at public entrance areas and lobbies;
 - incorporating elements to aid in the reduction of wind tunnel and wind shearing effects at grade levels around the building;
 - integrating site furniture (benches, waste receptacles, light standards), plantings, and bus shelters with the building's design to assist in improving the functionality of the streetscape and neighbourhood;
 - locating service entrances away from active public streetscapes, and if space is limited, designing service entrances so they are screened from the street in order to preserve the sense of place and aesthetic appeal of the streetscape, while ensuring that there is no manoeuvring or backing in from the street; and
 - the use of crime prevention principles through environmental design for the planning of the site, including taking advantage of opportunities for passive surveillance and territorial control.

3.2.2 Master Planning

Master planning is fundamental for the appropriate organization and development of sites. For federal precincts, campuses, office complexes, and office buildings, a master planning exercise must be undertaken for the project site area. At a minimum the following elements must be studied:

- the site's capacity to accommodate the building or building complex's functional, operational, and experiential components;
- the natural and built environment, including topography and climatic conditions;
- the surrounding context of the site in relation to:
 - rural, suburban, and urban core contexts;
 - neighbourhood and streetscape typologies;
 - heritage designations;
 - servicing;
 - emergency access; and
 - public transit opportunities;
- the projected growth and development of the surrounding area;
- the on-site circulation of employees, business operations, functional requirements, public transit links, and general public use;
- all applicable legislation and standards as well as local municipal official plans, technical standards, and bylaws for the site and adjacent land areas and urban fabric; and
- project-specific costs, risks and other issues associated with the site's development.

Furthermore, master planning for a multiple-building complex or campus must incorporate open areas, which can be either adjacent to the building or at another location as determined by the site master plan. In addition, security elements must be integrated with the site design and building design.

3.3 Landscape Architecture

The intent of landscape architecture design for federal office buildings is to provide integrated design and technical solutions to create liveable and sustainable environments. At varying scales of planning, design, and management, design strategies must encompass innovative and creative built-site infrastructure utilizing natural landscape elements to support and enhance federal office buildings.

3.3.1 Design Objectives

The objective of this section is to establish sound landscape architectural design requirements for federal office buildings. Sites for federal office buildings range in scale from single buildings in urban and rural settings to large campuses, precincts, and districts. Landscape architecture design objectives are to:

- create a well-developed site that will support and enhance the building's function and operation;
- enhance the user's outside experience;
- enhance the linkages and connections with the adjacent streetscapes and neighbourhoods;
- support and enhance sustainable best practices to strengthen the inter-relationship of the landscape and building with the environment through the use of green infrastructure; the reducing, recycling, and reusing of materials; and other sustainable practices and strategies;
- support and enhance the social values by applying universal accessibility best practices for all main access and exit points to buildings and sites, parking, and other amenities; and
- ensure low-maintenance solutions to create operational efficiencies.

3.3.2 Site Design

Site design strategies must utilize the local climate and environment to reduce operational costs and support an effective functional program for employees and the public by:

- demonstrating how sun radii, wind, topography, and vegetation are used to create microclimates to enhance the experience of the site and building for the occupants and visitors;
- illustrating how scale and massing of the building and its infrastructure, such as parking structures and circulation systems, will not negatively impact adjacent open spaces or streetscapes or critical view lines to and from the site;
- demonstrating how the design of the exterior circulation systems and site amenities supports the building's functionality, such as selecting appropriate locations for principal building entrances and key destination points that are easily identifiable when approaching the building; and
- demonstrating how wayfinding and orientation systems are efficient and effective and assist in preserving the cultural and aesthetic values of the landscape surrounding the building.

3.3.3 Technical Requirements

3.3.3.1 Site Areas

Site areas around buildings must encourage interaction with the environment and social interaction of the occupants as well as support recreation activities. The outdoor space must be:

- designed with natural landscaping materials selected to reduce impervious "hardscape" elements;
- designed using native plants to limit maintenance requirements and promote biodiversity;
- integrated with vegetative elements to create a dynamic landscape throughout the year that takes in consideration the four seasons;
- focused on eliminating the use of potable water for irrigation and using where required grey water irrigation systems and plantings, which require little to no irrigation;
- planned with trees placed to provide shaded rest areas and assist in achieving reductions in heat and glare on hard surfaces, as well as to contribute to the general enhancement of pedestrian health and comfort; and

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- planned with the intent of integrating planting in and around the building and parking area in order to promote visual surveillance for safety and security.

3.3.3.2 Circulation

Convenience and clarity of the exterior circulation system is a priority. Exterior circulation must be planned to achieve the following objectives:

- demonstration of a clear design strategy for pedestrian, bicycle, vehicular, service delivery, construction, emergency, security, and exterior material-handling circulation routes; intersections; staging areas; vehicular laybys; drop-off areas for building occupants; parking areas; as well as waste and snow storage areas;
- provision of space for drop-off zones and waiting areas for pedestrians and vehicles;
- integration with existing walkways, paths, and vehicular circulation networks; and
- demonstration of parking areas and circulation routes that maximize sustainable best practices to reduce impacts on the natural environment for stormwater and heat absorption.

3.3.3.3 Vegetation

Vegetation strategies must include:

- conservation and enhancement of existing natural areas and restoration of damaged areas to provide habitat and promote biodiversity;
- reinstatement of trees removed from the site on a ratio of two new trees for every tree removed; and
- integrated pest management using, where possible, natural predators to control infestations and monitoring programs where infestations have occurred.

3.3.3.4 Site Grading

Grading strategies must demonstrate an integrated approach to the site and building and adjacent land areas. There must be no negative impacts to riparian zones, ecologically sensitive landscapes, existing trees and shrubs that will be remaining, and adjacent land areas not owned by the federal government.

Site grading must:

- reuse materials, where possible, through efficient excavation;
- minimize the transport and placing of excavated materials to limit compaction;
- avoid the potential for settlement resulting from compression of the underlying soils;
- minimize the need for retaining walls;
- minimize the need for constructing cut slopes; and
- minimize the need for removal of topsoil or other organic soils including fill materials.

3.3.3.5 Site Drainage

The site drainage planning must include the development of a strategy to minimize the volume of stormwater and snowmelt runoff going to municipal systems, and to improve water quality. The approach should if possible be based on the historical conditions of ecosystems in the region.

In all cases, the design of site drainage must minimize the negative impacts of site grading strategies to municipal infrastructure, adjacent landscapes, surface water bodies, and below-ground water tables through:

- the use of above- and below-ground, sustainable green infrastructure stormwater control systems and site design such as the elimination of concrete curbs;
- incorporation of an integrated stormwater retention and detention system for the roof in order to reduce stormwater runoff and, where applicable, to provide irrigation;
 - for example, implementing a green roof or rainwater harvesting strategy should be considered, the viability and effectiveness of which must be clearly demonstrated;
- the provision of grey water irrigation to assist on-site vegetation growth if irrigation is required; and
- the provision of proper drainage to eliminate standing water that is at risk of harbouring mosquitoes or other disease-carrying insects.

For all projects, the following criteria must be respected:

- all surface stormwater runoff must be addressed on-site;
- a major drainage system must be designed to address a 1:100 year storm event;
- where a minor drainage system is required, it must be designed to address a 1:5 year storm event; and
- storm drainage systems must rely on gravity flow wherever possible.

3.3.3.6 Soil Erosion

Site planning and design must include strategies to control and minimize soil erosion, waterway sedimentation, and airborne dust. The site plan and sedimentation control plan for all land-related construction activities must:

- conform to the erosion and sediment control requirements of the provinces and municipalities; and
- mitigate risk of erosion of the embankments and sloped areas, especially those that could impact riparian zones, waterways, and stormwater retention ponds.

3.3.3.7 Site Furniture

The design and provision of site furnishings and shaded rest stops are an important aspect of site planning. The requirements of the functional program must be met and the selection of furnishings must:

- fit with the design concept for the building and surrounding site;
- be made of durable long-lasting materials; and
- require little or no maintenance.

3.3.3.7.1 Bicycle Storage

Secured bicycle storage for 5% or more of the regular building occupants should be provided within 60 m of the building. Bicycle racks should be placed in a location that is convenient to riders, such as a parking garage, parking lot or near a building entry. Bicycle racks should be located to avoid potential conflicts between cyclist and pedestrian traffic and also ensure that users do not cut across turf or planting areas. This location should be highly visible by building occupants, security personnel, security monitoring systems or by general traffic or in a secure (locked) area for use only by employees. Racks should have provisions for locking bicycles to them. Bicycle racks should be compatible with other site

furnishings and with the architectural and landscape design. Bicycle storage requirements should also be reviewed in conjunction with local regulations.

Materials for outdoor bicycle racks should be very durable and resistant to vandalism. Movable racks can be an important component in effective outdoor spaces. However operational considerations must be given as to the risk of theft and their storage. Metals that require repainting should not be permitted.

3.3.3.8 Site Lighting

Site lighting designs must achieve necessary light pollution reduction. Refer to section 8, Electrical Engineering, for additional requirements. Designs must:

- support the reduction of light fixture glare;
- support the reduction of light trespass to adjacent sites;
- support a balance between providing good visibility and meeting security concerns while respecting the character of a site, streetscape, and neighbourhood; and
- respect light hierarchies as per master planning and urban design requirements.

3.4 Civil Engineering

3.4.1 Design Objectives

The civil engineering design objectives associated with site development for both new construction and existing buildings include:

- aligning with provincial and municipal requirements found in official plans, zoning bylaws, technical standards, and other design and technical guidelines for the development of sites;
- integrating the project requirements of the utility and services authorities having jurisdiction, including those related to equipment installation, access, maintenance, and replacement;
- locating piping for all systems under dedicated service corridors or vehicular circulation routes to ensure year-round accessibility for maintenance;
- addressing trenching to minimize differential frost settlement of the cuts, reduce the settlement effects of trenches and pipes, as well as ensure frost protection of the pipes;
- controlling stormwater and sanitary sewage to meet the discharge standards of the authority having jurisdiction over the receiving outlet;
- sizing sanitary systems to accommodate “peak waste flow,” including long-term development forecasts as well as allowances for infiltration following municipal guidelines; and
- providing sanitary systems separate from stormwater systems.

3.4.2 Water Supply Services

The planning and design of water supply services for a campus must include the requirements to use a loop system fed from more than one source and to configure the entire distribution network to ensure redundancy of supply. Buildings must also have two feeds to ensure redundancy.

Service connections for individual site and building water supply must meet following design and technical requirements:

- the system design must confirm the available flow rates from the surrounding system;
 - flow rate testing and hydraulic analysis must be completed as part of the design to confirm capacities and pipe sizing;

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- flow and pressure requirements for site fire protection demands must be met, including the requirements of:
 - the National Building Code of Canada;
 - the National Fire Protection Association NFPA 24: *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*; and
 - domestic water demands (peak and average) must be met;
 - service lines to buildings are to be grounded as required by the *Canadian Electrical Code*, specifically the use of 3.0 m minimum metallic, continuous ductile iron or copper piping outside the building footprint is the preferred method of grounding;
 - modular wall seals must be provided at water service entries to buildings; and
 - cathodic protection of water mains and associated appurtenances must be provided based on soil and groundwater conditions and municipal standards.

3.4.3 Stormwater Management Services

Stormwater management services must be integrated with landscape architectural requirements for surface water flows. Refer to section 3.3.3.5, Site Drainage, for specific requirements. The gravity-based system must have as a minimum:

- pipe flow velocity within a range of 0.6 m/s to 3 m/s under full flow conditions;
- optimization of on-site water detention; and
- stormwater system components that meet the following requirements:
 - catch basin leads must be a minimum of 200 mm in diameter;
 - maintenance holes must be a minimum of 1200 mm in diameter;
 - sumps must be provided in maintenance holes and catch basins; and
 - safety platforms must be provided in maintenance holes that are more than 5.0 m deep.

3.4.4 Site Grading

Site grading must be integrated with landscape architectural design requirements. Refer to municipal requirements and to section 3.3.3.4, Site Grading, for detailed requirements.

3.4.5 Sanitary Services

On campuses, the sanitary sewer system design for individual buildings must be integrated with landscape architectural design requirements.

In rural areas, follow the requirements of the provincial and municipal authorities having jurisdiction for septic systems for on-site sewage treatment. Cesspools are not permitted.

The sanitary system of individual sites and buildings must be sized to accommodate “peak waste flow” as well as the long-term needs of the site. The system must meet the following design and technical requirements:

- cleanouts are to be located in the interior of the building, and maintenance holes must be provided where exterior access is required;
- municipal requirements as well as local guidelines of leakage allowances must be followed, and these design values for extraneous flow rates must be included in calculating peak sanitary flows; and

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- pipe velocity flow rates must be confirmed after construction and data must be submitted as part of the commissioning process;
 - sanitary system components must meet the following requirements:
 - sanitary sewers must be a minimum of 200 mm in diameter;
 - maintenance holes must be a minimum of 1200 mm in diameter;
 - maintenance holes must be benched;
 - external drop pipes must be provided for maintenance holes where the inlet elevation exceeds 600 mm or in accordance with the local authority having jurisdiction; and
 - safety platforms must be provided in maintenance holes that are more than 5.0 m deep.

4 Architecture and Interior Design

4.1 Design Objectives

The site, setting, and appearance of a federal building contribute to the image of the Government of Canada. In this context, the base building design of a federal building and its interior public spaces must contribute to the overall architectural value of the building. The main building signage and flagpoles must also be integrated into the design of the building.

Federal buildings must have a load factor ranging from 1.1 to 1.3 based on the 2010 American National Standards Institute / Building Owners and Managers Association ANSI/BOMA Z65.1-2010: *Office Buildings: Standard Methods of Measurement* using Method B. Buildings must also meet the following technical performance standards with reference to other detailed requirements in sections 6, Mechanical Engineering, and 8, Electrical Engineering:

- the building must meet a maximum air leakage rate of 0.20 air changes of building volume per hour at the standard building pressure of 50 N/m², and all buildings must undergo air leakage testing to confirm that this target level of airtightness is met;
- the building must be designed to minimize stack effect, and solutions to achieve these objectives must be identified; and
- the building design service life is to be a minimum of 50 years according to CSA S478: *Guideline on Durability in Buildings*.

4.2 Building Common and Service Areas

4.2.1 Entrances

The building must be designed to direct the visitor to a principal entrance, which must be conveniently located, have a grade-level approach based on existing site conditions, as well as be clearly articulated on the exterior of the building. Secondary and tertiary entrances must also be clearly articulated on the exterior of the building.

Building entrances must meet the following design and technical requirements:

- have a canopy for weather protection, sized for sheltering and for emphasizing the main entrance;
- have weather protection for secondary and tertiary entrances;
- provide conventional swing doors and a vestibule at the principal and secondary entrances, revolving or sliding doors may;
- provide a personnel door for exterior overhead door locations;
- incorporate building and wayfinding signage in compliance with the applicable treasury board federal identity policies, including standard federal signage mounted on a prominent facade and a flagpole mounted on a facade or the rooftop;
- deploy solutions to inhibit the buildup of dirt and moisture in the lobby;
- deploy solutions to maintain the integrity of the security of the lobby; and
- incorporate appropriate decorative or accent lighting to support the design concepts.

4.2.2 Lobbies

The main building lobby must provide a welcoming impression to Canadians visiting the office building and reflect a positive identity for the federal government. Lobbies must meet the following design and technical requirements:

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- be clearly visible from the exterior of the building both in the daytime and at night;
 - have the elevator lobby and main building lobby located such that they are visible from the building entrance vestibules;
 - be laid out to allow a continuous flow of pedestrian traffic with space large enough to accommodate all employee traffic during peak hours;
 - provide interlink ground floor entrance areas from the street and the parking lot areas;
 - accommodate circulation requirements that include additional floor area for a visitor and a security desk approximately 24 m² in size as well as surrounding area for security screening;
 - accommodate the placement of reception and security control functions to provide visual supervision and physical control of the lobbies, including elevator lobbies and escalator lobbies;
 - be designed to adhere to security requirements (see section 10, Security);
 - utilize durable interior finishes for all areas and high-impact-resistant finishes for areas with heavy pedestrian traffic, using finishes that can be easily cleaned and maintained (painted gypsum wallboard [GWB] is not considered durable);
 - have appropriate decorative or accent lighting to support the design concepts; and
 - at least one accessible washroom must be provided in close proximity to areas where public events may be held.

4.2.3 Building Core and Support Spaces

The core is the central area of the floor plate, which includes elevators, exit stairs, washrooms, mechanical and service shafts, as well as electrical rooms. The elevator lobby and the main building lobby must be designed as an interconnected reception area.

Planning for building cores must establish distances to perimeter glazing following Leadership in Energy and Environmental Design (LEED) requirements, with the workstations located no more than 12 m from the window wall.

Planning of office floor plates must be flexible to allow the subdivision of typical floors into a minimum of two separate tenant areas while not compromising life safety for occupants.

There must be an acoustic separation of sound transmission class (STC) 52 between the building core and occupant areas.

Requirements for building support areas and inter-relationships determined by the functional program must be achieved in the design.

4.2.3.1 Elevators

All occupied areas of a federal multi-story building must be served by at least one passenger elevator. Elevator cab sizes, class, and service capacity are to be determined through an elevator traffic capacity, wait times, and system analysis. Elevators must meet the following design and technical requirement:

- passenger elevators, if more than one, must be grouped in banks of at least two for efficiency;
- travel distances from a given office or workstation to an elevator must not exceed 60 m;
- the location of stairs and their design within buildings must be inviting and encourage their use rather than elevators, to the fullest extent feasible;
- if no separate freight or service elevator is provided, one passenger elevator must be designated as a service elevator;
- a freight elevator must be provided for midrise and higher office buildings;

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- a minimum ceiling height of 2.7 m is required in service elevator cabs, and freight elevators must have a ceiling height of no less than 3.7 m;
 - elevator wait times must be no more than 24 to 27 seconds during the morning peak time and no more than 31 to 35 seconds during the noon peak time;
 - the number of passenger elevators must be determined by the elevator traffic and system analysis;
 - provide shuttle elevator(s) from the ground floor lobby to below grade parking with fully automatic operation with selective-collective operation. Capacity must be based on anticipated traffic flow and system analysis; and
 - where equipment penthouses are provided, service elevators must provide access to that level.

A non-proprietary elevator control system must be used, and the PSPC project manager must define the extent of control. Destination control systems must be used. Security controls must be installed with override systems as required by the functional program.

Passenger elevator finishes must be focal points for the interior design of the building. Finishes for all surfaces must be durable, easily replaced, and low-maintenance. Door surfaces must be durable, scratch-resistant, and easily replaced. Inside and outside finishes must be coordinated with adjacent wall surfaces.

All finishes for service elevators must meet the service-level requirements for durability, and walls and ceilings must be metal. Flooring must durable, non-slip, easily maintainable, and replaceable.

In passenger elevators, recessed downlights or indirect fixtures must be used. Freight elevators must have recessed ceiling light fixtures.

All elevators must meet the requirements for firefighters emergency operation, with the service elevator designated as the dedicated firefighters elevator for the building.

4.2.3.2 Stairways (Open for Convenience)

Open stairways that connect lobby and atrium spaces must use a similar materials palette as the lobby space. Open risers are not to be provided.

4.2.3.3 Mechanical and Electrical Rooms

Mechanical and electrical equipment rooms must be designed with adequate aisle space and clearances around equipment to accommodate maintenance and equipment replacement. These rooms must meet the following criteria:

- mechanical rooms must be located to minimize heat and sound transmission to other parts of the building;
- mechanical spaces must be large enough to allow for a safe working environment and provide adequate area for maintenance service requirements and for future expansion;
- equipment rooms must have hoists, rails, and fasteners for chains to facilitate installation or removal of heavy equipment;
- easy access must be provided to roof-mounted equipment by an elevator cab stop or a large stairway to facilitate maintenance, and temporary ladders, steep stairwells, and ship's ladders must not be used;
- main mechanical and electrical equipment rooms (such as mechanical penthouses or basement rooms) must not be less than 3.6 m clear in height from the underside of the structure;

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- doorways and corridors to the building exterior must be of adequate size to permit the replacement of equipment; and the path may include knock-out panels, hoists, and provisions for cranes but must allow equipment replacement;
 - mechanical and electrical rooms must be accessible from non-occupied spaces such as corridors;
 - primary substations (electrical vaults) or rooms containing the main secondary switchgear must not be located below garage ramps, washrooms, or janitor closets or be at an elevation that requires sump pumps for drainage;
 - transformer vault rooms and emergency generator rooms must be located following the requirements of the local authority having jurisdiction;
 - floor-mounted electrical and mechanical equipment such as switchgears, main building transformers, motor control centres and generators, chillers, boilers, pumps, air-handling units, electric motors, motor starters, and tanks must be set on concrete housekeeping pads, curbs, or saddles at least 100 mm thick and at least 100 mm wider on all sides than the equipment they support; and
 - fuel tanks or storage tanks must have a housekeeping pad that incorporates a raised barrier of adequate volume for spill containment.

4.2.3.4 Vertical Shafts

Vertical shafts for running pipes, ducts, and flues must be located adjacent to other building core elements. In addition:

- shafts must be straight vertical runs for services;
- shafts must be sized 20% larger in area to accommodate planned expansion of the systems; and
- bus ducts require a raised containment curb edge at floor slab penetrations, and sleeves are to continue to 75 mm above the floor slab.

4.2.3.5 Washrooms

Washrooms must be located adjacent to vertical shafts at the building core. At least one washroom on each floor must be accessible, meeting the requirements of CSA B 651 *Accessible Design for the Built Environment*.

They must be designed with water-resistant, easily maintainable, durable finishes on all walls and floors. A mirror must be provided above each sink, or a continuous mirror provided across the entire sink area. All washroom partitions must use durable, easily maintainable materials and must be ceiling- or wall-hung. Separation partitions between urinals must be provided. Each washroom must have two recessed waste receptacles, in stainless steel, one for paper towels and one for garbage. Washroom plumbing fixtures must be of a low-flow specification in all areas except basement areas.

4.2.3.6 Change Rooms, Showers, Locker Rooms

Change rooms with lockers must be located as part of washroom areas associated with relevant LEED credit. If provided, the planning of the change rooms must include lockers and benches. The showers must be separate showers and visually separated from the locker areas. All finishes must be water-resistant, easily cleanable, and maintainable.

4.2.3.7 Custodial Spaces

Custodial spaces must be provided to support the operation and maintenance of the building and include building maintenance storage rooms, stockrooms, and maintenance workrooms. Provide a minimum area of 20 m² in the basement, on the ground floor adjacent to loading docks, and in the rooftop penthouse. Coordinate requirements with the functional program.

4.2.3.8 Janitor Closets

Janitor closets must be directly accessible from the office floor corridor and discretely located near the washroom facilities.

4.2.3.9 Recycling Centres

Corridor areas must be provided with multi-material waste and recycling recesses. A minimum of three containers is typical: one each for recyclables, mixed recyclables, and compostables. However, the requirements must be confirmed with building management. A minimum of one station per floor or one station per 1000 m² must be provided.

4.2.3.10 Waste Management Rooms

Waste management rooms and equipment must be secured and adjacent to loading docks or service entrances and meet the following requirements:

- be sized to accommodate the required functions of central collection, separation, and storage of garbage, recycling, and compostable materials;
- have areas sufficient for the storage of anticipated waste material volumes generated during a three-day building occupancy period;
- have refrigerated areas for compostable materials;
- accommodate all governmental requirements pertaining to waste reduction and waste audit programs; and
- facilities that use waste containers picked up by vendors must have at least one internal loading berth for the waste containers.

4.2.4 Building Management Spaces

Property management, building systems technicians, and building cleaning operations teams must have offices next to the security control centre. Approximately 15 m² must be allocated for this standard office space. Refer to the requirements of the building-specific functional program.

4.2.4.1 Security Control Centre

The security control centre must be located adjacent to the main lobby. Approximately 20 m² must be allocated for this room, which will require rough-in of specialized conduit in the floor slab and ceiling areas for the workstations. Rough-ins are also required for the building automation system (BAS), the emergency power system, as well as the fire alarm annunciator panel.

Planning for a security command centre and inspection station must be considered if it is not required at the time of building design. The security control centre design criteria outlined above must be used in conjunction with the Royal Canadian Mounted Police (RCMP) physical security guide [G1-013: Security Control Centre Space Requirements](#).

4.2.4.2 Loading Docks, Shipping, and Receiving

The loading docks and shipping and receiving areas are to be available to PSPC at all times. These areas must be convenient to service or freight elevators so that service traffic is segregated from the main passenger elevator lobbies and public corridors. They must be fully inside the building and include staging areas. Other requirements include the following:

- loading docks must be located for easy access by service vehicles and be separate from the main public entrances to the building;
- trucks and trailers that remain outside the building must have expandable environmental seals provided to separate interior unloading areas from the exterior;
- dock levellers and one scissor lift must be provided to accommodate the variety of bed heights of service vehicles;
- the edges of loading docks must be protected with edge guards and bumpers; and
- spot lighting must be provided to illuminate the inside of trailers for the loading and unloading activities.

4.2.5 Structured Parking

Parking is to be exterior on-grade parking, interior below-grade parking, or standalone structured parking. The general management criteria are contained in the Real Property Branch [Custodial Parking Policy](#) and [Custodial Parking Procedure](#). Design and technical requirements include the following:

- structures and parking spaces must be laid out for maximum efficiency;
- parking stalls must be full-sized, and compact vehicle-sized parking stalls are not to be provided;
- two-way aisles must have a minimum width of 6.7 m, one-way aisles a minimum width of 3.6 m, and parking spaces must be a minimum of 2.6 m wide and 5.2 m long;
- preferential parking spaces are to be provided for accessible parking and for electric vehicles with charging stations;
- accessible parking spaces must be adjacent to access aisles that are part of an accessible route to the building or facility entrance;
- access aisles and entrance platforms to elevator lobbies are to use bollards and guardrails to safeguard routes;
- entrances and enclosures of elevator lobbies must be located so that they are visible from the interior of the parking facility, and must have a glazed wall area that is a minimum 50% of the total wall area;
- structural elements must not intrude upon the required stall dimensions, columns must not be located within 610 mm of the required aisle (except where the aisle has no stalls perpendicular to it), and each stall must have direct access to an aisle;
- the entire length of the entrance and exit ramps must be protected from snow and ice, and snow and ice must not accumulate on the ramps;
- all vehicular entrances to structured parking are to be secured with overhead doors or grilles that must be electric-powered, on an emergency power circuit, and operated by card-readers or other means of remote control;
- garage openings must have a minimum width of 3.6 m and a minimum height of 2.4 m, and must be monitored by video camera;

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- the clear height throughout the vehicular accessible areas of a parking structure must not generally be lower than 2.25 m; and
 - a headache bar, with signage indicating the clear height, must be provided in front of each garage opening and mounted slightly lower than the clear height of the parking garage.

Pedestrian walkways must link the exterior structured parking or outdoor parking area with the building entrance. Passive landscape techniques must be used to prevent vehicles from encroaching upon pedestrian walkways. In addition, pedestrian crossings of vehicular circulation lanes must be identified.

4.3 Building Envelope

The objective is to have a building envelope that provides an effective separation between the interior and exterior environments to ensure the comfort of occupants and meet passive solar and energy consumption goals. The exterior enclosure must have a high level of refinement in the aesthetic expressed by the proportions, scale, and relief as well as the materials and colours used.

4.3.1 Exterior Wall Assemblies and Components

The exterior building envelope must be designed in accordance with the “rainscreen” principle. Face-sealed envelope systems must not be used. The envelope must meet or exceed the requirements established in the CSA S478: *Guideline on Durability in Buildings*. Design and technical requirements include the following:

- walls must have a minimum 50-year full service life and at least 30 years of service life prior to a major rehabilitation;
- windows must have a minimum 25-year full service life and at least 15 years of service life prior to a major rehabilitation of gasket and seal replacements;
- roofs must have a minimum 20-year full service life;
- the exterior wall design must provide complete control of the migration of heat, air, and moisture through the building enclosure, and minimizing risk of moisture-related failures must be prioritized in the design of exterior walls;
- the cladding design must have the means to evacuate moisture from the wall assembly and must comply with the American Society of Heating, Refrigerating and Air-Conditioning Engineers ASHRAE 160: *Criteria for Moisture-Control Design Analysis in Buildings*;
- the percentage of vision glazing and the energy performance characteristics of glazing selected for facades must reflect passive solar design best practices, and vision glazing is not to exceed a maximum of 40% of the envelope areas;
- curtain walls must be a pressure-equalized rainscreen design;
- curtain walls and windows must use high thermal performance thermally broken, metal frames with high-performance glazing units;
- metal and glass cladding systems must meet the requirements of the American Architectural Manufacturers Association and CSA Group’s AAMA/CSA 101-A440 *North American Fenestration Standard / Specification for Windows, Doors, and Skylights* in terms of maximum air leakage, as well as meet the performance class AW40;
- opaque wall assemblies must be a pressure-equalized rainscreen design and must reduce thermal bridging to a minimum, to less than 5% maximum of the wall area;
- window wall assemblies are not permitted for multi-storey buildings; and

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- a thermal analysis of the window systems must be provided based on the National Fenestration Rating Council's NFRC 500: *Procedure for Determining Fenestration Product Condensation Resistance Values*.

Soffits are totally exposed to weather and must therefore be designed to be resistant to the migration of heat, air, and moisture from the exterior to the interior environments. They must be designed to:

- resist displacement due to wind uplift;
- allow for access to operable equipment; and
- be airtight and insulated to limit condensation on the enclosure materials.

In addition, equipment or distribution systems that may be affected by weather must not be located inside soffits.

4.3.2 Exterior Sun Control

Passive solar principles and techniques must be used with facade and glazing designs to maximize responsiveness to climatic conditions. The base building envelope should be designed and constructed to passively manage solar heat gain, daylight, and glare with the use of passive sun-shading devices. Architectural features in the form of a projection from the face of the building must not cause ice accumulations that could represent a risk to the public.

Provision for repair, maintenance, and window cleaning, must be part of the exterior sun-control system design.

4.3.3 Glazing

The choice and thickness of double- or triple-glazed glass windows and the selection of glazing coatings and type of insulating gas in the air spaces must be based on climate, energy conservation, and security requirements.

Minimize the use of highly reflective glass that produces mirror images to avoid creating glare that would impact the surrounding streets and buildings.

Comply with legislation that aims to reduce danger to migratory birds.

The design of the building must include provisions for cleaning the interior and exterior surfaces of all windows, as per the CAN/CSA Z91-M90: *Safety Code for Window Cleaning Operations*, as amended from time to time.

4.3.4 Interior Sun Control

All windows on general office floors must have manually operated fabric roller shades to control the amount of daylight and heat gain in the office space. The type of shade, fabric, and neutral colour must be consistent throughout the building. The light filtering capacity must range from 0% to a maximum 14% openness factor. Openness factors must be selected and located on facades to achieve optimum effectiveness based on building orientation and exposure.

The interior fabric must be resistant to degradation by temperature variations and colourfast when in direct sunlight. The fabric must be stain- and mould-resistant and dimensionally stable. All fabric and hardware must be heavy-duty commercial grade, with a minimum warranty of 5 years.

Provide remote-operation controls for coverings on clerestory and atria windows. Ensure that systems and techniques are proposed for servicing for cleaning, maintenance, repair, and replacement.

4.3.5 Exterior Doors

Entrance doors must be constructed of heavy-duty materials that can withstand continuous high traffic. The exterior side of one leaf of a double-door entrance must have a lock guard or astragal to prevent tampering or break-in.

Doors used for egress only must not have any operable exterior hardware.

4.3.6 Bird Control Devices

Building design strategies must include techniques to manage bird control and reduce opportunities for nesting.

Design facades to meet the best practices contained in the [Bird-Friendly Development Guidelines](#) and the *Bird-Friendly Development Rating System* published by the City of Toronto (www.toronto.ca/lightsout/pdf/development_guidelines.pdf).

4.3.7 Window Washing Equipment

Building design must include suitably engineered systems for window washing equipment. The design applies to buildings of three stories or 12 m and higher, and must conform to the technical requirements found in the CAN/CSA Z91-02: *Health and Safety Code for Suspended Equipment Operations*.

4.3.8 Roofing Systems

Roofing systems and below-grade waterproofing systems require assemblies that are highly resistive to physical damage, including impact and water-entrapment resistance. Single-ply systems can only be used where the system is fully adhered to a solid structural surface. General principles that must be met include the following:

- roofing design, including metal flashing and trim, must follow the recommendations of the Canadian Roofing Contractors' Association (CRCA) and provincial roof associations;
- roof membranes are to be 2-ply, fully adhered membranes, and loose-laid and single-ply roof membranes must not be used;
- all inverted roof assemblies including green roofs must incorporate suitable wiring systems to facilitate the use of the electric field vector mapping (EFVM) non-destructive testing method to test for leaks in the waterproof membrane;
- roofing is to be sloped to drains and to avoid ponding on the surface of a membrane;
- the exterior surface of parapet walls and penthouses must be consistent and integrated with the envelope assembly materials;
- roof insulation must be installed in a minimum of two layers to maximize thermal breaks;
- permanent access via stairs to all roof levels must be provided to facilitate recurring inspection and maintenance, and the use of ship's ladders is not permitted;
- there must be continuity of the roof waterproof membrane and the wall air barrier;
- noise-emitting roof-mounted equipment must be screened with noise-abating panels;
- roof-mounted equipment must be housed in penthouses or screened by walls;
- roof-mounted equipment must be set back from the roof edge to minimize visibility and allow access for maintenance and repairs;
- critical roof-mounted equipment must be installed to permit roof system replacement or maintenance without disruption of equipment performance;
- pitch pocket details are not acceptable;

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- no building element may be supported by the roofing system except walkways;
 - exposed waterproof membranes on roofing assemblies must be protected by walkways along routes to and around rooftop equipment and all public/building user activity;
 - roof-mounted devices, such as antennae, lightning rods, flagpoles, and roof anchors, must be integrated into the building structure and roof design; and
 - all podiums and rooftop areas providing access to building occupants and the public must have protected waterproof membranes and insulation, as well as structural assemblies that will withstand the structural loading of planned activities and parapet heights that will address occupancy requirements.

4.3.9 Skylights and Sloped Glazing/Atria

These public area architectural features at the entrance and lobby spaces pose particular challenges for operations and maintenance. They must meet the following requirements:

- skylight design must follow the requirements of the American Architectural Manufacturers Association (AAMA) / Window and Door Manufacturers Association (WDMA) standard AAMA/WDMA 1600/I.S.7-00: *Skylights and Space Enclosures*;
- skylight placement must be calculated to prevent glare or overheating in the building interior;
- skylight and sloping glazing design must also incorporate the pressure-equalized rainscreen (PER) principle, which is based on the principle of pressure equilibrium;
- condensation gutters and a path for the condensation away from the framing must be incorporated; and
- design strategies must be provided for the cleaning of all sloped glazing and skylights, including access and equipment required for both exterior and interior faces.

4.3.10 Thermographic and Air Pressure Testing

The design intent for the exterior building envelope must be verified with thermal and air performance testing. Building enclosure commissioning must be undertaken by testing and reporting on airtightness based on the following standards and guidelines published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); the National Institute of Building Sciences (NIBS); and ASTM International:

- ANSI/ASHRAE 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings*;
- ASHRAE Guideline 0: *The Commissioning Process*;
- NIBS Guideline 3: *Building Enclosure Commissioning Process*; and
- ASTM E2813: *Standard Practice for Building Enclosure Commissioning*.

Thermographic inspections must be performed at pressurized and depressurized environmental conditions on the finished construction and before occupancy. Other applicable testing methodologies must be followed to verify that the actual construction and specified requirements have been met for the integrity of the air, vapour barrier, and waterproof membrane assemblies within the building enclosure.

Enclosure airtightness testing on all five faces of the building must be undertaken to confirm airtightness achievements. All five faces must meet the airtightness maximum air leakage of 1.27 L/s·m² at 50 mPa, following ASTM E779: *Standard Test Method for Determining Air Leakage Rate by Fan Pressurization* and ASTM E1827: *Standard Test Methods for Determining Airtightness of Buildings Using an Orifice*

Blower Door, as noted in ANSI/ASHRAE 189.1: Standard for the Design of High-Performance Green Buildings.

4.4 Architectural Components

4.4.1 Partitions

Partition assemblies have construction and acoustic requirements that must be met as identified by the following requirements in addition to those of the functional program:

- tolerances for deflection and long-term creep must be designed at the top of structures abutting partition walls;
- partition finishes used at the perimeter of a humid space, such as a bathroom, basement, or limited air control area, must be resistant to moisture, mould, and mildew;
- shower areas must use water-durable and mould-resistant partition materials as the substrate; and
- physical security control area walls must include full-height 18 gauge expanded metal mesh as part of the assembly.

4.4.2 Interior Doors

Interior doors must meet the durability requirements, functional program requirements, and the following additional standards, including those published by the Steel Door Institute (SDI), Window and Door Manufacturers Association (WDMA), and Door and Hardware Institute (DHI):

- heavy-duty doors and frames must be used that meet the Level 2 rating per ANSI/SDI 250.4: *Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors*, and all doors and frames should be certified with the Underwriters Laboratories of Canada (ULC) label, factory-primed, and prepared for hardware installation;
- door hardware must meet the Best Grade requirements of the Canadian General Standards Board (CGSB);
- wood doors must be constructed to ANSI/WDMA I.S. 1A: *Interior Architectural Wood Flush Doors* and ANSI/DHI A115-W: *Wood Door Hardware Standards, Hardware Preparation*; and
- doors leading to high-traffic areas must be 70% glazed.

4.4.3 Acoustic Treatment

Acoustic performance must meet project requirements as well as the following:

- the sound transmission class (STC) rating must include careful and extensive sealing of all joints and apertures between components around and passing through the separation, both above and below the partitions; and doors and other openings must use sound attenuation techniques appropriate to the STC;
- ceiling tiles must have a minimum noise reduction coefficient (NRC) or sound absorption average (SAA) coefficient of 0.75 and a minimum ceiling articulation class (CAC) rating of 180;
- reverberation time control in the main lobby areas must not be higher than 0.7 seconds at 500 Hz; and
- performance must comply with the “Maximum Ambient Noise Levels” table and evaluation standards found in the PSPC standard [MD 15000: Mechanical Environmental Standard for Federal Office Buildings](#).

4.4.4 Graphics and Signage

Graphics and signage must meet the requirements set by the [Policy on Communications and Federal Identity](#) for the application of the Coat of Arms and flag symbol with bilingual titles, and the use of the “Canada” wordmark. For design standards, refer to the [Federal Identity Program Manual](#) issued by the Treasury Board as well the following requirements:

- signs for washrooms, elevators, stairwells, emergency exits, and doors of main corridors must comply with the [tactile signage section of the Federal Identity Program Manual](#);
- for heritage buildings, signage must be compatible with the original signage design, using the materials, finishes, colours, typefaces, size, and scale as a guide for the new signage design; and
- all equipment and piping in maintenance rooms and in mechanical and electrical rooms, must be provided with signage.

4.5 Interior Design Components

PSPC provides finished interior service and occupant areas as part of the base building. Refer to the functional program for detailed requirements.

4.5.1 Carpet Tile

Commercial-grade carpet tiles must be specified for all base building areas that will be used for general-purpose office space and other functional areas as defined in the functional program. Carpet tile products must comply with the following minimum performance standards:

- for optimum performance, products must be of tufted-loop construction, with a multi-colour/textured pattern and a minimum of 4 fibre colours, with colour selection to take into consideration the ability to mask soiling and staining;
- yarn must be 100% solution dyed nylon or a combination of maximum 30 % yarn dyed, with permanent static control, permanent soil-hiding fibre cross-section with a modification ratio no greater than 2.2 and stain resistance that must be permanent and able to resist trafficking and numerous hot-water extractions without losing its effectiveness;
- carpet fibre must be a minimum pile weight of 576 g/m² with sufficient density to ensure long-term resistance to matting and crushing;
- water-based releasable adhesives are to be used that are best suited for the project or for environmental or flexibility reasons;
- carpet tile backings must be chosen based on project application and longevity;
- carpet tile must be certified by the Carpet and Rug Institute (CRI) Green Label Plus standard and must contain a minimum of 40% recycled material, use recovered materials, and be recyclable;
- all existing carpet being removed from buildings must be recycled; and
- during carpet removal, dust control procedures must be followed using high-efficiency particulate air (HEPA) filters.

4.5.2 Other Flooring

Primary public entrance areas to the building and lobbies, including elevator lobbies, must be finished with hard surfaces and with high-density and low-porosity materials chosen for their non-slip characteristics, low moisture absorbency, and hydrophobic nature. The high traffic volume of these areas must meet durable building standards to exceed a 50-year life cycle and be easy to maintain.

Secondary and support areas of the building, as well as high-traffic or service areas where acoustics are not a concern and higher-end finishes are not required as defined in the functional program, must be finished with resilient flooring. Products must be chosen for their durability, recyclability, low volatile organic compound (VOC) emission, low embodied energy, and low toxicity.

4.5.3 Wall Finishes

Primary public entrance areas to the building and lobbies, including elevator lobbies, must be finished for the full height of the walls using materials that exceed the 50-year life-cycle standard of durable building standards. Wall finishes must have a high density and low moisture absorbency, and these hard surfaces are to be chosen for their ease of maintenance. Painted gypsum board is not considered a durable finish.

Wall surfaces in heavy-traffic circulation areas must be treated with materials that are chosen for their impact resistance and low-maintenance character.

4.5.4 Material Finishes - Ceilings

A variety of options are possible for ceiling treatments. For general office spaces, at a minimum suspended acoustic tiles must be used and the following requirements must be met:

- standard office spaces within heritage buildings must maintain the heritage character of the spaces, including general volumetrics and the characteristics of finish materials;
- new suspended ceilings in standard office spaces proposed within heritage buildings must maintain full clearance at the existing windows; and
- washrooms must have full-length cove lighting above the counters or a lighting design that delivers a soft and uniform wall wash.

4.5.5 Architectural Woodwork

All wood products must be certified either by [Forest Stewardship Council](#) (FSC) Canada, the [Sustainability Forestry Initiative](#) (SFI), or to the CSA Group [Sustainable Forest Management System \(SFM\) standard](#). The requirements are as follows:

- built-in furniture and casework provided in the main building lobby must be heavy-duty; and
- those provided in other areas must be designed for normal use.

5 Structural Engineering

The *National Building Code of Canada* (NBC) serves as the basis for the structural design of office buildings.

Furthermore, the [Treasury Board Policy on Management of Real Property](#) serves as the basis for structural design because it places protection of the heritage character of federal buildings on an equal footing with other considerations related to real property management and it is within this policy that departmental obligations and responsibilities are defined. The Treasury Board policy stipulates that departments must manage the buildings they administer so as to conserve their heritage character throughout their lifecycle.

5.1 Design Objectives

The structural engineering design objective for office buildings is to provide an economical and efficient structure to meet the functional requirements and to fulfill the following additional requirements:

- the limit state design (LSD) method must be used for all structural design following the requirements of the NBC;
- for existing buildings, guidance provided in the Commentary L of ‘Application of NBC Part 4 of Division B for the Structural Evaluation and Upgrading of Existing Buildings’ of the “User’s Guide – NBC 2010 Structural Commentaries” must be considered;
- the design for seismic protection must conform to the [Real Property Services Policy on Seismic Resistance of PWGSC Buildings](#);
- alterations to and additions to heritage buildings shall be achieved by providing sustainable solutions while respecting the heritage value of the site in accordance with the *Standards and Guidelines for the Conservation of Historic Places in Canada*;
- design service life must be established per the CSA S478-95: *Guideline on Durability in Buildings*;
- flexibility to accommodate likely future functional requirements must be identified and integrated into the structural design; and
- the use of rainwater detention on building roofs for stormwater management must be minimized.

5.2 Structural Risk Management Statement

A structural risk management (SRM) statement must be prepared and submitted at each stage of the project. Documentation and submission requirements must be in accordance to the PSPC publication *Doing Business with Real Property Branch (RPB)*.

The structural vulnerability of the building and critical building elements for the following areas of potential risk must be identified:

- Environmental loads (wind, rain, snow, ice, geotechnical and site such as hydrostatic pressures, temperature effects, corrosive environment)
- Seismic protection (main structure and non-structural elements, i.e. Operational and Functional Components or OFCs)
- Serviceability requirements (vibration, deflection, fire protection, potential lack of proper maintenance)
- Security concerns (blast threat, progressive collapse prevention)
- Sustainability consideration
- Heritage protection concerns

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- Other areas of identified structural risk

Each of these risks and their potential impacts must be included in the SRM statement. The SRM must include statements describing how each of these risks will be mitigated and/or minimized.

Scenarios related to a change in structural conditions or actions should be specified in the structural risk management plan in order to identify possible critical situations for the structure. Each scenario is characterized by a predominant process or action and, where appropriate, by one or more accompanying processes or actions. The identification of scenarios represents the basis for the assessment and design of interventions to be taken to ensure structural safety and serviceability. The SRM statement must also include a summary description of the structural systems and design loads.

5.3 Floor Loads

Office floor loads must be designed for 3.8 kPa live load unless higher values are required for localized loads such as moveable filing systems.

Live-load reductions must not be used for horizontal framing members, transfer girders supporting columns, and columns or walls supporting the top floor or roof.

5.4 Parking Structures

New parking structures must be designed in accordance with the CSA S413: *Parking Structures* standard.

6 Mechanical Engineering

6.1 Design Objectives

Mechanical products and systems must be properly coordinated with architectural, structural, civil, electrical and other building systems based on whole building design concept and life-cycle review.

Mechanical design must be based on proper selection and application of sustainable, high-performance heating, ventilation, and air-conditioning (HVAC), plumbing and drainage systems and technologies to enhance overall building performance.

Meeting the National Energy Code of Canada is a minimum requirement. Based on specific project requirement and desired Green Building rating (LEED, Green Globes etc.), the design team must target for a higher energy performance.

6.2 Mechanical Environmental Requirements

Mechanical environmental requirements must satisfy PSPC's [MD 15000: *Mechanical Environmental Standard for Federal Office Buildings*](#), including but not limited to, the following:

- indoor design temperature;
- relative humidity operating limits;
- operating temperature range;
- outdoor design temperature;
- minimum outdoor air ventilation rate;
- flushing of air for new constructions and major renovations;
- provision of outdoor air to flush out the building on a floor-by-floor basis;
- indoor air contamination control; and
- acceptable acoustical environment.

All HVAC systems shall include devices to measure and control minimum outdoor air flow.

For spaces not listed in MD 15000 section 5.1, Acceptable Acoustical Environment, the maximum noise levels must not exceed the levels specified by the [National Joint Council *Occupational Health and Safety Directive, Part VII, Noise Control \(Levels of Sound\)*](#).

6.2.1 Building Pressurization

Design systems to ensure proper building pressurization. Ensure control of proper space pressure of the building to manage moisture, water vapor, airborne contaminants and potential for mold growth. The building automation system (BAS) must alarm when the building pressurization drops below a predetermined low limit.

A negative pressure must be maintained relative to the surrounding spaces in areas where exhaust systems are used or an indoor air quality contaminant source is located. Design space and building pressurization to ensure that the maximum door opening forces do not exceed *National Building Code of Canada* limits. Ensure that stack effect is controlled during both natural and mechanical ventilation strategies.

6.3 HVAC Systems

6.3.1 General Requirements

At least three distinct HVAC options must be considered at the pre-design or design concept stages complete with life cycle costing including capital costs, maintenance and operations costs, and replacement costs. The options analysis must consider low energy consumption and address

advantages and disadvantages of each option. The selected HVAC system will have low maintenance costs and be known to have proven durability and high performance in the industry.

The energy consumption for each HVAC option shall be obtained by using industry recognized energy simulation software. Submit proposed energy simulation software at early stages of design for approval.

The general requirements of the HVAC systems are:

- HVAC products and systems have an integrated whole building design approach based on Life Cycle evaluation.
- The evaluation of high performance and sustainable design strategies must be carried out during the Investigation and Report (I&R) or initial conceptual design stage.
- Energy/Heat recovery systems must be incorporated when required by applicable code or when feasible based on Life Cycle Evaluation.
- High-occupancy and highly variable occupancy areas must be provided with demand-controlled ventilation (DCV) systems with CO₂ sensors.
- HVAC systems must be capable of automatically maintaining space comfort conditions for all building load variations during the heating and cooling seasons.
- HVAC systems shall include devices to measure and control minimum outdoor air flow.
- Building pressurization control dampers are to be located as close to the air-handling unit as possible, and must be motorized and connected to the BAS.
- Noise generating HVAC components such as dampers and coils are located outside private offices to minimize disturbances.

6.3.2 Supply, Return, and Exhaust Fans

All fans must bear the Air Movement and Control Association (AMCA) seal, and performance must be based on tests made in accordance with the ANSI/AMCA 210: *Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating* standard. Fans must be selected based on optimum efficiency, required horsepower as well as sound power level ratings at full-load and part-load conditions. Fan motors must not run at overload anywhere on their operating curves; they must be selected for a 1.15 service factor and fan shafts must operate below the first critical speed.

Variable-speed operation of supply and exhaust fans must be accomplished through the use of variable-speed drives and inverter duty-rated motors. For smaller fans, electronically commutated motors (ECMs) may be used for variable-speed operation.

Fans must be provided with proper vibration isolation, thrust resistant supports or devices, grease box or extended grease lines, belt or coupling guard, inlet and outlet safety screen, companion flanges, flow measuring system and any other accessories necessary for particular application. Fans must be statically and dynamically balanced.

6.3.3 Air-Handling & Air-Distribution Systems

Air Handling Units must have double-walled insulated low leakage casing construction.

Other internal features like internal flow measurement and control, integrated mixing box, integrated energy/heat recovery system, internal LED service lights, thermal break, low leakage insulated dampers, factory installed DDC controls, redundant fans or fan arrays, dehumidification control and single point power must be provided based on specific application requirements

The air-handling unit and its internal components must comply with applicable Air-Conditioning, Heating, and Refrigeration Institute (AHRI) standards.

Individually finned tube coils must be certified to the AHRI 410: *Forced-Circulation Air-Cooling and Air-Heating Coils* standard, and the number of rows and fin spacing must be selected to allow effective cleaning. Select dehumidifying coils for no more than negligible water droplet carryover beyond the drain pan at design conditions. They must also be equipped with mist eliminators designed for low static pressure losses.

Selection of heating and cooling coils must consider the following:

- select heating and cooling coils to optimize system performance and energy efficiency;
- select proper coil headers and fin spacing for effective cleaning;
- minimize or eliminate water droplet carryover downstream from the dehumidification coils;
- provide adequate distance to downstream equipment from the dehumidification coils;
- provide mist eliminators where necessary; and
- provide coil slope for drainage;

Air Handling Units must be provided with double insulated stainless steel drain pans complete with indirect connection to waste systems and deep trap seals suitable for the system pressure.

Provide air filters in accordance with [MD 15000: Mechanical Environmental Standard for Federal Office Buildings](#).

Low-leakage AMCA-certified volume control dampers must be utilized for outside air mixing boxes where necessary. Use high-efficiency, low-pressure drop air blenders when proper mixing may not be possible within the air-handling unit. The location of air blenders must be selected based on actual site conditions.

Access doors must be provided for all internal sections of an Air Handling Unit to facilitate proper operation, inspection, service and maintenance. Access door construction must be similar to the Air Handling Unit casing construction.

Air – Distribution System must be designed and constructed in accordance with SMACNA and ASHRAE. VAV terminal units, VAV diffusers, Grilles, Diffusers, Registers and other components must be properly selected for specific application. Air – Distribution systems must be designed for low pressure drop to minimize over all fan energy use without compromising on comfort at full load and part load conditions.

6.4 Humidification and Water Treatment Systems

Design humidification levels must be coordinated with the overall mechanical HVAC and envelope design to prevent condensation on the interior surfaces, control water vapour migration into the exterior wall assembly, and ensure adequate building pressurization. Analysis of local water supply shall be part of the humidification system design to identify the type of water treatment systems required for the humidification equipment.

Humidification systems must also comply with the requirements of PSPC's [MD 15161: Control of Legionella in Mechanical Systems](#).

6.4.1 Humidifiers

Humidification systems must comply with the following requirements contained in section 5.12, Humidifiers and Water-Spray Systems, of the American Society of Heating, Refrigerating and Air-Conditioning Engineers standard ANSI/ASHRAE 62.1: *Ventilation for Acceptable Indoor Air Quality*:

- Make-up water for humidification systems must originate directly from a domestic cold-water source. Air-washer systems are not permitted for humidification purposes.
- Direct steam injection type humidifiers must not be used.

Humidifiers must be CSA-approved and be certified by the Underwriters Laboratories of Canada (ULC-listed) where applicable.

A high-level humidity safety switch as well as a flow switch must be integrated with each humidification system and tied into the BAS.

6.4.2 Water Treatment Systems

Systems requiring water treatment include the following:

- open and closed hydronic systems including cooling towers;
- potable water;
- boiler feed water;
- spray washers;
- humidification systems;
- grey water systems; and
- decorative water systems (fountains, ponds).

Design water treatment systems for the control of microbiological activity including *Legionella* control as well as slime production, dissolved solids precipitation, scaling, and corrosion protection in accordance with [MD 15161: Control of Legionella in Mechanical Systems](#).

The chemical feed system must have self-contained microprocessor controls capable of communicating with the BAS. The methods used to treat the system's make-up water must follow the guidelines in the ASHRAE *Handbooks*. Manual addition of chemicals is not permitted.

6.5 Hydronic Systems

Closed-loop systems must include an expansion tank and a pressure-relief valve. Hydronic systems that use a common return system for both hot water and chilled water must not be used. Hydronic systems that use a common distribution system to supply both heated and chilled water are acceptable provided that the system is designed to allow a dead band between change-over from one mode to the other of at least 8 °C outdoor air temperature.

Hydronic heat pumps connected to a common heat pump water loop with central devices for heat rejection (e.g. cooling towers) and heat addition (e.g. boilers) must have controls that are capable of providing a heat-pump water supply temperature dead band of at least 11 °C between initiation of heat rejection and heat addition by the central devices (e.g. cooling tower, boiler).

Refer to the CAN/CSA B214: *Installation Code for Hydronic Heating Systems* for detailed information on hydronic systems and components.

6.5.1 Expansion Tanks

Use only diaphragm-type expansion tanks in hydronic systems that are pre-charged to reduce the tank size. Consider operational and maintenance constraints when selecting a suitable location for the expansion tank.

6.5.2 Pipes and Valves

Hydronic system designs must be properly sized with two-way control valves for variable-flow to minimize the pressure drops and reduce pump energy in systems with multiple heating/cooling coils. Closed-loop piping system designs must incorporate pressure-balancing controls, pressure independent balancing valves, expansion tanks and required accessories. Isolation valves must be provided on all equipment and devices, including the following:

- main piping branches;

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- heat exchangers (including chiller evaporators and condensers);
 - heating and cooling coils;
 - terminal units; and
 - control valves.

The horizontal supply and return pipe network feeding floor perimeter heating systems shall be located at the bottom of the heaters as opposed to being at the top in order to prevent air entrainment inside the coils, prevent noise, provide proper heating and reduce maintenance labor costs related to the purging of the coils.

Provide local strainers for all terminal units, heating and cooling coils, and heat exchangers. Isolation and shut-off valves greater than 65 mm Ø must be high-performance butterfly valves, and those below 65 mm Ø must be ball valves. Isolation valves must also be provided for zones off vertical risers and major horizontal branches.

Provide flexible pipe connectors as required to prevent transmission of noise and vibration through piping systems. The use of grooved pipe connections is not permitted.

6.5.3 Hydronic Pumps

Design the hydronic pumping system to meet the following requirements:

- inverter duty-rated pump motors for variable-flow systems;
- provide best efficiency point (BEP) selection for the most frequently used flow rate (not the maximum flow rate);
- full flow range pumping capability without any overload conditions;
- maximum 1800 r/min for pump drives;
- chillers with corresponding primary chilled-water pumps and condenser-water pumps;
- sufficient pumping capacity for the stand-by pump(s) to maintain building operation in accordance with the requirements of the business continuity plan;
- sufficient space around each pump for the removal of the bearing unit and impeller without interfering with the operation of any other system;
- mechanical seals and labyrinth seals for all pump rotating assemblies;
- fully independent hydronic pumping systems capable of individual isolation without impacting operations;
- automatic bypass valves for variable primary-only chilled water systems, to ensure that the minimum flow through the chiller is always maintained; and
- variable-flow pumping systems in accordance with the requirements of ANSI/ASHRAE 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings*.

6.5.4 Vents and Drains

System drainage connections must be provided at all low points in the hydronic system, at each heating and cooling coil, and at each terminal unit.

Automatic air vents must only be used in accessible spaces, such as mechanical rooms where maintenance personnel can observe them.

Use manual air vents at terminal units and other less accessible high points, at all localized high points in the system, and at each heating coil.

Where hydronic systems are exposed, coordinate with architectural finishes to ensure maintainability.

6.6 Heating Systems

6.6.1 Heating Plants

New buildings or existing buildings undergoing major renovations must be designed to use low-temperature hot water heating systems from dedicated Hot Water Boiler System.

In cases where Central heating and cooling plant (CHCP) steam from District Energy Heating System is the only option, buildings must use steam-to-low-temperature-hot-water heat exchangers as part of energy transfer stations (ETSS). The building heating system must be designed for supply water of maximum 60 °C and return water of minimum 35 °C. Central Heating and Cooling Plant (CHCP) steam must not be distributed throughout any building as a heating medium.

For heat exchange systems, provide accessibility to all components without interfering with the operation of other systems and equipment, including the replacement of the tube bundle and/or disassembly of components. Piping networks must include the following:

- isolating and drain valves;
- piping design that account for thermal stresses;
- piping supports with provisions for thermal movement; and
- non-condensable gas elimination.

Double-wall heat exchangers must be used in domestic hot water heating applications. Plate heat exchangers must be used for waterside economizer applications.

6.6.2 Dedicated Boiler Hot Water Heating Systems

Hydronic hot water heating boilers must incorporate lower operating pressure and lower operating temperature for increased operating efficiencies.

Boilers must be located in a dedicated mechanical room with all provisions made for breeching, flue stack, and combustion air complete with an outdoor air intake. For high-rise applications, locate boilers in the rooftop penthouse to reduce static pressure on boilers.

Hot water heating systems must be designed for redundancy. Dedicated backup capacity must comply with requirements for business continuity plans in conformance with PSPC'S [DP 001: Policy for Emergency Preparedness in Public Works and Government Services Canada](#) and the Treasury Board of Canada Secretariat's [Operational Security Standard - Business Continuity Planning \(BCP\) Program](#).

While designing dedicated hot water heating systems, incorporate the following:

- high efficiency packaged boiler designs;
- factory pre-assembled components and controls;
- modular design (allowing the isolation of any boiler without interfering with the operation of any other boiler);
- separate specifications for control and relief valves to limit pressure and temperature;
- smart boiler and heating system controls integrated with BAS;
- minimum boiler efficiencies as per the *National Energy Code of Canada for Buildings*;
- boiler systems complete with all required auxiliaries, including expansion tanks, heat exchangers, water treatment, and air separators;
- control and piping arrangements that protect the boiler from thermal shock;
- pipe sizing in compliance with the ANSI/ASHRAE 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings*;

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- primary heating sources for a building that do not include electric resistance heating and/or electric boilers, except when justified by a life-cycle costing analysis or when utilizing renewable energy sources;
 - sodium/potassium-free (Na-K-free) gas valve actuators;
 - breeching, vents, stacks, and chimneys, in compliance with the National Fire Protection Association standards NFPA 54: *National Fuel Gas Code* and NFPA 211: *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*;
 - factory-fabricated, field-assembled breeching, vents, stacks, and chimneys; and material types, ratings, and distance to adjacent building materials that are in compliance with NFPA 54 and NFPA 211; and
 - heat transfer fluid that is free of ethylene glycol.

6.7 Cooling Systems

Cooling systems must be designed in compliance with the CAN/CSA B52: *Mechanical Refrigeration Code*.

Refrigeration systems, the choice of refrigerant, and leak mitigation measures must comply with the ANSI/ASHRAE 15: *Safety Standard for Refrigeration Systems* and ANSI/ASHRAE 34: *Designation and Classification of Refrigerants*.

Domestic cold water must not be used for cooling systems. Only acceptable refrigerants are to be used, in accordance with the CAN/CSA B52: *Mechanical Refrigeration Code*.

6.7.1 Chilled Water Systems

Ensure that the cooling plant controls are integrated with the chillers, cooling towers and distribution system for overall maximum integrated efficiency.

Chillers must meet the CAN/CSA C743: *Performance Standard for Rating Packaged Water Chillers* for energy efficiency requirements. Chiller performance must be certified by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI).

Demonstrate that life-cycle costing (LCC) has been used as the basis for the selection or omission of the following:

- variable-frequency drive (VFD) centrifugal, screw, or scroll chillers;
- water cooled or air cooled chillers
- magnetic bearing chillers
- waterside economizer (free cooling) systems
- heat recovery or heat pump chiller if required for specific application
- thermal storage solutions;
- absorption chillers;
- centrifugal chillers with oil-free compressors;
- rotary screw chillers; and
- scroll chillers.

Chilled water system designs must incorporate the following:

- vibration isolation and seismic control measures;
- flexible piping and conduits;

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- common header design for chilled water, with provisions to sequence chillers according to load requirements;
 - expansion tanks, heat exchangers, water treatment, and air separators for all auxiliaries;
 - recirculation/bypass control valves on chiller condenser piping to maintain the manufacturer's minimum incoming condenser water temperature;
 - pressure and temperature gauges, flow and energy-use meters, including adequate illumination, along with isolation valves to allow servicing while in operation;
 - microprocessor-based controls capable of communicating with the BAS;
 - Provisions for the BAS to sequence chillers to match the cooling load;
 - chiller operating limit controls;
 - chiller safety controls;
 - chiller freeze-protection controls;
 - chiller flow controls;
 - control panels with self-diagnostic capability and integral safety controls;
 - control panels with displays that include the following:
 - run time
 - operating parameters including set-points
 - electrical low-voltage alarm
 - phase-protection loss alarm
 - peak demand limiting controls
 - input/output coefficient of performance (COP)
 - BAS-connected chiller leak detection and remote alarming;
 - BAS-connected freeze protection, including hard-wired, low-limit switches for all freeze-prone coils;
 - piping connections that include isolating and drain valves on chilled water and condenser water loops;
 - minimum flow alarm through the chiller when the chiller is operating;
 - piping designs that incorporate provisions for the thermal movement of piping and the reduction of thermal stresses on the chiller; and
 - air-elimination accessories including a purge system that operates without affecting chiller operations.

Dedicated backup capacity must comply with requirements for business continuity plans in conformance with PSPC's DP 001: *Policy for Emergency Preparedness in Public Works and Government Services Canada (001)* and the Treasury Board of Canada Secretariat's [Operational Security Standard - Business Continuity Planning \(BCP\) Program](#).

Chiller units must be connected to a common header that allows for adequate isolation of individual units without interruption of service to the remaining units.

Cooling systems with a capacity less than 175 kW (50 tons) require a life-cycle cost analysis for incorporating or omitting cooling towers or evaporative condensers. The chilled water system design must maximize chilled water temperatures and minimize condenser water temperatures to achieve the greatest heat recovery rates and highest efficiencies.

Each chiller must be designed to permit refrigerant recovery during servicing and repair.

Chlorofluorocarbon (CFC) refrigerants are not permitted. For acceptable non-CFC refrigerants, refer to the [Federal Halocarbon Regulations](#) and the [Ozone-Depleting Substances Regulations](#) under the [Canadian Environmental Protection Act](#).

6.7.2 Cooling Towers

Cooling tower designs must incorporate the following:

- wet bulb design temperatures that meet the parameters specified in the ASHRAE 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings*;
- *Legionella* abatement strategies, including microprocessor controls capable of communicating with the BAS;
- performance certified by the Cooling Technology Institute (CTI) under the STD-201: *Certified Cooling Towers* standard;
- cooling tower fan power requirements that comply with ASHRAE 90.1;
- supply piping connected to a manifold to allow for any combination of equipment use;
- equalization piping between cell basins for multiple tower designs complete with isolation valves between cells;
- ladders and platforms for ease of inspection and replacement of components;
- control strategies for the prevention of “dead heading” with variable-speed pumps when the pump is operated in parallel with other pumps;
- clean-outs for sediment removal and flushing from basins;
- de-icing capability for operations in subfreezing climates;
- provisions in subfreezing climates for draining all piping during shut-downs using indoor drain-down basins;
- heat-tracing and thermal insulation for exterior piping subject to freezing;
- manual shut-down capability;
- basin heaters for all-weather waterside economizers;
- heat tracing above and below grade (down to 900 mm) for all condenser water piping operated in subfreezing climates;
- fibreglass, polyvinyl chloride (PVC), or stainless steel construction for condenser piping, cooling tower basins, and housings, free of bolted or riveted connections;
- vibration and sound isolation in accordance with the CTI STD-201 standard for cooling towers located on building structures;
- cooling tower elevations that maintain the required net positive suction head on condenser water pumps;
- 1200 mm minimum clear space beneath the bottom of the lowest structural member, piping, or sump on all rooftop installations (to allow re-roofing under the tower); and
- BAS-connected temperature and pressure sensors for chilled and condenser water pipes connected to the waterside economizer, with automated controls for waterside economizers and sequenced with the operating chillers to match the load requirements.

6.8 Plumbing Systems

Plumbing systems include domestic cold water supply (DCWS), domestic hot water supply (DHWS), and domestic hot water recirculation (DHWR) systems, plumbing fixtures, traps, sanitary waste and vent systems, and stormwater systems. Design the plumbing systems to meet the *National Plumbing Code of Canada*.

When designing plumbing systems, consideration must be given to the reuse of existing systems by confirming the condition of existing piping prior to re-use. To be fit for re-use, piping systems must satisfy the requirements outlined in this document as well as those contained in the applicable codes listed in section 13 in the Mechanical Codes, Standards, and Legislation section.

Hot water heaters, tanks, heat exchangers and pumps are to be located in mechanical rooms. Demonstrate that life-cycle costing (LCC) has been used as the basis for the selection or omission of heat recovery, instantaneous heating systems, high efficiency heating equipment, and renewable heat sources.

6.8.1 Plumbing Fixtures

All plumbing fixtures must be provided with stated water efficiency ratings and must comply with accessibility requirements as specified in the Treasury Board of Canada Secretariat [Accessibility Standard for Real Property](#), the CAN/CSA B651: *Accessible Design for the Built Environment* standard, and the PSPC [Real Property Branch Accessibility Procedure](#).

6.8.2 DCWS, DHWS, and DHWR Systems

The domestic water system must be designed to prevent the following:

- water hammer,
- cross-contamination,
- surge,
- erosion,
- noise, and
- cavitation.

In addition, the DCWS, DHWS, and DHWR systems must be designed to include the following:

- lead-free materials for all piping and fixtures in accordance with the CSA B125.1: *Plumbing Supply Fittings* standard;
- bacterial and/or chemical treatment of raw water supplies to be used for potable water services, and as an additional precaution, drinking fountains and water-bottle filling stations equipped with in-line filters capable of removing lead, to meet Health Canada's [Guidelines for Canadian Drinking Water Quality](#);
- a DHWR system when hot water availability exceeds 15 seconds at the furthest fixture from the heating source;
- a maximum hot water temperature of 40 °C at showerheads; and
- *Legionella* controls in accordance with [MD 15161: Control of Legionella in Mechanical Systems](#).

6.8.3 Sanitary Waste and Vent Systems

Provide separate sanitary and storm sewer runs to the property line, even in instances where the municipal sewers combine sanitary and storm sewers. Comply with the waste treatment requirements of the authority having jurisdiction.

Floor drains connected to the municipal sewer system or discharging into the environment must include safeguards to prevent discharges of hazardous materials where the incidence of discharges occurring is likely, such as in mechanical rooms and workshops.

Provide floor drains with materials and accessories adapted to the following specific building areas:

- cast iron drains and nickel-bronze strainers for public washrooms and other public areas;
- cast iron drains, stainless steel sediment buckets, and stainless steel funnel-type strainers for kitchens and dishwashing areas;
- large-diameter cast iron drains with funnel-type strainers in equipment rooms, with the drains located appropriately to eliminate horizontal runs of drain piping;
- large cast iron or concrete basins for parking garages installed in conjunction with heavy-duty cast iron grates to incorporate sand and oil interceptors; and
- trench drains or roadway inlets for ramps exposed to rainfall.

Provide trap seal primers for all floor drains where drainage is not routinely expected from spillage, cleaning, or rainwater. Provide floor drains with adequate cleanouts and plumbing vents in accordance with plumbing codes.

Only use sewage pumps where gravity drainage is not possible. If sewage pumps are required, only the lower floors of the building must be connected to the sewage pump; fixtures on the upper floors must use gravity flow to provide drainage to the public sewer.

Sewage pumps must be non-clog, screenless, grinder-type duplex pumps, with each discharge not less than 100 mm in diameter, complete with alternators and connected to the emergency electrical power grid.

Septic tanks and disposal fields must comply with all requirements of the authority having jurisdiction.

6.8.4 Stormwater Drainage Systems

Roof drains and overflow drains must be cast iron body type with high dome grates designed to provide adequate drainage.

Elevator shaft sumps must be fitted with sump pumps connected to the emergency power grid. Sump pump pits must be independent from elevator pits.

Stormwater lift stations and sump pumps must only be used where gravity drainage to municipal storm sewers is not possible. Stormwater lift stations and clear water sump pumps must be non-clog, screenless duplex pumps, with each discharge complete with alternators and connected to the emergency electrical power grid. Sump pumps must be complete with sealed cover plates, vents, inspection manholes, and access to level controls.

6.9 Advanced Metering System

Data management must focus on key performance indicators to be meaningful and useful for the implementation of the energy management system (EnMS) as described in the CAN/CSA-ISO 50001: *Energy Management Systems* standard.

Advanced metering systems must be installed in all new construction and major renovation projects to collect information on the consumption of electricity, gas, water, and other utilities (e.g. steam, chilled water).

The metering system must include meters, communications networks, and data management capabilities. Data from variable-frequency drives larger than 3.75 kW must be networked to the advanced metering system.

The advanced metering system must be networked to, or form part of, the building automation system (BAS). It must record data at a frequency no less than hourly (similar trigger points are also acceptable) and store the data in a central repository. The system must be able to show daily, monthly, and annual totalled readings and provide for combined readings to show total energy consumed for the period.

The system must include energy tracking for the whole building (and selected subsystems) by displaying the actual energy consumption in comparison to a baseline (either estimated or established). This data must be available on demand on the central operator workstation, and must be available in a form that allows for the ability to generate advisories to management when normal tolerances are not being maintained.

The advanced metering must record at a minimum the following information:

- electrical components:
 - phase voltages, phase currents, and power consumption (kW) readings for the following:
 - all risers;
 - motor control centres;
 - lighting panels;
 - power distribution panels;
 - telecommunication rooms; and
 - emergency loads (on the load side of the transfer switches);
 - line voltages, line currents, and power consumption (kW) readings for all feeders to the following:
 - motor loads over 15 kW;
 - all major mechanical equipment such as chillers, air-handling units, and pumps; and
 - all spaces planned to be leased;
- for mechanical components and subsystems:
 - electrical, gas and other fuels consumption;
 - domestic water consumption;
 - cooling tower water consumption;
 - steam and/or hot water;
 - chilled water (Energy/BTU metering); and
 - individual water flow or energy-measuring devices provided for chilled water lines serving computer rooms.

The water flow and airflow measuring devices must meet the requirements of the ANSI/ASHRAE 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings*.

6.9.1 Power Monitoring

In addition to, or as part of, the above listed metering, power monitoring must also form part of the advanced metering system. The power monitoring must be installed in the primary switchgear (if present and Crown-owned) as well as the main secondary switchgear, and must measure, at a minimum, the phase voltage, phase current, power consumption, power factor, and harmonic distortion.

6.10 Building Automation Systems

The building automation system (BAS) must have a non-proprietary design to monitor, control, and report on all mechanical, environmental-control, and energy-consuming systems, and must be based on Ethernet BACnet TCP/IP network, native BACnet controllers and other devices. The BAS must be able to provide an integrated platform for intelligent, smart and high performing building

The BAS must include as a minimum:

- controllers;
- sensors and other field devices (use smart sensors and devices where feasible);
- Networks;
- Computers;
- All necessary software components including energy management;
- engineering;
- new wiring;
- complete graphical package, including dashboards;
- installation;
- programming;
- start-up;
- commissioning;
- as-built and documentation;
- warranty and maintenance; and
- any devices or accessories to make a complete system.

The BAS must comply with ANSI/ASHRAE 135: *A Data Communication Protocol for Building Automation and Control Networks* and ANSI/ASHRAE 135.1: .Method of Test for conformance to BACnet

The system must utilize direct digital control (DDC) technology with networked distributed processing, and be user-programmable in the field for all required automated functions.

The BAS must provide means for direct access to all setpoints, trends, and objects using BACnet protocol (BACnet/IP or native BACnet). The “As-built” documentation must provide the list of all setpoints, trends, and objects with explanation of their function and/or meaning.

In addition, visual and audible identification of BAS alarm signals must be provided in the security control room during unoccupied periods. However, such alarms must not be integrated with the fire and security systems.

Existing proprietary systems can be used in existing buildings only after a detailed life-cycle cost analysis has been done that can justify the continued use of such proprietary systems or non-BACnet systems.

6.10.1 Operator Work Stations

The primary operator work station (OWS) must be capable of displaying information from the BAS as well as the advanced metering system

The main OWS and secondary OWS must be listed by the BACnet Testing Laboratories (BTL) as either a BACnet Advanced Operator Workstation (B-AWS) or a BACnet Operator Workstation (B-OWS).

6.10.2 Controllers

Standalone, microprocessor-based, fully programmable control units must include the following features:

- the use of BTL-listed DDC controllers only;
- microprocessors (CPUs) with memory and hardware sufficient for the installation and for at least a 25% expansion of capability for each controller controlled by the master controller;
- a controller power supply that accepts local power and provides all conditioning necessary for reliable, fail-safe operation;
- a battery-backed real-time clock accurate to ± 5 seconds/year with 72-hour backup;
- battery-backed RAM with 72-hour backup;
- network interface to other controllers;
- network interface allowing access by operators (including access via OWSs); and
- automatic, complete recovery after a power failure.

6.11 Mechanical Systems for Special Spaces

6.11.1 Entrance and Lobbies

Positively pressurize the entrance vestibule relative to atmospheric pressure to minimize infiltration. Ensure that exterior door operations are not adversely affected and remain within acceptable limits, in conformance with the *National Building Code of Canada*.

6.11.2 Elevator Machine Rooms

Maintain space temperature conditions, as required by equipment specifications and in accordance with the American Society of Mechanical Engineers (ASME) / CSA Group (CSA) standard ASME A17.1/CSA B44: *Safety Code for Elevators and Escalators*. Consider the use of secondary chilled water for cooling, and the use of elevator machine room heat exhausting for heating the remaining building. Ensure that the elevator design minimizes the draw of interior air through the stack effect.

6.11.3 Mechanical and Electrical Rooms

All mechanical, electrical, and telecommunication equipment rooms must be maintained with room space conditions, such as ventilation, heating, and cooling, as required by PSPC's [MD 15000: *Mechanical Environmental Standard for Federal Office Buildings*](#).

Install equipment in a manner that the servicing of any equipment will not require shut-down of other equipment. Identify operational requirements and redundancy requirements where applicable at early stages of design.

The location of water lines must comply with the requirements of the *Canadian Electrical Code*.

All telecommunications rooms must be ventilated and cooled in accordance with the requirements of the Telecommunications Industry Association (TIA) / Energy Information Administration (EIA) standard ANSI/TIA 569: *Telecommunications Pathways and Spaces* and its addenda.

6.11.4 Computer Room Cooling and Ventilation

Provide computer room ventilation in accordance with PSPC's [MD 15000: Mechanical Environmental Standard for Federal Office Buildings](#).

Provide high performance, low energy cooling system. Cooling systems must be evaluated based on specific use and application of computer rooms.

Identify operational requirements and redundancy requirements where applicable at early stages of design. Demonstrate that an evaluation based on life-cycle costing (LCC) has been used as the basis for the selection or omission of the use of heat recovery and or water side economizer (free cooling) systems.

6.11.5 Service Areas

Requirements for mechanical systems in service areas include the following:

- janitor closets must not be used for the location of any equipment;
- air dampers-on mechanical ventilation systems serving transformer rooms and emergency generator rooms require limit switches tied into an alarm for the damper position. The damper position must be interlocked with its ventilation fan;
- the construction, ventilation, and equipping of all rooms containing refrigeration units, such as chiller equipment rooms, must comply with the ANSI/ASHRAE 15: *Safety Standard for Refrigeration Systems*, the ANSI/ASHRAE 34: *Designation and Classification of Refrigerants*, as well as the CAN/CSA B52: *Mechanical Refrigeration Code*;
- indoor parking garages must include supply and exhaust systems activated by carbon monoxide detectors, and must use energy recovery systems where justified by a life-cycle costing analysis;
- the design of the HVAC for the indoor parking areas must include a life-cycle costing analysis of energy recovery systems and of variable air flow systems;
- mailrooms must have independent HVAC systems to deal with the potential for chemical/biological contamination;
- uninterruptible power supply (UPS) battery rooms must be ventilated/exhausted directly to the outdoors at a rate that is in compliance with code requirements and the manufacturer's recommendations, and in addition:
 - the exhaust system must be connected to the emergency power distribution system;
 - fans must be explosion-proof; and
 - ductwork must consist of a dedicated, negative pressure system of corrosion-resistant material; and
- high-occupancy and highly variable occupancy areas must be provided with demand-controlled ventilation (DCV) systems with CO₂ sensors, with enthalpy energy recovery and de-humidification systems provided where justified by a life-cycle costing analysis.

6.12 Fuel Storage Systems

For fuel storage systems refer to section 8.11.1 Emergency Generator System and 2.7.4 Fuel Storage Systems.

6.13 Miscellaneous Requirements

6.13.1 Acoustical Insulation

Provide acoustical insulation where required to satisfy the requirements listed in Table 5-1, Maximum Mechanical Noise, in PSPC's [MD 15000: Mechanical Environmental Standard for Federal Office Buildings](#).

Acoustic treatment of fan noise must be incorporated at the air-handling unit by using duct silencers on the supply and return ducts. The treatment must not use fibre insulation on the interior surfaces of the ductwork upstream of the air terminal units.

6.13.2 Identification of Mechanical Systems

All piping and ductwork systems in new constructions or major renovations must be identified in accordance with the [Workplace Hazardous Materials Information System \(WHMIS\)](#) manual issued by Health Canada, which represents Canada's national standard for hazard classification and communication.

6.13.3 Outdoor acoustical treatments

Air intakes, exhausts, mechanical rooms, cooling towers, air-handling units, emergency generators, and waste-handling equipment must have noise attenuation provisions, where required, to achieve compliance with noise restrictions at the property line.

7 Fire Protection Engineering

7.1 Design Objectives

The design objective of life and safety systems is to ensure the health and safety of federal employees in the event of an emergency. Fire protection and suppression systems must comply with the *National Building Code of Canada* and *National Fire Code of Canada*.

All sites on or off municipal services must be evaluated and strategies provided to address issues related to health and safety. Municipal installations must meet the National Fire Protection Association's NFPA 1142: *Standard on Water Supplies for Suburban and Rural Fire Fighting* and other appropriate NFPA standards that stipulate water requirements for supplying fire suppression systems. Issues to be addressed include the following:

- evaluation of pressure and flow rates to determine their adequacy;
- evaluation of pressure and/or flow rates based on 10 years of projected deterioration (or increase in demand due to population growth); and
- evaluation of the use of fire pump(s) and/or booster pump(s) feeding from a private tank or reservoir.

7.2 Specialized Functions for Base Building and Tenants

Office buildings may have tenants who have requirements related to specialized functions in addition to the base building requirements. These functions must be integrated into the base building system.

Furthermore, general storage facilities within base buildings must meet the requirements of the NFPA 13: *Standard for the Installation of Sprinkler Systems* and the NFPA 231: *Standard for General Storage*.

Specialized tenant functions identified in the functional program may include one or more of the following:

- the storage arrangements and protection of a rack storage facility, which must meet the requirements of NFPA 13, NFPA 231, and NFPA 231C: *Standard for Rack Storage of Materials*;
- the storage arrangements and protection of an inflammable and combustible liquid storage area, which must meet the requirements of the *National Fire Code of Canada*, the NFPA 30: *Flammable and Combustible Liquids Code*, and the applicable Factory Mutual (FM) Global Property Loss Prevention Data Sheets;
- facilities having high-value or mission-essential electrical equipment, mainframe computers, or network equipment with the potential for high dollar loss and/or business interruption, which must be designed and installed in accordance with NFPA 75: *Standard for the Fire Protection of Information Technology Equipment*;
- Sprinkler systems such as wet, dry, deluge or pre-action as required for the type of occupancy and approved by Departmental Representative; and
- fire protection requirements for cooling towers, which must meet the requirements of NFPA 214: *Standard on Water-Cooling Towers*.

7.3 Sprinkler Systems

Sprinkler systems must meet all of the requirements below, which supersede the design requirements of NFPA 13: *Standard for the Installation of Sprinkler Systems*:

- all sprinklers installed in any new construction or renovation projects must be listed by a nationally recognized testing facility such as Underwriters Laboratories of Canada (ULC);

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- all quick-response glass bulb sprinklers must be equipped with a protective device to reduce damage prior to installation, and the protective device must be removed after the sprinkler is installed;
 - all sprinkler escutcheons installed in any new construction or renovation projects must be ULC-listed equipment;
 - flow control (on-off) sprinklers must not be installed in any new construction or renovation projects;
 - all automatic sprinklers installed less than 2 m above the floor must be equipped with sprinkler guards to provide protection against accidental damage;
 - black steel piping and/or copper tubing must be used for all wet-pipe sprinkler piping;
 - chlorinated polyvinyl chloride (CPVC) sprinkler piping must not be used;
 - galvanized (internal and external) sprinkler piping must be used for all dry-pipe sprinkler systems;
 - steel pipe sizes 50 mm and smaller must comply with the specifications in Schedule 40 and must be threaded;
 - steel pipe sizes larger than 50 mm must at a minimum comply with the specifications in Schedule 10;
 - piping less than Schedule 40 must be roll-grooved;
 - threadable lightwall pipes must not be used;
 - piping having a corrosion-resistant ratio less than one must not be used;
 - plain-end fittings must not be used;
 - automatic sprinklers must be installed in all new construction projects and in all renovation projects:
 - this includes elevator machine rooms, boiler rooms, mechanical equipment rooms, walk-in freezers and cold rooms, essential electronic facilities, electrical closets, telephone closets, emergency generator rooms, uninterruptible power service and battery rooms, electrical switchgear rooms, transformer vaults*, and telephone exchange (private automatic branch exchange [PABX]) rooms;
 - * note that sprinklers can be omitted in the transformer vault if the vault is provided with a 3-hour fire separation; however, appropriate fire protection devices must be provided in the vault as required by the local utility and authority having jurisdiction; and
 - all electrical equipment must be provided with a sprinkler-proof enclosure;
 - all sprinkler systems must be wet-pipe sprinkler systems unless installed in areas subject to freezing or as directed by the project-specific program;
 - in areas subject to freezing, dry-pipe sprinkler systems or dry pendent sprinklers must be installed, heat must be provided in the space, and/or sprinkler piping must be rerouted;
 - do not use heat tape on sprinkler piping;
 - antifreeze sprinkler systems must not be installed in any new construction or renovation projects;
 - damage to motors, switchgear, electronic equipment, direct digital control (DDC) and alarm panels, computers, etc., must be minimized by applying spray fireproofing;
 - sprinklers installed in electrical rooms and electrical closets must be equipped with sprinkler guards to provide protection against accidental damage;
 - sprinklers in historically significant spaces must be carefully placed to minimize damage to ornamental materials, and in addition:
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- detailed drawings must be developed for architecturally sensitive areas, showing precise sprinkler locations and finishing notes as necessary to ensure proper installation; and
 - sprinklers must be centred and placed symmetrically in relation to ornamental patterns and architectural features that define the space, such as arched openings;
 - sprinklers and escutcheons must match the original architectural surfaces or hardware; and
 - oxidized brass or bronze heads are recommended for use in deeply coloured (unpainted) woodwork.
 - in elaborately decorated ceilings, heads must be camouflaged by custom coating and by omitting escutcheon plates, and in such cases, low-profile, quick-response sprinklers are preferred.

7.4 Fire Alarm Systems

Fire alarm systems must meet all of the following special requirements, which are in addition to those contained in the above listed codes and standards:

- have a non-proprietary, open protocol for interoperability with other building systems;
- be monitored by the building automation system in a one-way, read-only manner; and
- be standalone systems able to function independently of other building systems.

In addition, fire protection conduits must meet the requirements set out in section 32 of the *Canadian Electrical Code*.

7.5 Fire Pumps and Accessories

7.5.1 Fire Pump Design and Installation

When a fire pump is necessary to supplement water flow and pressure, it must be sized to comply with the appropriate NFPA standards:

- NFPA 13: *Standard for the Installation of Sprinkler Systems*;
- NFPA 14: *Standard for the Installation of Standpipe and Hose Systems*; and/or
- NFPA 20: *Standard for the Installation of Stationary Pumps for Fire Protection*.

Fire pumps must be designed for manual and/or automatic shut-down. Manual shut-down must ensure that the pump does not shut down prematurely before controlling the fire. Automatic shut-down is only permitted when activated by a low water level shut-off device.

7.5.2 Fire Pump Controller

The fire pump controller must be completely assembled, wired, and tested by the manufacturer before shipment from the factory. The status and condition of all fire pump units must be monitored by and signalled at the fire pump controller, and the status of the fire pump must be monitored by the fire alarm system.

7.5.3 Jockey Pump

A jockey pump (or pressure maintenance pump) must be utilized where it is desirable to maintain a uniform or relatively high pressure on the fire protection system. Jockey pumps must be sized to make up the allowable leakage rate within 10 minutes.

8 Electrical Engineering

8.1 Design Objectives

The electrical engineering design objectives are to provide a safe, reliable, and maintainable electric power system for office buildings. The electrical system design must meet the following objectives:

- be sized to meet the anticipated loads of the building;
- be coordinated in terms of interrupting capacity, device and cable ratings, fault levels, and protective relaying;
- allow safe maintenance, minimizing shock and arc flash hazards for maintenance personnel; and
- support power conservation initiatives.

8.2 Design Studies

8.2.1 Electrical Load Analysis

An electrical load study must be performed for new office building construction as well as renovation projects where modifications to the electrical distribution system may result in overload conditions. The report must analyze the building loads, including scenarios for normal use, off-hour use (nighttime and weekends), emergency scenarios, and different seasons.

8.2.2 Short Circuit, Device Evaluation and Coordination Study

A short circuit, device evaluation, and coordination study must be performed for new office building construction as well as renovation projects where modifications to the electrical distribution system may result in protective devices not being coordinated, or in equipment being subjected to short circuit currents greater than their ratings. If series-rated equipment is used, it must be marked in a clear and conspicuous manner to ensure it is replaced with equipment of the same type and rating.

All electrical equipment panels containing interrupting devices must be labelled with the assembly short circuit current rating. Over-current devices (breakers, fuses, relay, etc.) and overload devices must be coordinated and have settings adjusted as per the coordination study.

8.2.3 Arc Flash Study

An arc flash study must be performed for new building construction as well as renovation projects where modifications to the electrical distribution system may result in the need to update existing safety labelling.

The study must be performed in accordance with the CSA Z462: *Workplace Electrical Safety* standard. Safety labels, also in accordance with CSA Z462, must be applied on all panel boards, motor control centres, switchgear, and major electrical equipment. Labels must comply with the [Official Languages Act](#), including bilingual labels for regions prescribed under subsection 35(2) of the Act.

8.3 Site Utility

In buildings where low voltage is economically justifiable for the site utility, new building construction projects should have the utility company furnish power at the main utilization voltage (i.e. 600/347 V or 208/120 V).

In the case of larger buildings, or office building campuses where it is impractical or uneconomical to use low voltage, high voltage (over 750 V) may be used.

Redundant services should be requested from the utility if a cost-benefit analysis finds the redundant connection to be warranted. Redundant service should be requested for larger building (over 25,000 m² of floor space).

8.3.1 Substation Ownership and Demarcation Points

PSPC prefers that substations be utility-owned. However, the project details along with discussions with the local utility company will dictate the ownership of the substation and the placement of the ownership and operational demarcation points. Projects involving large buildings and campus locations may require PSPC to own substations due to cost benefits, security requirements, operational requirements, or agreement with the local utility.

8.3.2 Electrical Service

An underground service must be used to supply office buildings where conditions allow. The underground service must be installed in a concrete-encased duct bank. Cables must be selected based on all aspects of the cable operation and must comply with the requirements of the local utility.

8.3.3 Underground Cable and Conduit

Direct buried cables must not be used. Instead, buried conduits appropriate to the site conditions must be used to facilitate the modification and repair of electrical distribution.

8.3.4 Concrete-Encased Duct Banks

Concrete-encased duct banks must be used where many circuits follow the same route, for runs under permanent hard pavements, and where service reliability is paramount, such as at service entrances. The duct bank installation must comply with the *Canadian Electrical Code*. For new building construction, spare ducts for planned future expansion must be provided. In addition, extra ducts equivalent to a minimum of 25% (of the total ducts) must be provided for unknown future expansion. Ducts must be routed so as to avoid other underground utilities, foundations, and structures. They must have watertight seals where they enter into buildings, and must slope toward manholes.

8.3.5 Electrical Manholes

Manholes must be spaced such that pulling tension on cables will not exceed amounts that may damage the cable integrity. Furthermore, manholes must be provided with the following:

- cable racks;
- sumps;
- hardware for cable pulling (irons, inserts etc.);
- labelling on all cables; and
- grounding.

Manholes must be large enough to have all conductors secured on cable racks and must provide adequate working space around the conductors.

Separate manholes must be provided for:

- low-voltage cables (not exceeding 750 V);
- high-voltage cables (exceeding 750 V); and
- telecommunications cables.

Electrical handholes may be used for low-voltage feeders (below 750 V), branch circuits, and telecommunications pathways.

8.4 Primary Distribution

Primary power distribution systems consist of transformers, cables, switchgear, and associated equipment and operate at high voltage (over 750 V). For projects in which PSPC-owned primary power

distribution systems are being installed, i.e. typically large buildings or campuses, the following design requirements must be met:

- use an open-loop or primary selective system architecture for redundancy if the system supplies over 25,000 m² of floor space and/or if the building contains mission-critical equipment such as data centres; and
- provide a minimum spare capacity of 25% above the design demand load as determined according to the *Canadian Electrical Code*.

8.4.1 Primary Substation

Primary substations must be located so that radio frequency interference will not interfere with telecommunications frame equipment. Oil-filled transformers located in underground vaults must not be positioned directly adjacent to or beneath an exit way. No building drainage system may pass through the ceiling of the room containing the primary substation.

8.4.1.1 Primary Substation Transformers

PSPC-owned primary transformers must be installed in compliance with the *Canadian Electrical Code* and the *National Building Code of Canada*. The efficiency of the transformers must meet or exceed the following applicable CSA standards:

- CAN/CSA C802.1: *Minimum Efficiency Values for Liquid-Filled Distribution Transformers*;
- CAN/CSA C802.2: *Minimum Efficiency Values for Dry-Type Transformers*; and
- CAN/CSA C802.3: *Minimum Efficiency Values for Power Transformers*.

Ensure that transformer noise levels which will not cause interference in working areas.

8.4.1.2 Primary Substation Switchgear

PSPC-owned primary switchgear should be provided with draw-out type circuit breakers of the air, vacuum, or SF₆ type, or with fused-air interrupter switches, and must comply with the following design requirements:

- include energy-reducing maintenance switching or other effective means of reducing arc flash hazard during maintenance activities such as remote operation;
- be built according to the CSA C22.2 NO. 31: *Switchgear Assemblies* standard and meet the requirements of the local utility, including any metering requirement;
- include a mimic bus to show bussing, contacts, overcurrent devices, and instrumentation;
- all bussing must be copper; and
- include power monitors and advanced metering as per section 6.9, Advanced Metering System.

8.5 Secondary Distribution

Secondary power distribution systems consist of transformers, cables, switchgear, switchboards, and associated equipment and operate at 600/347 V, 208/120 V, or for small buildings at single phase 240/120 V.

Either spot networks (when available) or a secondary selective circuit arrangement must be provided if either of the following applies:

- the building is over 10,000 m²; or
- the building contains mission-critical equipment such as data centres.

8.5.1 Secondary Switchgear

Secondary switchgear must meet the following design requirements:

- comply with the CSA C22.2 NO. 31: *Switchgear Assemblies* standard;
- have a main service disconnect;
- include hardware to lock out all breakers and switches;
- only use draw-out type breakers for breakers 800A and above;
- have an enclosure that is sprinkler-proof in areas protected with sprinklers;
- contain a ground bus throughout;
- have spare space and ampacity of 25% (for new installations);
- contain energy-reducing maintenance switching if arc flash is a risk for maintenance;
- have the state of each breaker (open/closed) monitored by the building automation system; and
- include advanced metering as per section 6.9, Advanced Metering System.

8.5.2 Distribution Switchboards

Distribution switchboards must meet the following design requirements:

- comply with the CSA C22.2 NO. 244-05: *Switchboards* standard;
- have a main service disconnect;
- have spare space and ampacity of 25% for new installations; and
- contain advanced metering for feeders to panel boards measuring current and totalizing watt-hours as per section 6.9, Advanced Metering System.

8.5.3 Secondary Transformers

Secondary transformers must be installed in compliance with the *Canadian Electrical Code* and the *National Energy Code of Canada for Buildings*. The transformers must conform to the following applicable CSA standards:

- CAN/CSA C802.1: *Minimum Efficiency Values for Liquid-Filled Distribution Transformers*; and
- CAN/CSA C802.2: *Minimum Efficiency Values for Dry-Type Transformers*.

Transformer should be selected based on the following requirements:

- secondary transformers supplying large nonlinear loads must be K-rated or oversized in order to prevent overheating due to harmonics;
- Dry type transformers are preferred for primary voltages of 5 kV or lower where insulation, coordination and protection satisfactory to the Power Supply Authority can be obtained;
- Liquid cooled transformers are preferred for voltages above 5 kV and for loads greater than 400KVA at 600V/120-208V;
- Transformer noise levels must not cause interference in working areas; and
- Copper windings are preferred for liquid filled transformers.

8.5.4 Motor Control Centres (MCC)

Motor control centres must meet the following design requirements:

- comply with the CSA C22.2 No. 14: *Industrial Control Equipment* standard;
- be provided with metering and power monitoring as per section 6.9, Advanced Metering System;
- have operator controls as per section 8.10, Operator Controls;

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- include interlocks to prevent multiple motor loads with high inrush current from starting simultaneously, in order to prevent nuisance tripping of breakers and to avoid placing excessive loads on transformers or the emergency power supply system
 - the MCC is elevated off the ground;
 - the use of combination starters is preferred; and
 - use motor control centres where they provide an economical and practical grouping of controls.

8.5.5 Motor Control

Electric motors control must meet the following criteria:

- The transient voltage drop from motor starting must be kept below utility limits, this can be done via soft starters, VFDs, or other means.
- Motors must be protected with thermal overload protection of the manual reset type. Built –in overloads in the motor are not acceptable.
- Three-phase motors must be provided with a manually operable disconnecting means which can be locked-out.
- The control scheme be coordinated with the mechanical consultant.

8.5.5.1 Variable-Frequency Drives (VFD)

In cases where motor speed is controlled to various set points, variable-frequency drives (VFD) must be used for all motors greater than 3.7 kW (5 hp). Harmonic distortion generated by VFDs must be mitigated as per section 8.5.10, Power Quality. Data from VFDs for motors over 3.7 kW must be networked to the advanced metering system as per section 6.9, Advanced Metering System. VFDs, conductors, and motors must be coordinated in accordance with manufacturer’s requirements.

8.5.6 Electrical Motors

Electric motors must meet the following criteria:

- the efficiency must comply with the *National Energy Code of Canada for Buildings*;
- electric motors 746W and over must be three-phase;
- motor windings preferred in copper when efficiency is superior and when smaller size is a factor.

8.5.7 Elevator and Escalator Power

Electrical design standards in elevators and escalators must comply with the following codes and standards:

- *National Building Code of Canada*;
- [*Canada Occupational Health and Safety Regulations, Part IV, Elevating Devices*](#);
- *CAN/CSA B44: Safety Code for Elevators and Escalators*; and
- *CAN/CSA B355: Lifts for Persons with Physical Disabilities*.

Elevators must be powered from a breaker or fused disconnect located in the elevator machine room that is equipped with hardware for lockout.

8.5.8 Panelboards

Panelboards must comply with the *CSA C22.2 No. 29: Panelboards and Enclosed Panelboards* standard. Separate panelboards must be used for regular power supplying:

- lighting;

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- general-purpose receptacles and miscellaneous loads;
 - telecommunications systems; and
 - mechanical loads (heating, ventilation, and air-conditioning).

Panels powered by emergency power may contain mixed loads.

Panelboards must be of the bolt-on, circuit breaker types. Multi-pole breakers must have a single handle. Each circuit must be clearly labelled with a durable typewritten directory within the panel. All panelboards must be fitted with lock-type doors and door-in-door trim.

Panelboards supplying the main telecommunications room, also known as distributor room C, must be provided with a surge protection device (SPD) with a surge rating of no less than 50 kA per phase (25 kA per mode).

All new panelboards must be provided with minimum 25% spare ampacity and 25% spare overcurrent devices. Where practical, recessed panelboards should have additional spare, empty conduits extending to ceiling spaces.

8.5.9 Secondary Distribution Conductors

Either copper or aluminum conductors may be used for the following equipment:

- motor windings; and
- distribution transformer windings.

Only copper conductors must be used for the following equipment:

- bus ducts;
- switchgear bussing;
- switchboard bussing; and
- cables and conductors.

8.5.10 Power Quality

The building's electrical system must comply with the standards set by the local utility for power-line flicker, total harmonic distortion, and power factor, as well as with the requirements outlined in the following sections.

8.5.10.1 Power Factor

The system design must maintain a minimum power factor of 0.9 lagging. Power factor correction equipment should be utilized when required. If utilized, power factor-correcting capacitors must be properly labelled, complete with listed discharge times for servicing.

8.5.10.2 Electromagnetic Interference

Take precautions to minimize extremely low frequency electromagnetic interference by avoiding the use of single conductor armored cables and taking into consideration potential impact of electromagnetic interference when locating transformer equipment.

8.5.10.3 Total Harmonic Distortion

Total harmonic distortion must not exceed limits set by the utility or interfere with electronic equipment in the building. If it exceeds these limits or interferes with electronic equipment, the distortion must be mitigated. Suitable mitigation measures include, but are not limited to, the following:

- varying equipment operating settings;
- selection of equipment that produces lower amounts of harmonics, such as drives with more pulses;

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- selection of equipment with built-in mitigation;
 - passive filters;
 - isolation transformers; and
 - active conditioning equipment.

8.6 Branch Circuits

All branch circuit wiring must be copper and no smaller than No. 12 AWG.

8.6.1 Lighting Branch Circuits

Lighting branch circuits must be 120 V, or Power Over Ethernet (POE) for new construction. Existing installation at 347 V may remain but conversion to 120 V or POE should be considered subject to life cycle costing including the cost of the conductors, equipment, maintenance, and operation.

8.6.2 Receptacle Branch Circuits

Standard receptacles must be duplex, CSA 5-15R, commercial grade, unless otherwise required by code. Emergency power receptacles must be red. Isolated grounding receptacles must be orange. The colour of standard receptacles, switches, and faceplates must be coordinated with the architectural colour scheme.

Receptacles for housekeeping must be CSA 5-20R suitable for 15/20 A and must be placed in walls around permanent cores or corridors. The distance between receptacles in corridors must be 15 m or less, and receptacles must be located within 7.5 m from the corridor ends.

Emergency power receptacles must be provided in all electrical closets and in the main mechanical and electrical equipment rooms if an emergency power system is available. Each piece of mechanical equipment located either in the interior or exterior of a building must have access to a receptacle placed no more than 7.5 m away.

Receptacle faceplates must be labelled on the exterior with a typewritten machine-made label indicating the panel and the number of the circuit that feeds the receptacle.

8.7 Grounding and Lightning Protection

8.7.1 Grounding System

The ground source for the electrical power system must have resistance to ground of less than 5 ohms, as confirmed by the fall-of-potential ground testing method outlined in the Institute of Electrical and Electronics Engineers (IEEE) Standard 81: *IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System*.

Electrical rooms must be fitted with a bonding bus interconnected with the building's grounding system with a minimum of 25% spare terminals or holes for future bonding. All low-voltage power distribution systems must be supplemented with a separate bonding conductor. Each stack of electrical and telecom closets will have its own vertical dedicated ground riser conductor.

8.7.2 Lightning Protection

Lightning protection requirements must be determined in accordance with the latest edition of the CAN/CSA B72-M87: *Installation Code for Lightning Protection Systems*.

Lightning arrestors must be installed on the transformer primary terminals of the main electrical service (subject to agreement with the local utility if the substation is utility-owned).

Surge protection devices compliant with Underwriters Laboratories (UL) standard UL 1449: *Standard for Surge Protective Devices* must be installed on the secondary switchgear with a minimum surge current

capacity of 240 kA per phase (120 kA per mode), and must be installed on each switchboard with a minimum surge current capacity of 120 kA per phase (60 kA per mode).

8.8 Placement of Electrical Rooms

Electrical rooms must meet the architectural and interior design requirements listed in section 4.2.3.3, Mechanical and Electrical Rooms, and must support the efficient vertical and horizontal distribution of power and control systems.

Electrical closets must be stacked vertically to the greatest extent possible. If an electrical room contains transformers or other heat-generating equipment, adequate cooling and/or ventilation must be provided so that environmental requirements are met as per section 6.2, Mechanical Environmental Requirements.

Electrical rooms in new building construction must have adequate sleeves installed for future modifications. At a minimum, two capped 100 mm spare sleeves through the structural floors must be installed. All floor sleeve penetrations must extend 100 mm above the finished floor.

8.9 General Workmanship

Electrical installations must be of good workmanship, this requires electrical equipment to:

- be securely and permanently fastened and or supported;
- be installed level, and plumb;
- have cable and conduit be installed parallel to and perpendicular to building lines;
- have a neat and finished appearance; and
- have corrosion protection adequate for the environment.

8.9.1 Seismic Design

Electrical equipment must be laterally restrained for seismic load requirements as outlined in section 5, Structural Engineering, and the *National Building Code of Canada*.

8.9.2 Building Raceways

Raceway systems used in buildings must comply with the *Canadian Electrical Code* and local regulations.

8.9.3 Wiring Methods

Risers for regular power and emergency power must be combined with other core elements to form compact groups and to maximize usable floor space. Bus duct risers must have a 100 mm curb around floor penetrations to prevent water from running down the bus duct. New bus ducts should be totally enclosed. Sprinklers must not aim water at ventilated or open bus ducts.

Conceal raceways for horizontal electrical distribution systems within the concrete slab, in the ceiling plenum, or in a raised floor if one is present. Concrete encased tubing and conduit, electrical metallic tubing, rigid conduit, cable tray, or modular wire distribution systems are acceptable. The minimum conduit size for power and lighting circuits shall be 21 mm. Permanent tags should be provided to feeders at pull and junction boxes. For motors and equipment subject to vibrations or movement provide flexible connections.

In office areas, install zone distribution boxes near anticipated loads to service workstations in compliance with the circuit loading requirements outlined in the [Government of Canada Workplace 2.0 Fit-up Standards](#).

8.10 Operator Controls

Commanding and signalling devices must comply with the national standard CAN/CSA Z431: *Basic and Safety Principles for Man-Machine Interface, Marking and Identification - Coding Principles for Indicators and Actuators*. This standard applies to both physical operator controls and human-machine interfaces (HMIs) that form part of a building automation system.

All wired operator controls (e.g. push buttons, selector switches, and pilot lights) must be extra low voltage (below 30 V).

8.10.1 Colour Coding

Motor control and HMI colour coding must comply with the CAN/CSA Z431 standard.

The CAN/CSA Z431 standard allows information to be imparted from three different perspectives:

- the condition of the process;
- the state of the equipment; and
- the safety of persons, property, and/or the environment.

Display colours and shapes for HMIs and operator controls must be from the perspective of the condition of the process or the state of the equipment. From these perspectives, green indicates a normal/operational state.

From the perspective of the safety of persons and property, green indicates a safe condition, and indicating devices must only be applied locally to facilitate service or maintenance (e.g. a green light placed near a door to indicate that it is safe to enter). In addition, indicating devices must include clear labelling to ensure correct interpretation.

8.10.2 Operating Controls Labeling and Language Policy

Labelling on operator controls (mechanical indicators) and HMIs must make use of symbols as per CAN/CSA Z431. Any words used on controls or in HMIs must comply with the [Official Languages Act](#), including bilingual signage for regions prescribed under subsection 35(2) of the Act.

8.11 Emergency Electrical Power Supply

All facilities must have an emergency electrical power system for life safety if required by the *National Building Code of Canada* and in accordance with the *Canadian Electrical Code*.

Self-contained battery units may be used for emergency light fixtures in buildings where an emergency generator is not required for other systems.

8.11.1 Emergency Generator System

If required, an emergency generator system must consist of a central engine generator with a separate distribution system with one or more automatic transfer switches (ATSs). The emergency generator system must be provided in accordance with the latest version of the CSA C282: *Emergency Electrical Power Supply for Buildings* standard.

In addition to CAN/CSA C282, the fuel system must also meet the requirements of the latest version of the CAN/CSA B139 Series: *Installation Code for Oil-Burning Equipment*. The base building generator fuel day tank must meet the following requirements:

- have a sufficient quantity of fuel to operate the engine for a minimum of 2 hours of running time at full load;
- be within the proximity of the generator in an appropriately fire rated room; and

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- be automatically refilled from a main storage tank with sufficient capacity to operate the engine for a minimum of 12 hours' running time at full load.

The purpose of the tank requirements is to facilitate safe evacuation in an emergency and to protect government assets.

The emergency distribution system must be designed so that emergency power sources cannot under any condition back-feed energy into the de-energized normal system. A permanent system must be provided to allow safe and fast connection of a portable load bank to test the generator full load.

The emergency system status and alarms must be transmitted to the building automation and fire alarm systems.

8.11.2 Emergency Power Loads

At a minimum, emergency electrical power supply must be provided for the following loads (other loads may be added as required):

- life-safety load:
 - exit lighting
 - emergency lighting
 - fire alarm system
 - fire control centre
 - smoke control systems
 - fire pumps, and suppression system
 - high-rise stairway pressurization fans
 - elevators
 - generator auxiliaries (fuel pump, control power, etc.)
- essential building load:
 - lighting:
 - security perimeter lighting
 - lighting for main electrical room, electrical closets, security rooms, fire control centre, telecommunications rooms, and generator room
 - mechanical:
 - mechanical control systems
 - sump pumps
 - sewage pumps
 - exhaust fans removing toxic, explosive, or flammable fumes
 - hydronic heating system (if applicable)
 - telecommunications:
 - telecommunications room emergency receptacles
 - telecommunications rooms back-up power system (UPS)
 - building controls:
 - building automation system
 - advanced metering system
 - security systems

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- electrical:
 - emergency power receptacles
 - miscellaneous:
 - horizontal sliding doors in public spaces
 - other associated equipment designated by code
 - essential client loads

8.11.3 Automatic Transfer Switch (ATS)

All automatic transfer switches (ATSs) supplied and installed for the base building and/or tenant must be provided in accordance with the CAN/CSA C282: *Emergency Electrical Power Supply for Buildings* standard and must have the following features:

- both automatic and manual operation;
- network connection to the building automation system;
- dedicated ATSs for:
 - life-safety loads;
 - essential buildings loads; and
- manual bypass isolation switch to permit electrical bypass and isolation of the ATS without interrupting the load (to either the normal or emergency power).

8.11.4 Uninterruptible Power Supply System

Uninterruptible power supply (UPS) systems generally do not form part of the base building but are tenant-owned and -operated. Tenant requirements for UPS systems must be considered in the base building design.

UPS installations that may adversely affect the power quality in the building must include forms of mitigation such as filtering, isolation transformers, and active filtering.

Rooms containing UPS batteries must have sufficient ventilation in order to prevent the accumulation of any vented hydrogen from reaching hazardous levels as per section 6.11.5, Service Areas. Hydrogen detection sensors must be installed in areas where hydrogen is most likely to accumulate. They must also be networked to the building automation system.

Base building UPS systems (non-client-owned), if required, must meet the following requirements:

- have an input power factor of above 0.8;
- have an output power factor of above 0.8;
- have an efficiency of above 90%;
- include a maintenance bypass switch; and
- be interconnected to the building automation system for monitoring status, voltages, and currents.

8.12 Lighting

Lighting must be designed to assist in defining the overall building architecture, meet organizational safety and security requirements, as well as meet the multiple task requirements of individuals in different types of spaces within the building.

Anticipated and existing tasks must be determined with input from clients and PSPC. Default lighting levels are listed in Table 1 and Table 2 at the end of this section. The lighting design must also be in accordance with the [Government of Canada Workplace 2.0 Fit-up Standards](#).

8.12.1 Lighting Design Requirements

Lighting design must provide appropriate levels of illumination for performing tasks easily and comfortably. Lighting must satisfy both quantity and quality aspects demanded by the work environment, by providing the following:

- visual comfort to promote workers' well-being;
- visual performance to promote high levels of visual task execution; and
- visual safety to permit safe movement within the work environment.

The lighting system should also be energy efficient, complying with the *National Energy Code of Canada for Buildings* (NECB).

The following requirements must be adhered to in terms of illuminance, luminance ratio, and colour rendering:

8.12.1.1 Illuminance and Luminance Ratio

Light levels must comply with the illuminance and luminance ratio requirements outlined in Table 1 and Table 2 at the end of this section. For specific areas not found in these tables, and for applications other than typical office environments, refer to the [Canada Occupational Health and Safety Regulations](#) of the [Canada Labour Code](#), the *National Building Code of Canada*, and *The Lighting Handbook* published by the Illuminating Engineering Society (IES). When there are discrepancies between the three sources, the *Canada Labour Code* takes precedence.

8.12.1.2 Colour Rendering and Temperature

For all lighting, lamps must be selected with a colour rendering index (CRI) not less than 80 and a correlated colour temperature (CCT) less than or equal to 4100 °K.

8.12.2 Lighting Power Density

Lighting power densities (W/m^2) must comply with the requirements contained in the latest edition of the *National Energy Code of Canada for Buildings* (NECB). This applies to new and existing buildings where the base building lighting system is being physically replaced.

While individual areas may deviate in power loading from the recommended values, the total power budget for lighting for the building or overall space must not be exceeded unless justified by the client's operational requirements. The total power budget for the project must be documented in the investment analysis report (IAR), and a demonstration must be provided showing that implementation of the proposed design will not exceed the budget.

8.12.3 Day Lighting

To reduce energy consumption by the illumination system, day lighting (also called daylight harvesting) must be considered for all new construction and major retrofits. The IAR must identify whether day lighting is to be implemented. If implementation is not feasible, the report must include a justification for not implementing day lighting.

Day lighting systems in work areas must utilize continuous dimming rather than simple on-off operation to minimize distraction to workers.

8.12.4 Flexibility and Servicing Accessibility

The lighting design must allow easy servicing of the luminaires and replacement of lamps, drivers and ballasts. It must also be possible to economically modify the lighting system post occupancy to meet the required lighting levels.

8.12.5 General Luminaires Criteria

Luminaires and associated fittings must be of standard commercial design, the use of LED lighting is recommended. Designers must use components that are proven (capable of demonstrating the required performance in relevant projects), readily available, technologically current, user-friendly, and that provide convenient operation, ease of maintenance, and energy efficiency. Custom-designed fixtures should only be installed to meet heritage requirements.

Ballasts, when used, must have a sound rating of “A” for all areas occupied by personnel, and must conform to the CAN/CSA C654: *Fluorescent Lamp Ballast Efficacy Measurements* standard and local electrical authority requirements. Ensure that all voltage drops are within the manufacturer’s specification for the lamps being controlled. Ballasts must be electronic and energy-efficient with a minimum power factor of 0.95, and have a maximum total harmonic distortion (THD) of 10%.

Exit signs must be of the light-emitting diode (LED) type and meet the requirements of the CAN/CSA C860: *Performance of Internally Lighted Exit Signs* standard. Location and symbols must be in accordance with the *National Building Code of Canada*.

8.12.6 Specific Lighting Applications

Emergency lighting must be installed and meet the performance requirements of the *National Building Code of Canada* and [Part VI of the Canada Occupational Health and Safety Regulations](#). In addition to these requirements, emergency battery-powered lighting must also be provided in main mechanical and electrical rooms, generator rooms, and automatic transfer switches rooms.

Equipment room light fixtures must be located so that lighting is not obstructed by tall or suspended pieces of equipment.

Lighting fixtures must be provided at all building entrances and exits. Exterior lighting fixtures must be connected to the emergency lighting circuit.

Luminaires in parking areas must be placed so that they maintain the required vehicle clearance.

8.12.7 Light Pollution Reduction

The exterior lighting design must comply with the light pollution reduction requirements listed in the latest version of the Leadership in Energy and Environmental Design (LEED) building certification program. This requires defining lighting zones as per the Illuminating Engineering Society (IES) and International Dark-Sky Association (IDA) *Model Lighting Ordinance (MLO)*, and selecting luminaires with an appropriate luminance, shielding, and orientation so that backlight, uplight, and glare (BUG) are in compliance with LEED requirements.

8.12.8 Lighting Controls

8.12.8.1 Lighting Controls Requirements

Lighting controls in office spaces must be designed to meet the latest *National Energy Code of Canada for Buildings (NECB)*. Lighting control zones must not exceed the maximum requirements of NECB or one 15 A circuit, whichever is smallest.

The selection of manual control, dimmable control, localized automatic control, microprocessor lighting control, networked control, or any combination of the four is a fundamental design choice and is dependent on a number of factors. These include the frequency of use, available day lighting, normal or extended work hours, and the use of open or closed office plans. The designer must provide descriptions and a rationale for the chosen scheme.

A local means of override must be provided in every area to ensure continuing operations when required.

8.12.8.2 Microprocessor and Networked Lighting Controls

Lighting control systems must function on an open protocol to avoid vendor lock-in, and must be able to integrated with the with building automation, and/or security systems.

8.12.8.3 Lighting Controls for Specific Applications

Building entrance lighting and wall-mounted access security lighting must be controlled by an on-off photocell sensor to activate the lights from dusk to dawn.

All exterior lighting not designated to operate from dusk to dawn must be controlled by a photocell and a time switch, or by the networked lighting control system.

Interior garage lighting should be reduced during off building hours when motion sensors do not detect movement, as an energy-saving measure. This energy saving measure should exclude security lighting within garages.

8.12.9 Base Building Light Levels

Base building light levels must meet the more stringent of the minimum levels outlined in the [Canada Occupational Health and Safety Regulations \(COHSR\)](#) of the [Canada Labour Code](#), the National Building Code of Canada, and those provided in the tables at the end of this section. If specific areas are not found in the tables, then refer to the IES publication *The Lighting Handbook*, latest edition.

8.12.9.1 Interior Lighting Calculation Parameters

Typical default parameters to be used in interior lighting calculations are as follows:

- luminaire ambient temperature: 1.0
- voltage to luminaire: 1.0 (electronic ballast)
- ballast factor: 0.9 (manufacturer's data takes precedence)
- burnouts: 1.0
- lamp lumen depreciation: 0.9 (manufacturer's data takes precedence)
- luminaire dirt depreciation: 0.9 (for office spaces)
- light reflectance values: 80-50-20 (ceiling, walls, and floor respectively, assuming light colours)

8.12.9.2 Illumination Levels Interior Spaces

Illumination levels for interior spaces are listed in Table 1. It should be noted that COHSR requirements for illumination levels at task positions of 1000 lux for cartography, plan reading or difficult visual tasks and 500 lux for operating business machines, typing, reading or writing should be met during space fit-up, as per the Workplace 2.0 Fit-up Standards via task lighting.

Table 1: Base Building Interior Illumination Levels

Location	Minimum Average Illumination (lx) ^a	Maximum Uniformity Ratio (avg : min) ^b	Maximum Uniformity Ratio (max : min) ^c
General Office Spaces	425	2:1	5:1
Meeting rooms, boardrooms, conference rooms, file storage areas, training rooms, and reception areas	300	2:1	
Library, general lighting	300	2:1	
Common areas (public spaces, lounges, lobbies, atriums, washrooms, and elevator lobbies)	150	2:1	
Food preparation areas	500	1.5:1	
Lunchrooms and cafeterias	150	3:1	
Electrical and mechanical rooms	200	3:1	
Telecommunications rooms	500	3:1	
Frequently used corridors, stairways, and elevators	100	2:1	
Infrequently used corridors and stairways	50	2:1	

Notes:

- ^a Illumination levels for interior office spaces are expressed as the minimum acceptable values of average maintained horizontal illuminance level (lx) over the working plane at each workstation or at floor level for support spaces (based on carpeted areas). To ensure a uniform approach and yield consistent results, measurement of lighting levels must be made in accordance with the document [Measurement of Lighting Levels in the Workplace – Canada Occupational Health and Safety Regulations, Part VI, 928-1-IPG-039](#).
- ^b The uniformity ratio is given at a task plane height over an entire room or space, except for general office spaces, food preparation areas, and meeting rooms where it is over the task area.
- ^c Throughout entire work space comprising the task areas.

8.12.9.3 Illumination Levels for Exterior Spaces

Base building exterior light levels must meet the more stringent of the minimum levels outlined in the [Canada Labour Code](#) and those provided in the exterior lighting level table below.

Lighting levels must also meet security requirements as determined by performing a threat and risk assessment as per the [Policy on Government Security](#) published by the Treasury Board of Canada Secretariat and RCMP guidelines as outlined in section 10, Security.

Table 2: Exterior Illumination Levels

Location	Minimum Average Illumination (lx) ^a	Maximum Uniformity Ratio (avg : min)	Maximum Uniformity Ratio (max : min)	
Grounds				
Pedestrian walkways	10	4:1	10:1	
Pedestrian walkways and vehicular intersection	30	3:1		
Vehicular traffic	10	4:1		
Vehicular intersections	30	3:1		
Building Entrances and Exits				
Frequently used building entrances and exits	100	2:1		
Infrequently used building entrances and exits	50	2:1		
Open Parking				
Vehicular traffic	10	4:1		
Vehicular intersections	30	3:1		
Vehicular parking	10	4:1		
Pedestrian walkways	10	4:1		
Covered Parking				
General parking and pedestrian areas	50	4:1		
Ramps and corners during daytime	100	4:1		
Ramps and corners during nighttime	50	4:1		
Entrance areas ^b during daytime	500	4:1		
Entrance areas ^b during nighttime	50	4:1		

Notes:

- ^a Illumination levels for exterior commercial office building spaces are expressed as the minimum acceptable values of average maintained horizontal illuminance levels (lx) over the usable area at pavement level. To ensure a uniform approach and yield consistent results, measurement of lighting levels must be made in accordance with the document [Measurement of Lighting Levels in the Workplace – Canada Occupational Health and Safety Regulations, part VI, 928-1-IPG-039](#).
- ^b The entrance area is defined as the portal or physical entrance to the covered portion of the parking structure and 15 m beyond the edge of the covering into the structure.

9 Telecommunications Systems

9.1 Telecommunication Spaces

Telecommunication spaces must meet the following requirements:

- be stacked vertically to the greatest extent possible;
- be serviced from electrical panels supplying only telecommunications systems;
- be located in dry spaces not subject to flooding from natural sources or building water sources such as washrooms or janitor closets; and
- include required architectural features outlined in the Telecommunications Industry Association (TIA) standard TIA 569: Telecommunications Pathways and Spaces, such as backboards, ceiling heights, and door sizes.

9.2 Telecommunication Entrance Facility

The entrance facility must be within a dedicated enclosed room. However, the room may also serve as a service provider space or access provider (PSPC or contractor) space if the access provider equipment is kept secure with a locked barrier such as a wire mesh to prevent unauthorized access.

The entrance facility must be powered by at least two dedicated 20A, 120 V duplex receptacles on emergency power if an emergency power system is available.

9.3 Telecommunications/Distributor Room

Telecommunications rooms, also referred to as distributor rooms, must be dedicated and not contain electrical equipment for power distribution other than panels supplying the room or related equipment. A minimum of one telecommunications room must be provided per building floor, with additional rooms provided in accordance with ANSI/TIA 569.

Each room must contain at least two dedicated 20A, 120 V duplex receptacles on emergency power if an emergency power system is available, and must provide convenience receptacles on the perimeter of the room every 1.8 m.

9.4 Telecommunication Raceway System

Backbone and horizontal telecommunication raceways must meet the requirements of ANSI/TIA 569 and be installed with sufficient separation distance from power raceways to mitigate the effects of electromagnetic interference (EMI) as per ANSI/TIA 569.

9.5 Service Entrance Pathway

Service entrance pathways must meet the requirements of the ANSI/TIA 758: *Customer-Owned Outside Plant Telecommunications Infrastructure Standard*.

9.6 Telecommunication Grounding and Bonding System

Telecommunication equipment must have a dedicated grounding and bonding system as per ANSI/TIA 607: *Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises* (and addenda). The system must be bonded to the building grounding system.

The telecommunications room must be fitted with copper bonding bus connections interconnected with the building's grounding system with a minimum 25% spare capacity for future bonding.

Telecommunication grounding and bonding conductors must be copper.

10 Security

10.1 Design Objectives

The security design must protect facilities and be flexible to allow integration of tenant-funded requirements, both baseline and enhanced. The security design must also comply with all applicable policies, standards and guidelines from Public Services Procurement Canada, Treasury Board Secretariat, Royal Canadian Mounted Police, and the Communications Security Establishment.

10.2 Threat and Risk Assessment

In order for a security system to be effective it needs to be developed based on an understanding of the actual threats and risks it is designed to control. Prior to developing the security elements on an office building project, a Threat and Risk Assessment (TRA) must be completed. The threat and risk assessment process is intended to evaluate a building, its assets, the tenants, the threats against the building and the occupants, and the performance of safeguards against these threats.

10.3 Security Site Brief & Security Design Brief

For new office building construction projects, develop a Security Site Brief (SSB). A Security Design Brief (SDB) must also be developed for all new construction projects and renovation projects which materially impact building security. Refer to [G1-005: Guide to the Preparation of Physical Security Briefs](#) for details on developing these two briefs. The two documents cover detailed security requirements for life safety and emergencies, site, building design, building layout, electronic access control, electronic intrusion detection, closed circuit television / video equipment, security control centre, secure rooms, vaults, sensitive discussion areas, telecom and data links.

Federal tenants may have specialized functional programs that will guide the fit-up of space within the base building. In this case, the specialized functions must be integrated into the base building systems and design.

11 Definitions

Advanced metering system	A system that collects time-stamped data from meters via a communications network, providing useful data for energy use management, procurement, and operations.
Advanced meters	Meters that have the capability of measuring and recording data at least hourly, and can relay the information to an advanced metering system.
BACnet or BACnet standard	A data communications protocol for building automation and control networks that allows devices from different vendors to interoperate, or work together, on the same network. It is an International Organization for Standardization (ISO) global standard developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). BACnet communication requirements are defined by the ANSI/ASHRAE 135 standard and all current addenda and annexes.
Base Building	The building shell including finished floors, structure, exterior envelope, interior core and demising walls, finished ceilings complete with lighting, and other building systems consistent with the designed function and planned general use of the building.
Building automation system	A modern building control system that optimizes the start-up and performance of a building's mechanical systems, including the alarm, lighting, security, energy monitoring, and heating, ventilation, and air-conditioning (HVAC) systems. The building automation system (BAS) greatly increases the interaction between the subsystems of a building and improves occupant comfort, lowers energy use, and allows off-site building control.
Commissioning	A process of ensuring that all systems in a building are installed, functionally tested, and capable of being operated and maintained to perform in conformity with design intent. Control system commissioning requires a point-to-point check and detailed documentation of each parameter. Commissioning includes a complete functional test of the sequence of operation for each piece of equipment.
Duct bank	Two or more conduits (ducts) routed together.
Extra low voltage	Voltage below 30 V.
Fit-up	Alterations and improvements to the base building or base building systems in order to prepare the accommodation for occupancy by a department.

Handhole	A below-grade enclosure that allows personnel to reach in (but not enter) for the purpose of operating, installing, and maintaining electrical cables.
High voltage	Voltage above 750 V.
Low voltage	Voltage between 30 V and 750 V
Major Renovation	A renovation that involves substantial work to several base building elements at the same time or to an individual base building element at any given time.
Manhole	A below-grade enclosure that personnel may enter for the purpose of operating, installing, and maintaining electrical cables.
Office building	Structures predominantly used to offer office space categories such as general administrative, secure administrative, quasi-judicial office space, and call/contact centres.
Primary distribution	A power distribution system that consists of transformers, cables, switchgear, and associated equipment and operates at high voltage (over 750 V), used to distribute power in large buildings or at campus locations.
Project Team	<p>Project Teams are an internal vehicle to PSPC for the communication of pertinent and essential information relative to the development, implementation and ongoing activities of a project.</p> <p>The size and make-up of project teams is determined by the Project Leader and based on the size, complexity and type of real property project. Refer to the roles and responsibilities for project teams in the NPMS for further details.</p>
Secondary distribution	A power distribution system that consists of transformers, cables, switchgear, and associated equipment and operates at 600/347 V, 208/120 V, or for small buildings at single phase 240/120 V.

12 Acronyms and Abbreviations

AABC	Associated Air Balance Council
ADM	Assistant Deputy Minister
AHRI	Air-Conditioning, Heating, and Refrigeration Institute
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	ASTM International (formerly American Society for Testing and Materials)
ATS	automatic transfer switch
BAS	building automation system
BEP	best efficiency point
BHMA	Builders Hardware Manufacturers Association
BOMA	Building Owners and Managers Association
BUG	backlight, uplight, and glare
CCT	correlated colour temperature
CEC	<i>Canadian Electrical Code</i>
COE	centre of expertise
COHSR	Canada Occupational Health and Safety Regulations
CRI	Carpet and Rug Institute
CRI	colour rendering index
CRN	Canadian Registration Number
CSA	CSA Group (formerly Canadian Standards Association)
CTI	Cooling Technology Institute
DALI	digital addressable lighting interface
DCWS	domestic cold water supply
DDC	direct digital control
DHI	Door and Hardware Institute
DHWS	domestic hot water supply
EIA	Electronics Industries Alliance
EnMS	energy management system
FAR	floor-area ratio
FIPP	<u>Federal Identity Program Policy</u>

FSDS	Federal Sustainability Development Strategy
HMI	human machine interface
HVAC	heating, ventilation, and air conditioning
IAR	investment analysis report
IAQ	indoor air quality
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society of North America
IESNA	Illuminating Engineering Society of North America
IWCA	International Window Cleaning Association
LCC	life-cycle costing
LED	light emitting diode
NBC	<i>National Building Code of Canada</i>
NEBB	National Environmental Balancing Bureau
NECB	<i>National Energy Code of Canada for Buildings</i>
NPMS	National Project Management System
NFPA	National Fire Protection Association
NFRC	National Fenestration Rating Council
NIBS	National Institute of Building Sciences
NJC	National Joint Council
OPC	open protocol connectivity
OWS	operator work station
PWGSC	Public Works and Government Services Canada
RCMP	Royal Canadian Mounted Police
RPB	Real Property Branch
SDI	Steel Door Institute
SFI	Sustainability Forestry Initiative
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
STC	sound transmission class
TAB	testing, adjusting balancing
TBS	Treasury Board of Canada Secretariat
THD	total harmonic distortion
TIA	Telecommunications Industry Association
UL	Underwriters Laboratories
ULC	Underwriters Laboratories of Canada

UPS	uninterruptible power supply
VFD	variable-frequency drive
VOC	volatile organic compound
WHMIS	Workplace Hazardous Materials Information System

13 General Codes, Standards, and Legislation

- [Canada Labour Code](#)
- [Canada Labour Code, Part II, Canada Occupational Health and Safety Regulations](#)
- [Canadian Environmental Protection Act](#)
- [Department of Public Works and Government Services Act](#)
- [Policy on Communications and Federal Identity](#)
 - [Federal Identity Program Manual](#)
- [Federal Real Property and Federal Immovables Act](#)
- [Government of Canada Workplace 2.0 Fit-up Standards](#)
- Municipal/local utility regulations
- *National Building Code of Canada* and supplements
- *National Energy Code of Canada for Buildings*
- *National Fire Code of Canada*
- *National Plumbing Code of Canada*
- [Official Languages Act](#)
- PWGSC [Sustainable Buildings Policy](#)
- Treasury Board [Fire Protection Standard](#)
- CAN/CSA Z-234.1-*Canadian Metric Practice Guide*.
- CAN/CSA B651: *Accessible Design for the Built Environment* standard;

13.1 Architectural Codes, Standards, and Legislation

- AAMA/CSA 101-A440 *North American Fenestration Standard / Specification for Windows, Doors, and Skylights*
- AAMA/WDMA:1600/I.S.7: *Skylights and Space Enclosures*
- ANSI/BOMA Z65.1: *Office Buildings: Standard Methods of Measurement*
- ASHRAE 160: *Criteria for Moisture-Control Design Analysis in Buildings*
- CAN/CSA B651: *Accessible Design for the Built Environment*
- City of Toronto [Bird-Friendly Development Guidelines](#) and *Bird-Friendly Development Rating System*
- CSA S478: *Guideline on Durability in Buildings*
- CSA Z809 [Sustainable Forest Management](#)
- NFRC 500: *Procedure for Determining Fenestration Product Condensation Resistance Values*
- [Real Property Branch Accessibility Procedure](#)
- Real Property Branch [Custodial Parking Policy](#) and [Custodial Parking Procedure](#)
- [RPB Policy on the Stewardship of Federal Heritage Buildings](#)
- [Standards and Guidelines for the Conservation of Historic Places in Canada](#)
- Treasury Board Secretariat [Accessibility Standard for Real Property](#)

13.2 Window Washing Standards

- ANSI A39.1: *Safety Requirements for Window Cleaning*
- ANSI/IWCA I-14.1: *Window Cleaning Safety Standard*

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- ASME A120.1: *Safety Requirements for Powered Platforms and Traveling Ladders and Gantries for Building Maintenance*
 - CAN/CSA Z91-02: *Health and Safety Code for Suspended Equipment Operations* (2002 most recent revision)
 - CAN/CSA Z91-M90: *Safety Code for Window Cleaning Operations*

13.3 Structural Codes, Standards, and Legislation

- CAN/CSA S413: *Parking Structures*
- CAN/CSA S832: *Seismic Risk Reduction of Operational and Functional Components (OFCs) of Buildings*
- CSA S478: *Guideline on Durability in Buildings*
- PWGSC *Doing Business with Real Property Branch (RPB)*
- [Real Property Services Policy on Seismic Resistance of PWGSC Buildings](#)
- [Standards and Guidelines for the Conservation of Historic Places in Canada](#)

13.4 Civil Codes, Standards, and Legislation

- Site services follow provincial and municipal standards

13.5 Mechanical Codes, Standards, and Legislation

- AABC *National Standards for Total System Balance*
- AHRI 410: *Forced-Circulation Air-Cooling and Air-Heating Coil*
- ANSI/AHRI 880: *Performance Rating of Air Terminals*
- ANSI/AMCA 210: *Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating*
- ASHRAE Guideline 0: *The Commissioning Process*
- ASHRAE Guideline 4: *Preparation of Operating and Maintenance Documentation for Building Systems*
- ASHRAE handbooks:
 - *Handbook—HVAC Applications*
 - *Handbook—Fundamentals*
 - *Handbook—Refrigeration*
 - *Handbook—HVAC Systems and Equipment*
- ANSI/ASHRAE/IES 100: *Energy Efficiency in Existing Buildings*
- ANSI/ASHRAE 105: *Standard Methods of Determining, Expressing, and Comparing Building Energy Performance and Greenhouse Gas Emissions*
- ANSI/ASHRAE 111: *Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems*
- ANSI/ASHRAE 135: *BACnet - A Data Communication Protocol for Building Automation and Control Networks*
- ANSI/ASHRAE 15: *Safety Standard for Refrigeration Systems*
- ANSI/ASHRAE/ACCA 180: *Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems*

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- ANSI/ASHRAE 189.1: Standard for the Design of High-Performance Green Buildings
 - ANSI/ASHRAE 34: *Designation and Classification of Refrigerants*
 - ANSI/ASHRAE 52.2: *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*
 - ANSI/ASHRAE 55: *Thermal Environmental Conditions for Human Occupancy*
 - ANSI/ASHRAE 62.1: *Ventilation for Acceptable Indoor Air Quality*
 - ANSI/ASHRAE/IES 90.1: *Energy Standard for Buildings Except Low-Rise Residential Buildings*
 - ANSI/BHMA A156 Series Standards
 - ANSI/DHI A115-W: *Wood Door Hardware Standards, Hardware Preparation* the DHI industry association
 - ANSI/SDI 250.4: *Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors*
 - ANSI/WDMA I.S. 1A: *Interior Architectural Wood Flush Door*
 - ASME UPV: *Code for Unfired Pressure Vessels*
 - ASME BPVC: *Boiler and Pressure Vessel Code*
 - ASTM E1827: *Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door*
 - ASTM E2813: *Standard Practice for Building Enclosure Commissioning*
 - ASTM E779: *Standard Test Method for Determining Air Leakage Rate by Fan Pressurization*
 - [Canadian Environmental Protection Act, Ozone-Depleting Substances Regulations](#)
 - [Canadian Environmental Protection Act, Federal Halocarbon Regulations](#)
 - CAN/CSA B139 Series: *Installation Code for Oil-Burning Equipment*
 - CAN/CSA B149.1: *Natural Gas and Propane Installation Code*
 - CAN/CSA B149.2: *Propane Storage and Handling Code*
 - CAN/CSA B214: *Installation Code for Hydronic Heating Systems*
 - CAN/CSA B355: *Lifts for Persons with Physical Disabilities*
 - CAN/CSA B44: *Safety Code for Elevators and Escalators*
 - CAN/CSA B52: *Mechanical Refrigeration Code*
 - CAN/CSA B64: *Backflow Preventers and Vacuum Breakers*
 - CAN/CSA C743: *Performance Standard for Rating Packaged Water Chillers*
 - CAN/CSA Z204: *Guideline for Managing Indoor Air Quality in Office Buildings*
 - CAN/CSA-ISO 50001: *Energy Management Systems*
 - CSA standards for commissioning
 - CTI STD-201: *Certified Cooling Towers*
 - [Federal Halocarbon Regulations](#)
 - [MD 15000: Mechanical Environmental Standard for Federal Office Buildings](#)
 - [MD 15161: Control of Legionella in Mechanical Systems](#)
 - NIBS Guideline 3: *Building Enclosure Commissioning Process*
 - NJC [Occupational Health and Safety Directive](#)
 - [PWGSC Commissioning Policy](#)

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- [PWGSC Commissioning Manual](#) and PWGSC Commissioning Guidelines
 - SMACNA HVAC Air Duct Leakage Test Manual

13.6 Fire Protection Engineering

- CAN/ULC S524: *Standard for the Installation of Fire Alarm Systems*
- CAN/ULC S536: *Standard for Inspection and Testing of Fire Alarm Systems*
- CAN/ULC S537: *Standard for Verification of Fire Alarm Systems*
- NFPA 1142: *Standard on Water Supplies for Suburban and Rural Fire Fighting*
- NFPA 13: *Standard for the Installation of Sprinkler Systems*
- NFPA 14: *Standard for the Installation of Standpipe and Hose Systems*
- NFPA 20: *Standard for the Installation of Stationary Pumps for Fire Protection*
- NFPA 211: *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*
- NFPA 214: *Standard on Water-Cooling Towers*
- NFPA 231: *Standard for General Storage*
- NFPA 231C: *Standard for Rack Storage of Materials*
- NFPA 24: *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*
- NFPA 30: *Flammable and Combustible Liquids Code*
- NFPA 54 / ANSI Z223.1: *National Fuel Gas Code*
- NFPA 75: *Standard for the Fire Protection of Information Technology Equipment*
- NFPA 96: *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*

13.7 Electrical Codes, Standards, and Legislation

- CAN/CSA C282: *Emergency Electrical Power Supply for Buildings*
- CAN/CSA C654: *Fluorescent Lamp Ballast Efficacy Measurements*
- CAN/CSA C802.1: *Minimum Efficiency Values for Liquid-Filled Distribution Transformers*
- CAN/CSA C802.2: *Minimum Efficiency Values for Dry-Type Transformers*
- CAN/CSA C802.3: *Minimum Efficiency Values for Power Transformers*
- CAN/CSA B72-M87: *Installation Code for Lightning Protection Systems*
- CAN/CSA C860: *Performance of Internally Lighted Exit Signs*
- CSA C22.1: *Canadian Electrical Code, Part I*
- CSA C22.2: *Canadian Electrical Code, Part II*
- CSA C22.3: *Canadian Electrical Code, Part III*
- CAN/CSA Z431: *Basic and Safety Principles for Man-Machine Interface, Marking and Identification – Coding Principles for Indicators and Actuators*
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- CSA Z462: *Workplace Electrical Safety*
- IEEE Standard 81: *Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System*
- IES: *The Lighting Handbook*
- [Measurement of Lighting Levels in the Workplace – Canada Occupational Health and Safety Regulations, Part VI, 928-1-IPG-039](#)

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- Provincial electrical codes and regulations
 - UL 1449: *Standard for Surge Protective Devices*

13.8 Telecommunication Codes, Standards, and Legislation

- ANSI/TIA 568.1: *Commercial Building Telecommunications Infrastructure Standard* (and addenda)
- ANSI/TIA 569: *Telecommunications Pathways and Spaces* (and addenda)
- ANSI/TIA 606: *Administration Standard for Telecommunications Infrastructure* (and addenda)
- ANSI/TIA 607: *Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises* (and addenda)
- ANSI/TIA 758: *Customer-Owned Outside Plant Telecommunications Infrastructure Standard*

13.9 Security Codes Standards, and Legislation

- Public Services Procurement Canada
 - [DP 051: Departmental Security Program Policy](#)
 - [DP 052: Corporate Security Program Policy](#)
- Treasury Board of Canada Secretariat:
 - [Operational Security Standard on Physical Security](#)
 - [Operational Security Standard - Business Continuity Planning \(BCP\) Program](#)
 - [Operational Security Standard - Readiness Levels for Federal Government Facilities](#)
 - [Policy on Government Security](#)
 - [Security and Contracting Management Standard](#)
 - [Security Organization and Administration Standard](#)
 - [Standard for Fire Safety Planning and Fire Emergency Organization](#)
- Royal Canadian Mounted Police:
 - [G1-005: Guide to the Preparation of Physical Security Briefs](#)
 - [G1-013: Security Control Centre Space Requirements](#)
 - [G1-028: Security Use of Mobile Shelving](#)
 - [Harmonized Threat and Risk Assessment Methodology \(hosted by Communications Security Establishment Canada \[CSEC\]\)](#)