



**RETURN BIDS TO:**

**RETOURNER LES  
SOUMISSIONS À :**

NRC.BidReceiving-  
ReceptiondesSoumissions.CNRC@nrc-cnrc.gc.ca

**REQUEST FOR PROPOSAL  
DEMANDE DE PROPOSITIONS**

**Proposal To:** National Research Council Canada

We hereby offer to sell to His Majesty the King in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out thereof.

**Proposition au :** Conseil national de recherches Canada

Nous offrons par la présente de vendre à Sa Majesté le Roi du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexées, au(x) prix indiqué(s).

**Instructions :** See Herein

**Instructions:** Voir aux présentes  
**Comments - Commentaires**

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

**Issuing Office – Bureau de distribution  
National Research Council Canada  
Conseil national de recherches Canada**

<b>Title – Sujet</b> Digital Twin Facility, Architectural & Engineering Design	
<b>Solicitation No. – N° de l'invitation</b> 24-58019	<b>Date</b> May 15, 2024
<b>Solicitation Closes – L'invitation prend fin</b> <b>at – à 02 :00 PM</b> <b>on – le June 11, 2024</b>	<b>Time Zone Fuseau horaire</b> EDT
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Inquiries to : - Adresser toutes questions à:</b> Kacendra Dion	
<b>Email address – l'adresse courriel :</b> Kacendra.Dion@cnrc-nrc.gc.ca	
<b>Destination – of Goods, Services, and Construction:</b> <b>Destination – des biens, services et construction :</b> National Research Council Canada 1 Arctic Avenue, PO Box 12093 St John's, Newfoundland A1B 3T5	

<b>Vendor/firm Name and address Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Facsimile No. – N° de télécopieur Telephone No. – N° de téléphone</b>	
<b>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)</b>	
<b>Signature</b>	<b>Date</b>



## TABLE OF CONTENTS

<b>PART 1 - GENERAL INFORMATION</b> .....	<b>4</b>
1.1 SECURITY REQUIREMENTS.....	4
1.2 STATEMENT OF WORK.....	4
1.3 DEBRIEFINGS.....	4
<b>PART 2 - BIDDER INSTRUCTIONS</b> .....	<b>4</b>
2.1 STANDARD INSTRUCTIONS, CLAUSES AND CONDITIONS.....	4
2.2 MANDATORY SITE VISIT.....	5
2.3 LATE BIDS.....	6
2.4 SUBMISSION OF BIDS.....	6
2.5 FORMER PUBLIC SERVANT.....	6
2.6 ENQUIRIES - BID SOLICITATION.....	7
2.7 APPLICABLE LAWS.....	8
2.8 BID CHALLENGE AND RECOURSE MECHANISMS.....	8
<b>PART 3 - BID PREPARATION INSTRUCTIONS</b> .....	<b>8</b>
3.1 BID PREPARATION INSTRUCTIONS.....	8
<b>PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION</b> .....	<b>10</b>
4.1 EVALUATION PROCEDURES.....	10
4.2 BASIS OF SELECTION.....	10
<b>PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION</b> .....	<b>11</b>
5.1 CERTIFICATIONS REQUIRED WITH THE BID.....	11
5.2 CERTIFICATIONS PRECEDENT TO CONTRACT AWARD AND ADDITIONAL INFORMATION.....	11
<b>PART 6 - RESULTING CONTRACT CLAUSES</b> .....	<b>12</b>
6.1 SECURITY REQUIREMENTS.....	12
6.2 STATEMENT OF WORK.....	12
6.3 GENERAL CONDITIONS.....	12
6.4 TERM OF CONTRACT.....	12
6.5 AUTHORITIES.....	13
6.6 PROACTIVE DISCLOSURE OF CONTRACTS WITH FORMER PUBLIC SERVANTS.....	14
6.7 PAYMENT.....	14
6.8 INSPECTION AND ACCEPTANCE.....	15
6.9 INVOICING INSTRUCTIONS.....	15
6.10 CERTIFICATIONS AND ADDITIONAL INFORMATION.....	15
6.11 APPLICABLE LAWS.....	15
6.12 PRIORITY OF DOCUMENTS.....	15
6.13 <i>SACC MANUAL</i> CLAUSES.....	15
6.14 DISPUTE RESOLUTION.....	16
6.15 NON-PERMANENT RESIDENT (FOREIGN COMPANY).....	16
6.17 WITHHOLDING OF 15 PERCENT ON SERVICE CONTRACTS WITH NON-RESIDENTS.....	16
6.18 GOVERNMENT SMOKING POLICY.....	17
6.19 ACCESS TO GOVERNMENT FACILITIES/EQUIPMENT.....	17
ANNEX A, Statement of Requirement.....	18
ANNEX B, Mandatory technical evaluation criteria.....	34
ANNEX C, Basic of Payment.....	40



---

ANNEX D, Security Requirements Check List.....	42
ANNEX E, Plant layout drawings.....	45
ANNEX F, Ship bridge motion simulator mounting platform.....	46
ANNEX G, Ship bridge motion simulator power requirements.....	48
ANNEX H, Construction Documentation and Deliverables Manual.....	49
ANNEX I, Engineering & Construction CADD Standards.....	76
ANNEX J, NRC Workspace Furniture Carpet and Colour Standards.....	107



## **PART 1 - GENERAL INFORMATION**

### **1.1 Security Requirements**

1. Before award of a contract, the following conditions must be met:
  - (a) the Bidder must hold a valid organization security clearance as indicated in Part 6 - Resulting Contract Clauses;
  - (b) the Bidder's proposed individuals requiring access to classified or protected information, assets or sensitive work sites must meet the security requirements as indicated in Part 6 - Resulting Contract Clauses;
  - (c) the Bidder must provide the name of all individuals who will require access to classified or protected information, assets or sensitive work sites;
2. Bidders are reminded to obtain the required security clearance promptly. Any delay in the award of a contract to allow the successful Bidder to obtain the required clearance will be at the entire discretion of the Contracting Authority.
3. For additional information on security requirements, please contact NRC's personnel security administrator at [NRC.SS-PersonnelSecurity-SdeS-SecuriteduPersonnel.CNRC@nrc-cnrc.gc.ca](mailto:NRC.SS-PersonnelSecurity-SdeS-SecuriteduPersonnel.CNRC@nrc-cnrc.gc.ca)

### **1.2 Statement of Work**

To provide a complete design, services during tender and services during construction of the new Digital Twin facility in accordance with the detailed Statement of Work attached as Annex "A".

### **1.3 Debriefings**

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

## **PART 2 - BIDDER INSTRUCTIONS**

### **2.1 Standard Instructions, Clauses and Conditions**

You are invited to submit one electronic Technical Proposal and one electronic Financial Proposal in two separate attachments to fulfil the following requirement forming part of this Request for Proposal (RFP). One attachment must be clearly marked 'Technical Proposal' and the other attachment must be marked 'Financial Proposal'. All financial information must be fully contained in the Financial Proposal, and only in the Financial Proposal. Vendors who provide financial information in the technical proposal will be disqualified. All proposals should include the front page of this RFP duly completed.

2035 (2022-12-01), General Conditions - Services (Higher Complexity) apply to and form part of the Contract.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.



Proposals submitted must be valid for not less than sixty (60) calendar days from the closing date of the RFP.

**2.1.1** It is the Bidder's responsibility to:

- (a) return a signed copy of the bid solicitation, duly completed, IN THE FORMAT REQUESTED;
- (b) direct its bid ONLY to the Bid Receiving address specified;
- (c) ensure that the Bidder's name, the bid solicitation reference number, and bid solicitation closing date and time are clearly visible;
- (d) provide a comprehensive and sufficiently detailed bid, including all requested pricing details, that will permit a complete evaluation in accordance with the criteria set out in the bid solicitation.

Timely and correct delivery of bids to the specified bid delivery address is the sole responsibility of the Bidder. The National Research Council Canada (NRC) will not assume or have transferred to it those responsibilities. All risks and consequences of incorrect delivery of bids are the responsibility of the Bidder.

**2.1.2** Bids may be accepted in whole or in part. The lowest or any bid will not necessarily be accepted. In the case of error in the extension of prices, the unit price will govern. NRC may enter into contract without negotiation.

**2.1.3** Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the terms and conditions of the resulting contract.

**2.1.4** While NRC may enter into contract without negotiation, Canada reserves the right to negotiate with bidders on any procurement.

**2.1.5** Notwithstanding the bid validity period stipulated in this solicitation, Canada reserves the right to seek an extension from all responsive bidders, within a minimum of three (3) days prior to the end of such period. Bidders shall have the option to either accept or reject the extension.

**2.1.6** If the extension referred to above is accepted, in writing, by all those who submitted responsive bids, then Canada shall continue immediately with the evaluation of the bids and its approval processes.

**2.1.7** If the extension referred to above is not accepted, in writing, by all those who submitted responsive bids then Canada shall, at its sole discretion: either continue to evaluate the responsive bids of those who have accepted the extension and seek the necessary approvals; or cancel the solicitation; or cancel and reissue the solicitation.

## **2.2 Mandatory Site Visit**

It is **mandatory** that the Bidder or a representative of the Bidder visit the work site. Arrangements have been made for the site visit to be held at 1 Arctic Avenue, St. John's, NL on May 23, 2024. The site visit will begin at 9h00 am to 11h59 am, Newfoundland time, in NRC OCRE building.

Bidders must communicate with the Contracting Authority no later than May 21, 2024 to confirm attendance and provide the name(s) of the person(s) who will attend. Bidders will be required to sign an attendance sheet. Bidders should confirm in their bid that they have attended the site visit. Bidders who do not attend the mandatory site visit or do not send a representative will not be given an alternative appointment and their bid will be declared non-responsive. Any clarifications or changes to the bid solicitation resulting from the site visit will be included as an amendment to the bid solicitation.



## 2.3 Late Bids

All risks and consequences of incorrect delivery of electronic bids are the responsibility of the Bidder. The National Research Council Canada will not be responsible for late bids received at destination after the closing date and time, even if it was submitted before. Electronic bids received after the indicated closing time based on NRC servers' received time will be irrevocably rejected. Bidders are urged to send their proposal in sufficient time, in advance of the closing time to reduce any technical issues. The National Research Council Canada will not be held responsible for bids sent before closing time but received by the NRC servers after the closing time.

## 2.4 Submission of Bids

Technical and Financial Proposals must be **received electronically** no later than 14:00 EDT (NRC's Server Time), Solicitation Closing Date shown on Front Page to the following NRC email address:

[NRC.BidReceiving-ReceptiondesSoumissions.CNRC@nrc-cnrc.gc.ca](mailto:NRC.BidReceiving-ReceptiondesSoumissions.CNRC@nrc-cnrc.gc.ca)

The NRC has restrictions on incoming e-mail messages. **The maximum e-mail message size including all file attachments must not exceed 10MB.** Zip files or links to bid documents will not be accepted. Incoming e-mail messages exceeding the maximum file size and/or containing zip file attachments will be blocked from entering the NRC e-mail system. A bid transmitted by e-mail that gets blocked by the NRC e-mail system will be considered not received.

Proposals must not be sent directly to the Contracting Authority or the Technical Authority.

All submitted proposals become the property NRC.

## 2.5 Former Public Servant

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 FPSs, bidders must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder 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 bid 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 Bidder a FPS in receipt of a pension? **Yes ( ) No ( )**

If so, the Bidder must provide the following information, for all FPSs 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.

By providing this information, Bidders agree that the successful Bidder'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: 2019-01 and the Guidelines on the Proactive Disclosure of Contracts.

Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? **Yes ( ) No ( )**

If so, the Bidder 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.

## 2.6 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than 5 calendar days before the bid closing date. Enquiries received after that time may not be answered.

Contracting Authority, Procurement Services  
National Research Council Canada  
Kacendra Dion - Kacendra.Dion@cnrc-nrc.gc.ca

### For open public tender

To ensure the equality of information among Bidders, responses to general enquiries will be made available to all bidders unless such publications would reveal proprietary information. The bidder who initiates the question will not be identified. Technical questions that are considered proprietary by the bidder must be clearly identified. NRC will respond individually to the bidder if it considers the questions proprietary. If NRC does not consider the question proprietary, the bidder submitting it will be allowed to withdraw the question, or have the question and answer made available through the Open Bidding System (OBS) to all bidders.



Bidders who attempt to obtain information regarding any aspect of this RFP during the solicitation period through any NRC contacts other than the Contracting Authority identified herein, may be disqualified (for that reason alone).

It is the responsibility of the Bidder to obtain clarification of the requirement contained herein, if necessary, prior to submitting its proposal. The Bidder must have written confirmation from the Contracting Authority for any changes, alterations, etc., concerning this RFP.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by Bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

## **2.7 Applicable Laws**

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Newfoundland.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the Bidders.

## **2.8 Bid Challenge and Recourse Mechanisms**

If you have any concerns relating to the procurement process, please refer to the [Recourse Mechanisms](#) page on the Buyandsell.gc.ca website. Please note that there are strict deadlines for filing complaints with the Canadian International Trade Tribunal (CITT) or the [Office of the Procurement Ombudsman \(OPO\)](#). Suppliers should therefore act quickly when they want to challenge any aspect of the procurement process.

<https://buyandsell.gc.ca/for-businesses/selling-to-the-government-of-canada/bid-follow-up/bid-challenge-and-recourse-mechanisms>

<https://opo-boa.gc.ca/plaintesurvol-complaintoverview-eng.html>

## **PART 3 - BID PREPARATION INSTRUCTIONS**

### **3.1 Bid Preparation Instructions**

Canada requests that the Bidder submits its bid in separate attachment sections (when applicable) as follows:

- Section I: Technical Bid
- Section II: Financial Bid
- Section III: Certifications

There shall be no payment by the National Research Council for costs incurred in the preparation and submission of proposals in response to this request. No payment shall be made for costs incurred for clarification(s) and/or demonstration(s) that may be required by NRC. The National Research Council reserves the right to reject any or all proposals submitted, or to accept any proposal in whole or in part





without negotiation. A contract will not necessarily be issued as a result of this competition. NRC reserves the right to amend, cancel or reissue this requirement at any time.

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process [Policy on Green Procurement](https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=32573) (https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=32573). To assist Canada in reaching its objectives, bidders should:

- 1) Include all environmental certification(s) relevant to your organization (e.g., ISO 14001, Leadership in Energy and Environmental Design (LEED), Carbon Disclosure Project, etc.)
- 2) Include all environmental certification(s) or Environmental Product Declaration(s) (EPD) specific to your product/service (e.g., Forest Stewardship Council (FSC), ENERGYSTAR, etc.)

Canada is committed to greening its supply chain. Environmentally preferable goods and services are those that have a lesser or reduced impact on the environment over the life cycle of the good or service, when compared with competing goods or services serving the same purpose. Environmental performance considerations include, among other things: the reduction of greenhouse gas emissions and air contaminants; improved energy and water efficiency; reduced waste and support reuse and recycling; the use of renewable resources; reduced hazardous waste; and reduced toxic and hazardous substances. In accordance with the [Policy on Green Procurement](https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=32573) (https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=32573), for this solicitation:

- Bidders are encouraged to offer or suggest green solutions whenever possible.
- Bidders are requested to provide all correspondence including (but not limited to) documents, reports and invoices in electronic format unless otherwise specified by the Contracting Authority or Project Authority, thereby reducing printed material.
- Bidders should recycle (shred) unneeded copies of non-classified/secure documents (taking into consideration the Security Requirements).
- Product components used in performing the services should be recyclable and/or reusable, whenever possible.
- Bidders are encouraged to offer goods and/or services certified to a reputable eco-label.
- Bidders should use equipment that has high energy efficiency or produces low air emissions.
- Bidders are encouraged to offer environmentally preferred products which supports a sustainable environment for nature and wildlife.
- Bidders are encouraged to offer environmentally preferred products which ensure the comfort and air quality of building occupants.

Bidders are encouraged to consult the following websites:

<https://www.tpsgc-pwgsc.gc.ca/app-acq/ae-gp/index-eng.html>  
<https://www.tpsgc-pwgsc.gc.ca/app-acq/ae-gp/rle-glr-eng.html>

### **Section I: Technical Bid**

In their technical bid, Bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

### **Section II: Financial Bid**

Bidders must submit their financial bid in accordance with the Basis of Payment.



### **3.1.1 Electronic Payment of Invoices – Bid**

Payments from the National Research Council Canada (NRC) are made by electronic payment. Direct deposit payments will be made in Canadian dollars and can only be deposited into Canadian bank accounts.

Only bank accounts outside of Canada are eligible to enroll as a Wire transfer payment method.

### **3.1.2 Exchange Rate Fluctuation**

Bids will be evaluated in Canadian currency, therefore, for evaluation purposes, the exchange rate quoted by the Bank of Canada as being in effect on date of bid closing, shall be applied as the conversion factor for foreign currency. Prices quoted shall not be subject to, or conditional upon, fluctuations in commercial or other interest rates during either the evaluation or contract period.

### **Section III: Certifications**

Bidders must submit the certifications and additional information required under Part 5.

## **PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION**

### **4.1 Evaluation Procedures**

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including "technical", and "financial", evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

#### **4.1.1 Technical Evaluation**

Proposals will be assessed in accordance with the mandatory and rated evaluation attached as Annex B Part 3 Evaluation Criteria. Bidders shall provide a detailed response to each criterion. NRC reserves the right to verify any and all information provided by the bidder in their proposal.

#### **4.1.2 Financial Evaluation**

The cost proposal must be a fixed price quotation and Delivered At Place, excluding taxes. The fixed price must include all the materials and services required to fulfil all aspects of the Statement of Work. Bidders should identify the currency on which the cost proposal is based.

Canada will not accept travel and living expenses that may need to be incurred by the Contractor for any relocation of resources required to satisfy its contractual obligations

Applicable Sales Tax: The GST, PST, QST or HST, whichever is applicable, shall be considered an applicable tax for the purposes of this RFP and extra to the price herein. The amount of applicable sales tax shall be disclosed and shown as a separate item.

### **4.2 Basis of Selection**

The highest combined technical score (40%) and price (60%), with a minimum consensus score of 60% in each of the point-rated evaluation criteria requirements. To be declared responsive, a bid must:

- (a) comply with all the requirements of the bid solicitation; and



- (b) contain an introduction section with the license to practise information; and
- (c) obtain the required minimum consensus score of 60% in each of the point-rated evaluation criteria requirements.

Bids not meeting (a) or (b) or (c) will be declared non-responsive. Neither the responsive bid obtaining the highest number of points nor the one with the lowest evaluated price will necessarily be accepted.

A contract for engineering services described in this Statement of work is anticipated to be awarded to the Proponent with the highest combined technical score in accordance with contracting documents.

## **PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION**

Bidders must provide the required certifications and additional information to be awarded a contract.

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

### **5.1 Certifications Required with the Bid**

Bidders must submit the following duly completed certifications as part of their bid.

#### **5.1.1 Integrity Provisions - Declaration of Convicted Offences**

In accordance with the Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, **if applicable**, the declaration form available on the [Forms for the Integrity Regime](http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html) website (<http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>), to be given further consideration in the procurement process.

### **5.2 Certifications Precedent to Contract Award and Additional Information**

The certifications and additional information listed below should be submitted with the bid but may be submitted afterwards. If any of these required certifications or additional information is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to provide the certifications or the additional information listed below within the time frame provided will render the bid non-responsive.

#### **5.2.1 Integrity Provisions – Required Documentation**

In accordance with the section titled Information to be provided when bidding, contracting or entering into a real property agreement of 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>), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

In addition to all other information required in the procurement process, the Bidder **must** provide the following:



- Bidders who are incorporated, including those bidding as a joint venture, must provide a complete list of names of all individuals who are currently directors of the Bidder or, in the case of a private company, the owners of the company.
- Bidders bidding as sole proprietorship, as well as those bidding as a joint venture, must provide the name of the owner(s).

<u>SURNAME</u>	<u>GIVEN NAME(S)</u>	<u>TITLE</u>

### 5.2.2 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder 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.

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.

## PART 6 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

### 6.1 Security Requirements

6.1.1 The following security requirements (SRCL and related clauses) as described in Annex D apply and form part of the Contract.

### 6.2 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work at Annex "A" and the Contractor's technical bid.

### 6.3 General Conditions

[2035](#) (2022/12/01), General Conditions - Services (Higher Complexity) apply to and form part of the Contract.

### 6.4 Term of Contract

#### 6.4.1 Period of the Contract

The period of the Contract is from date of Contract to October 31, 2025 inclusive.



#### **6.4.2 Option to Extend the Contract**

Canada may exercise this option at any time by sending a written notice to the Contractor at least (10) calendar days before the expiry date of the Contract. The option may only be exercised by the Contracting Authority, and will be evidenced for administrative purposes only, through a contract amendment.

#### **6.4.3 Delivery Date**

All the deliverables must be received on or before October 31, 2025.

#### **6.4.4 Delivery Points**

Delivery of the requirement will be made to: \_\_\_\_\_

### **6.5 Authorities**

#### **6.5.1 Contracting Authority**

The Contracting Authority for the Contract is:

Name: Kacendra Dion  
Title: Senior Contracting Officer  
National Research Council Canada

Telephone: (438) 324-8125  
E-mail address: Kacendra.Dion@nrc-cnrc.gc.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

#### **6.5.2 Technical Authority**

The Technical Authority for the Contract is:

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Organization: \_\_\_\_\_  
Address: \_\_\_\_\_

Telephone: \_\_\_\_\_  
E-mail address: \_\_\_\_\_

The Technical Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Technical Authority; however, the Technical Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

#### **6.5.3 Contractor's Representative**

Name: \_\_\_\_\_  
Title: \_\_\_\_\_



Address: \_\_\_\_\_

Telephone: \_\_\_\_ \_

E-mail address: \_\_\_\_\_

## 6.6 Proactive Disclosure of Contracts with Former Public Servants

By providing information on its status, with respect to being a former public servant in receipt of a Public Service Superannuation Act (PSSA) pension, the Contractor has agreed that this information will be reported on departmental websites as part of the published proactive disclosure reports, in accordance with Contracting Policy Notice: 2012-2 of the Treasury Board Secretariat of Canada.

## 6.7 Payment

### 6.7.1 Basis of Payment

The Contractor will be paid for costs reasonably and properly incurred in the performance of the work under this Contract in accordance with the following:

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a fixed price, as specified in the contract for a cost of \$ \_\_\_\_\_. Customs duties are excluded and Applicable Taxes are extra.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work, unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

### 6.7.2 Limitation of Expenditure

Unless otherwise authorized in writing by the National Research Council of Canada (NRC), NRC's financial liability to the Contractor under this Contract shall not exceed \$ \_\_\_\_\_. Customs duties are excluded and Applicable Taxes are extra. The Contractor must not perform any work that would cause the total liability of NRC to exceed this limitation unless authorized in writing by the Contracting Authority through a contract amendment. All work shall be done to the full satisfaction of the Technical Authority named herein before any payment shall become due to the Contractor.

### 6.7.3 Method of Payment

#### SACC Manual clause **H1008C** (2008-05-12), Monthly Payment

Canada will pay the Contractor on a monthly basis for work performed during the month covered by the invoice in accordance with the payment provisions of the Contract if:

- a. an accurate and complete invoice and any other documents required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- b. all such documents have been verified by Canada;
- c. the Work performed has been accepted by Canada.

### 6.7.4 Electronic Payment of Invoices – Contract

The Contractor accepts to be paid using any of the following Electronic Payment Instrument(s):

- a. Direct Deposit (Domestic Only);
- b. Wire Transfer (International Only);



## 6.8 Inspection and Acceptance

The Technical Authority is the Inspection Authority. All reports, deliverable items, documents, good and all services rendered under the Contract are subject to inspection by the Inspection Authority or representative. Should any report, document, good or service not be in accordance with the Statement of Requirement and to the satisfaction of the Inspection Authority, as submitted, the Inspection Authority will have the right to reject it or require its correction at the sole expense of the Contractor before recommending payment.

## 6.9 Invoicing Instructions

The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.

Invoices **must** be sent to: [nrc.invoice-facture.cnrc@nrc-cnrc.gc.ca](mailto:nrc.invoice-facture.cnrc@nrc-cnrc.gc.ca)

**PLEASE QUOTE CONTRACT NO. [to be inserted at contract award] ON ALL DOCUMENTATION AND INVOICES.**

## 6.10 Certifications and Additional Information

### 6.10.1 Compliance

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

## 6.11 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Newfoundland.

## 6.12 Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) the Articles of Agreement;
- (b) the general conditions 2035 (2022/12/01), General Conditions - Services (Higher Complexity) apply to and form part of the Contract;
- (c) ANNEX A, Statement of Work;
- (d) ANNEX D, Security Requirements Check List;
- (e) the Contractor's bid dated \_\_\_\_\_.

## 6.13 SACC Manual Clauses

**SACC Manual clause [A2000C](#)** (2006-06-16) Foreign Nationals (Canadian Contractor)

**SACC Manual clause [A2001C](#)** (2006-06-16) Foreign Nationals (Foreign Contractor)

**SACC Manual clause [G1001C](#)** (2013-11-06) Insurance

**SACC Manual clause [4013](#)** (2022-06-20) Compliance with on-site measures, standing orders, policies, and rules





## 6.14 Dispute Resolution

The Parties agree to make every reasonable effort, in good faith, to settle amicably all disputes or claims relating to the Contract, through negotiations between the Parties' representatives authorized to settle. If the Parties do not reach a settlement within 25 working days after the dispute was initially raised to the other party in writing, either Party may contact the Office of the Procurement Ombudsman (OPO) to request dispute resolution/mediation services. OPO may be contacted by e-mail at [boa.opo@boa-opo.gc.ca](mailto:boa.opo@boa-opo.gc.ca), by telephone at 1-866-734-5169, or by web at [www.opo-boa.gc.ca](http://www.opo-boa.gc.ca). For more information on OPO's services, please see the [Procurement Ombudsman Regulations](#) or visit the [OPO website](#).

## 6.15 Non-Permanent Resident (Foreign Company)

The Contractor shall ensure that non-permanent residents intending to work in Canada on a temporary basis in fulfilment of the Contract, who are neither Canadian citizens nor United States nationals, receive all appropriate documents and instructions relating to Canadian immigration requirements and secure all required employment authorizations prior to their arrival at the Canadian port of entry. The Contractor shall ensure that United States nationals having such intentions receive all appropriate documents and instructions in that regard prior to their arrival at the Canadian port of entry. Such documents may be obtained at the appropriate Canadian Embassy/Consulate in the Contractor's country. The Contractor shall be responsible for all costs incurred as a result of non-compliance with immigration requirements.

## 6.16 Non-Permanent Resident (Canadian Company)

The Contractor is responsible for compliance with the immigration requirements applicable to non-permanent residents entering Canada to work on a temporary basis in fulfilment of the Contract. In some instances, the employment authorization necessary to enter Canada cannot be issued without prior approval of Human Resources Centre Canada (HRCC). HRCC should always be contacted as soon as the decision to bring in a non-permanent resident is made. The Contractor will be responsible for all costs incurred as a result of non-compliance with immigration requirements.

## 6.17 Withholding of 15 percent on Service Contracts with Non-residents

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 Contractor in respect of services provided in Canada if the Contractor is not a resident of Canada, unless the Contractor obtains a valid waiver from the [Canada Revenue Agency](#) (CRA). The amount withheld will be held on account for the Contractor in respect to any tax liability which may be owed to Canada.

Although most tax treaties between Canada and other countries provide for some relief from Canadian tax, Canada does not normally relinquish its right to withhold tax pursuant to the provisions of section 153 of the [Income Tax Act](#) and subsection 105(1) of the [Income Tax Regulations](#). If the non-resident contractor can adequately demonstrate, based on treaty protection, that the withholding normally required is in excess of the ultimate tax liability, or that the withholding creates undue hardship to the contractor, then the CRA may issue permission to the payer authorizing a reduction of the subsection 105(1) withholdings. The procedure to apply for a reduction of withholding is detailed in Income Tax Information Circular [IC75-6R2](#) Appendices A and B, as well as in CRA's [T4061, Non resident Tax Withholding, Remitting, and Reporting](#). Requests for a waiver or a reduction of the withholding will not be entertained unless deductions at source are remitted to CRA.





### **6.18 Government Smoking Policy**

Where the performance of the work requires the presence of the Contractor's personnel on government premises, the Contractor shall ensure that its personnel shall comply with the policy of the Government of Canada which prohibits smoking on any government premises.

### **6.19 Access to Government Facilities/Equipment**

Access to the facilities and equipment necessary to the performance of the work shall be provided through arrangements to be made by the Technical Authority named herein. There will be however, no day-to-day supervision of the Contractor's activities, nor control of the Contractor's hours of work by the Technical Authority.

The Contractor undertakes and agrees to comply with all Standing Orders and Regulations in force on the site where the work is to be performed, relating to the safety of persons on the site or the protection of property against loss or damage from any and all causes including fires.

***NRC-CMRC***

# Statement of Work Engineering Services

## Digital Twin Facility Architectural & Engineering Design

Office of Renewal Facility Management

May 2, 2024

Revision C



National Research  
Council Canada

Conseil national de  
recherches Canada

**Canada**



# Table of Contents

1 General .....	4
1.1 Background .....	4
1.1.1 General Project Overview .....	4
1.1.2 NRC Commitment to Greening .....	4
1.2 Project Description .....	5
2 Statement of Work .....	6
2.1 General .....	6
2.2 Project Quality and Design Principles .....	6
2.3 Scope of Work .....	7
2.3.1 Project Management .....	7
2.3.2 Site Evaluation: .....	7
2.3.3 Architectural and Engineering Design: .....	7
2.3.4 Construction Management, and project documentation .....	10
3 Evaluation Criteria .....	17
3.1 Technical Evaluation Criteria and mandatory requirement .....	17
3.1.1 Basis of Selection .....	17
3.1.2 Technical Evaluation Criteria .....	18
3.1.3 Financial Proposal .....	21

# 1 General

## 1.1 Background

### 1.1.1 General Project Overview

The National Research Council (NRC) is seeking an engineering consultant to support the development of a new Digital Twin facility located in St. John's, NL as part of the Facility Renewal Program under the Office of Facility Renewal Management (OFRM), Infrastructure Project Management Office (iPMO). The Digital Facility is part of the NRC Ocean, Coastal and River Engineering (OCRE) Research Centre and will be used to simulate virtual environments for the Large Ice Tank, Clear Water Wave Maker Tank and Shore Engineering facilities.

The NRC Ocean, Coastal and River Engineering (NRC OCRE) supports a broad cross-section of industry sectors by developing creative and practical solutions to engineering challenges in rivers, lakes and marine environments. It provides expertise and tools to identify, adapt, and integrate advanced solutions into systems that improve the performance and safety of ocean, coastal, and marine operations, meet the challenges of climate change, and protect infrastructure, property and people from severe weather events and other environmental risks.

NRC OCRE offers specialized consulting and applied research services in ocean engineering, coastal engineering, solutions for water resources management, marine safety standards and technologies, as well as marine renewable energy assessments and technology. Our work supports industries that operate in harsh environments characterized by ice, wave, wind and cold temperature. OCRE serves the needs of clients in a variety of sectors, including: offshore oil and gas, marine transportation, marine and waterfront infrastructure, hydropower production, water resource management, standards and regulation, engineering design and construction. Our clients include start-ups, technology innovators and global industry leaders.

Our key technologies cover a broad range of applications, including marine vehicles design and operation, ice forecasting and measurement as well as methods to predict structural loading in ice, improved coastal defenses against erosion and storm damage, better marine safety and risk management systems and more reliable flood forecasting and modeling.

### 1.1.2 NRC Commitment to Greening

The NRC is committed to achieving significant greenhouse gas (GHG) emission reductions to its real property portfolio, with a new net-zero emissions by 2050 commitment. Consequently, all projects affecting energy use should consider cost-effective improvements to reduce GHG emissions.

The Greening Government Strategy for Real Property requires all new buildings and major building retrofits to prioritize low-carbon and climate resilience, with investment decisions based on the total cost of ownership.

New HVAC-R equipment shall use lower global warming potential (GWP) refrigerants unless such equipment and/or lower-GWP refrigerant is found to be not available domestically. GWP limits for new HVAC-R equipment shall be as per the [Greening Government Strategy: A Government of Canada Directive](#)

- [Canada.ca](https://www.canada.ca) - Heating, Ventilation, Air Conditioning and Refrigeration Guidance Document published by the Centre for Greening Government.

The Green Government Strategy also seeks to achieve a 30% reduction in embodied carbon in structural construction materials by 2025.

## 1.2 Project Description

The new Digital Twin facility is expected to be constructed in the old library space at the 1 Arctic Avenue OCRE building in St. John's, Figure 1. The new facility will include two dedicated High-Performance Computing (HPC) IT rooms, a new space for a mechanical bridge simulator, control room and the necessary infrastructure to connect the new system.

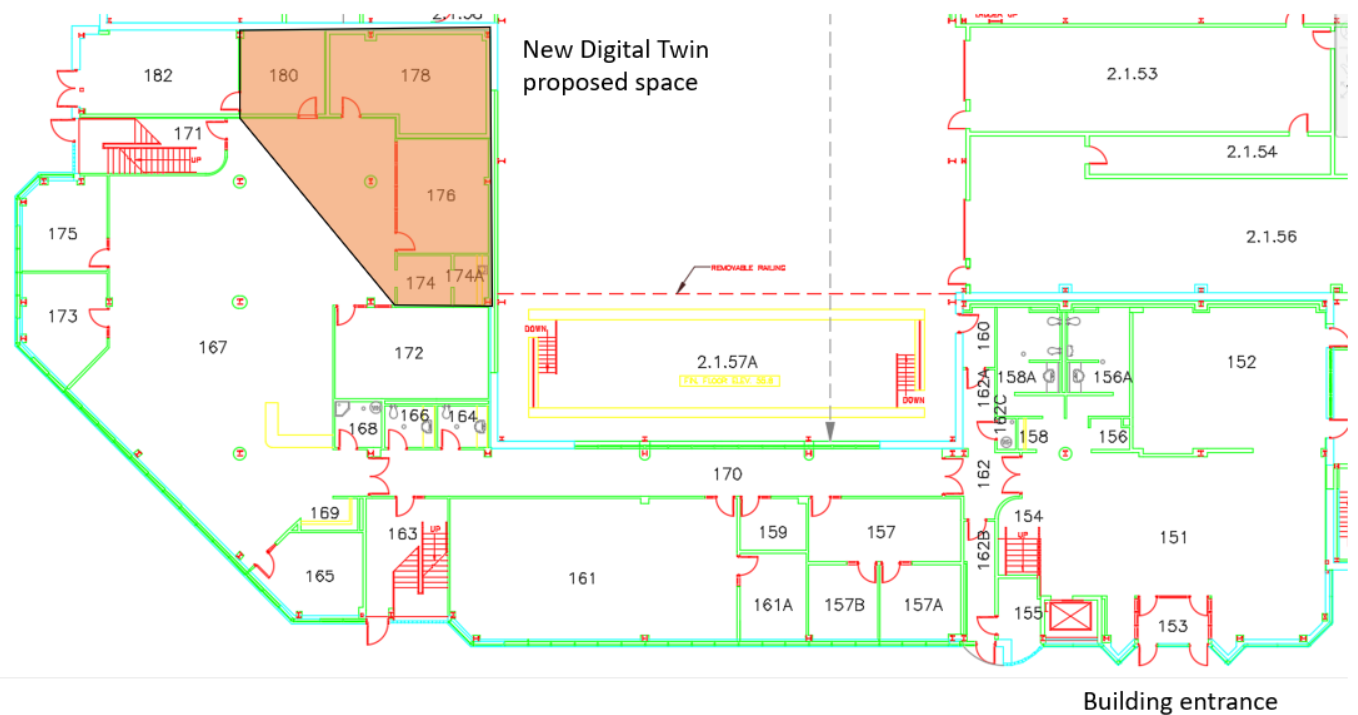


Figure 1: New Digital Twin Facility space

This Statement of Work cover the necessary requirements related to Architectural and Engineering support to develop the new facility, including drawings and specification, as well as support NRC Project team during tender and site construction.

As part of the project development the National Research Council is hiring an independent system integrator that will be responsible to support the development of the HPC, specify and supply the bridge simulator, including testing and commission and participate in the technical definition of the space.

## 2 Statement of Work

### 2.1 General

Any and all required documentation and deliverables outlined as required by this project Statement of Work must be in accordance with the NRC Construction Documentation & Deliverables Manual, and the NRC Engineering & Construction CAD Standards (see annex).

### 2.2 Project Quality and Design Principles

In addition to assuring all designs are code compliant, at a minimum the following design principles shall also be taking into consideration throughout the duration of the project by the Consultant:

- Adherence to a high standard of architectural and engineering design based on recognized, contemporary design principles. All design elements, planning, architectural and engineering design must be fully coordinated and consistent with accepted industry best practice design principles.
- Projects are to be implemented in an environmentally responsible manner and provide a healthy and safe work environment that meets all applicable Codes and supports optimum operations.
- Quality of materials, details and construction methods shall be commensurate with type of building, budget allocation, and life-cycle costing.
- Where possible, operation and maintenance costs are to be minimized with equipment selections.
- All construction and installation details are to be designed to facilitate ease of maintenance in a safe and effective manner.
- [Government of Canada Workspace Design Standards](#). Bidders are encouraged to review these documents prior to bid submission. These standards must be applied to the design development of administrative (office) areas.
- Adherence to local Authorities Having Jurisdiction requirements
- Greening Government Strategy: A Government of Canada Directive; Treasury Board of Canada Secretariat.
- National Energy Code of Canada for Buildings (NECB) 2017 \*or most current edition\*; National Research Council of Canada, Canadian Commission on Building and Fire Codes; Natural Resources Canada.
- Advanced Energy Design Guides, American Society of Heating Refrigeration and Air-Conditioning Engineers.]
- [Heating, Ventilation, Air Conditioning and Refrigeration (HVAC-R) Guidance Document (2022); Centre for Greening Government; Treasury Board of Canada Secretariat.]
- [TBS Guide for implementing The Standard on Embodied Carbon in Construction; Embodied Carbon Project Disclosure Template.]

## 2.3 Scope of Work

### 2.3.1 Project Management

After award of the contract, the selected supplier will assign a Project Manager and/or a technical lead as a single point of contact for all matters related to the project. The supplier Project Authority will be responsible to communicate any project information to the NRC Dept. Representative, including but not limited to: Status Reports, Meeting agendas and minutes, Change Orders, design drawings, design reviews, etc.

### 2.3.2 Site Evaluation:

The Contractor is expected to provide a report with the results of a full site assessment prior to design, including geological conditions, in order to assess the feasibility of excavating the facility to accommodate the Digital Twin Bridge Simulator. If that is not possible NRC may consider the area (2.1.57) adjacent to the library space for head space requirements.

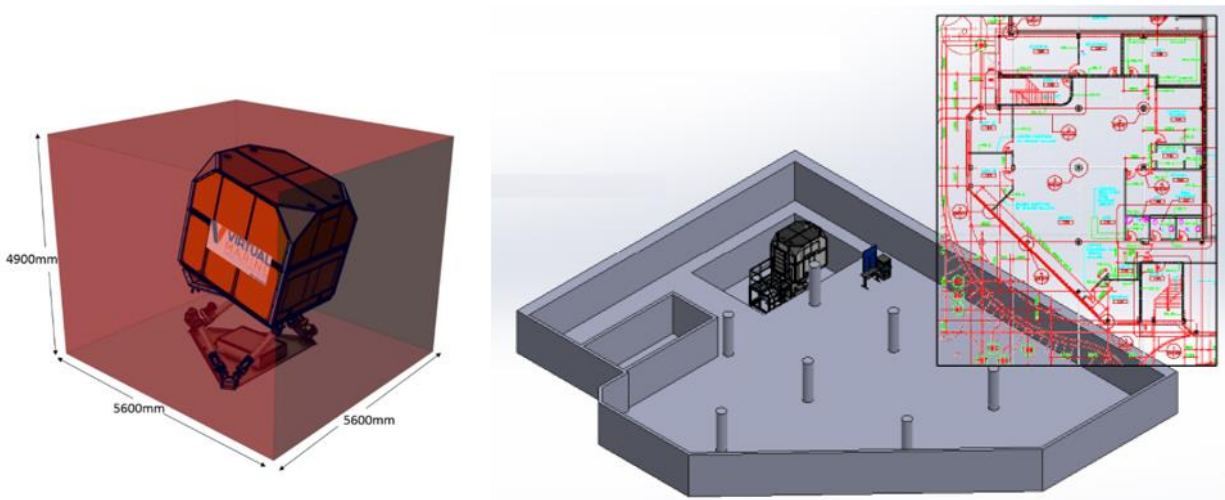


Figure 1 – Bridge simulator representation on site. (Not a reference to design.)

### 2.3.3 Architectural and Engineering Design:

The Contractor must complete an architectural design that includes all A&E disciplines required to submit a quality construction tender. The known disciplines are mechanical, electrical, and civil engineering. However, others may be required for the new Digital Twin facility, which will be constructed in the old library space. The National Research Council has specified that the space should be presented in a modern way, to convey its use as a centre of excellence for digitalization and simulation.

#### 2.3.3.1 Library space:

The new Digital Twin facility will occupy the following rooms: 180, 178, 176, 174, 174A, and a portion of 167.

The following items must be designed and engineered as follows:



1. Segregated, secured space to house one of the Small High-Performance Computer (HPC) cluster at room 180;
2. Mechanical simulator bridge space, designed for day-to-day operations, easy accessibility and serviceability in room 176 and 178;
3. Control room in room 176;
4. Area entrance, visualization and common space in room 167;
5. Small cafeteria, room 174 and 174A;
6. Modify perimeter space to separate access (remove door on 171 and 180) and modify rooms 173 and 175 for hotel/shared space accommodations;
7. Revamp area 167 to create a welcoming space with common areas and media interaction;
8. Secure access to all areas, including card access and video surveillance system;
9. Network connections and data storage and transfer system;
10. The space must meet the Government of Canada Workspace Design Standards for administrative space;
11. The space must comply with CSA compliance for accessibility;
12. Verify that firewall/door integrities are maintained with proposed renovations, egress distances, safety code compliance review;
13. Upgrade lighting system as required, only in the worked space;
14. Review IT (data) and cabling, security, and communication for upgrades/modifications;
15. Ensure the existing HVAC system is adequate for the new space;
16. Ensure all operating sequences are minimizing energy consumption;
17. Develop site access with proper accessibility considerations.
18. Develop a visual identify with support from NRC communication teams, i.e.: applied vinyl, demo screens, etc.

### **2.3.3.2 Network room**

The network room is located across the facility in the space 2.1.49

The following items must be designed and engineered as follows:

1. Segregated, secured space to house one of the Large High-Performance Computer (HPC) cluster;
2. Modify room 2.1.49D to add a wall and secure access:
  - Design new HVAC system to handle the HPC heat load, including support infrastructure and rack cooling system, such as row cooling (Figure 2);
  - Design HPC room to accommodate three times the equipment currently being installed for future upgrades;
  - Ensure power requirements are adequate to match current and existing HPC needs;
  - Proposed HVAC system must accommodate future expansions up to three (3) HPC as noted above.
3. Add restricted access to the two existing doors on room 2.1.49C: SSC network room;
4. Provide network connection infrastructure (i.e., cable trays) as per NRC (SSC) instructions from the network room to the new Digital Twin facility.

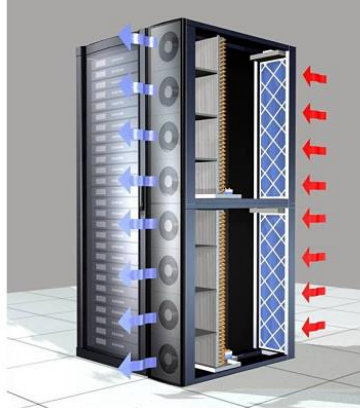


Figure 2. Example of HPC row cooling system

### 2.3.3.3 Preliminary High Performance Computer information

The following components have been identified as part of the HPC cluster and will serve as a reference for proponents when evaluating the network room requirements. The final HPC configuration will be provided during the A&E development by the NRC Department Representative.

- Rack: 2 x RXL - LD01 and Lambda Rack Shipping Crates
- PDU: 4 x 17.3 kW PDUs, 208V Delta 60A IEC 60309 3P+G 9Hr, (18) x IEC 60320/C13,(18) x Cx
- In-Band/Storage Switch: 1x Spectrum Based 100GbE 1U Open Ethernet Switch with Onyx 32 QSFP28 Ports
- IMPI Switch: EX2300-48T (48x 1 GbE RJ-45 ports + 4x SFP/SFP+ uplink ports)
- Storage: 1x 4U TrueNAS with Dual Controllers, 4NVMe slots and 24x3.5" Drive Bays-1600W Redundant Power
- Storage: 1x4U Rackmount Expansion Shelf – 60 Hot-Swap SAS3.5" Hard Drive Bays – 2xExpander supports SAS – 1200W Redundant Power Supply
- RAIDZ1Pool with 4+1 Parity and approximately 1% Hot Spares
- RAIDZ2Pool with 5+2 Parity and approximately 3% Hot Spares
- CPU NODE:
  - 1U node with 1xAMD EPYC 7713 (64 cores, 2.0GHz)
  - Memory: 512GB
  - Operating system drive: 2x1 TB M.2NVMe
  - Network: ConnectX-5 EN Adapter Card 100GbE Single-Port QSFP28 PCIe 3.0x16 & 1x100Gb/s
- CPU NODE 1TB memory:
  - 1U node with 1xAMD EPYC 7713 (64 cores, 2.0GHz)
  - Memory: 1024GB
  - Operating system drive: 2x1 TB M.2NVMe
  - Network: ConnectX-5 EN Adapter Card 100GbE Single-Port QSFP28 PCIe 3.0x16 & 1x100Gb/s
- Lambda Hyperplane 4U
  - 2xAMD EPYC 7763 (64 cores, 2.45GHz, 256 MB Cache, PCIe 4.0)

- 8x NVIDIA GPU A100 (80GB)
- Memory: 1024GB
- Operating system drive: 3.84 TB NVMe + 3.84 TB NVMe
- Network for storage: 100 Gps connectX-5 NIC (dual port)

## 2.3.4 Construction Management, and project documentation

### 2.3.4.1 Functional Programming

#### 2.3.4.1.1 Objective

Define project requirements, space planning, space requirements, space adjacencies, technical requirements and other parameters that must be integrated into future project design and implementation.

#### 2.3.4.1.2 Tasks

To accomplish the objectives outlined under Functional Programming, the Contractor shall, at a minimum, perform the following:

- Review operational requirements and technical needs of the facility with identified NRC Technical representatives;
- Review and adhere to the applicable Treasury Board policies and directives;
- Conduct a site analysis to evaluate the availability and adequacy of site services, utilities, access, and the opportunities for and constraints to site development;
- Evaluate the condition and suitability of existing space and buildings to be incorporated into project requirements;
- Gather data necessary to develop functional space programs, adjacency matrices, and space data sheets;
- Identify security, restricted access, communications, IT, and other elements that may affect the design of the facility; and
- Identify, clearly define, and prepare a document that outlines all items to be included in the scope of work for the next proposed phase of work following functional program development.

#### 2.3.4.1.3 Deliverables

In accordance with the NRC Construction Documentation & Deliverables Manual, and the NRC Engineering & Construction CAD Standards the Consultant shall provide the following:

- Function Space Program Report – including any adjacency matrix and room data sheets, security and communications, and IT facility requirements;
- Risk Assessment/Risk Register (as per NRC Template).

### **2.3.4.2 Conceptual Design Development (Architectural)**

#### 2.3.4.2.1 Objective

As part of the project development, the NRC requires the development of three (3) conceptual design options which include all relevant and appropriate architectural and engineering development options for evaluation of the NRC Dept. Representatives before the A&E consultant proceed with the final design.

#### 2.3.4.2.2 Tasks

In order to meet the objectives outlined as part of conceptual design development, the Consultant shall, at a minimum, conduct the following:

- Prepare three (3) architectural feasible conceptual options to meet project requirements;
- Options shall be presented to the NRC Dept. Representatives to facilitate approval, including:
  - Detail view of all the architectural features of the space;
  - Information on how the space will be maintained and serviced;
  - Mechanical, electrical and civil requirements to develop the space and connect to the network room;
  - Security and access details;
  - Pros and cons of each option relative to overall project objectives and requirements.
- Conduct two (2) meetings with NRC stakeholders; one (1) to discuss proposed concept options to proceed with for evaluation, and one (1) to review the final design with NRC stakeholders. Consultant shall prepare meeting agenda and minutes for distribution as per direction of NRC Departmental Representative.

### **2.3.4.3 Construction Documentation (Detailed Design Development)**

#### 2.3.4.3.1 Objective

Complete the development of the drawings and specifications into a complete, coherent, and coordinated package that is suitable for Tender. Specifications, drawings, and addenda shall be complete and clear in order to enable Contractors to prepare bids. Documentation has to be provided in English and French.

#### 2.3.4.3.2 Tasks

In order to meet the objectives outlined as part of construction documentation preparation, the Consultant shall, at a minimum, conduct the following:

- Prepare the drawings and specifications in NMS format for submission to NRC Departmental Representative, in AutoCAD format, for review and comment at the following stages: 66%, and 99% progress;
- Conduct progress review meetings with NRC at each documentation progress stage and prepare meeting minutes for distribution as per direction of NRC Departmental Representative;
- Review and respond to all NRC Departmental Representative provided comments and questions identified in each documentation progress stage; and
- Revise and update the cost estimates, including details on methodology used, as indicated:
  - Class C at 66% progress stage; and

- Class B at 99%;

#### 2.3.4.3.3 Deliverables

In accordance with the NRC Construction Documentation & Deliverables Manual, and the NRC Engineering & Construction CAD Standards the Consultant shall provide the following:

- Final construction documentation consisting of signed and sealed final drawings and NMS format specifications ready for Tender;
- Class C and B cost Estimate;
- Estimated operations and maintenance costs for the facility;
- Proposed and/or updated Engineering Design Workplan & Schedule; Proposed Construction Schedule; and
- Project Risk Assessment Plan/Risk Register (as per NRC Template).

#### 2.3.4.4 Translation of Construction Documentation

##### 2.3.4.4.1 Objective

Provide translated final drawings and specifications, including those required to address Q&A during the tendering process, as required by NRC Departmental Representative.

##### 2.3.4.4.2 Tasks

In order to meet the objectives outlined, the Consultant shall, at a minimum, conduct the following:

- Retain the services of a qualified translator or translation firm with experience in translating construction terminology, drawings and specifications; or
- Use an in-house bilingual technical resource with experience in translating construction terminology, drawings and specifications; and
- Integrate the translation and editing activities at Tender document stage.

##### 2.3.4.4.3 Deliverables

Signed and sealed bilingual drawings and specifications ready for Tender in accordance with requirements outlined in the NRC Construction Documentation & Deliverables Manual, and the NRC Engineering & Construction CAD Standards.

#### 2.3.4.5 Services During Tender

##### 2.3.4.5.1 Objective:

Provide assistance to the NRC in order to address technical issues relating to the construction documents prepared by the Consultant for Tender.

##### 2.3.4.5.2 Tasks

In order to meet the objectives outlined, the Consultant shall, at a minimum, conduct the following:

- Attend mandatory site visit for bidders, maximum of two (2);
- Review and formulate recommendations on questions and requests for clarifications received from bidders;
- Evaluate any alternative material, equipment, systems or method proposed submissions for compliance with specified standard of acceptance; and
- Prepare addenda to the drawings and specifications, as required during tender period.

#### 2.3.4.5.3 Deliverables

Prepare bilingual addenda, signed and sealed in accordance with requirements outlined in the NRC Construction Documentation & Deliverables Manual, and the NRC Engineering & Construction CAD Standards.

### 2.3.4.6 Services During Construction

#### 2.3.4.6.1 Objective

Ensure construction of the project complies with contract documentation.

#### 2.3.4.6.2 Tasks

In order to meet the objectives outlined, the Consultant shall, at a minimum, conduct the following:

- Provide an online management platform for project documentation management, sharing and storage.
- Conduct site visits to review the construction progress at 25%, 50%, 75% and 99% completion;
- Maintain a library of annotated digital photos illustrating progress, quality, and issues at various stages of the project;
- Attend status meetings during construction, online or in person;
- Issue revisions and clarifications to the plans and specifications, supplementary details and sketches to ensure the design intent is conveyed, as well as, respond to questions related to the design intent (English only);
- Maintain a log and review sub-consultant submittals;
- Prepare the Contemplated Change Notice for design changes, and maintain a detailed log, including record of decisions and nature of the requested change;
- Review sub-consultant Financial Offers for Contemplated Change Notices and formulate recommendations to the NRC Departmental Representative;
- Review the Commission Plan, and participate in the commissioning to assist in resolving technical issues that arise during the commissioning phase;
- Conduct a project inspection and prepare a deficiency list for the Interim Certificate of Completion.
- Conduct a project inspection prior to the issuance of a Final Certificate of Completion; and
- Conduct a warranty inspection prior to the end of the warranty period and identify any resulting issues.
- Participate in the close-out / lessons learned meeting.

#### 2.3.4.6.3 Deliverables

In order to meet the objectives outlined, the Consultant shall, at a minimum, complete and prepare the following documentation, as required:

- Inspection reports, minutes of meetings, and log of construction issues and their resolution;
- Submittal's status report at status review meetings;
- Status report on CCNs and sub-contractor responses at status review meetings;
- Deficiency report(s); and
- Final construction report identifying key issues that arose during project execution and lessons learned.

#### 2.3.4.7 Commissioning

##### 2.3.4.7.1 Objective

Ensure and verify that the building's systems and their components are installed, adjusted, and perform as intended by the design and the project, in every mode of operation (i.e.: day, night, season, failure) and that the NRC has received the training necessary to operate it efficiently.

##### 2.3.4.7.2 Tasks:

In order to meet the objectives outlined, the Consultant shall, at a minimum, conduct the following:

- Familiarize with the project, the design, the project documents, shop drawings and product information submitted;
- Develop a Commissioning Plan, incorporating feedback from NRC, identifying the roles and responsibilities of the Consultant, the designated General Contractor, sub-consultants, Contract Administrator, and the NRC stakeholders. The Commissioning Plan and its execution are to conform to CSA Z320-11;
  - Digital simulator and HPC operation commissioning are the responsibility of the integrator hired by NRC.
- Develop a systematic approach for the Contractor to verify and certify that they have installed components and systems as specified, and that all testing specified in the project documents have been completed and witnessed, with which, all non-conformances must be documented and presented to the NRC Departmental Representative;
- Develop a documented, systematic approach to witness and verify that the individual system tests specified in the project documents;
- Develop a documented, systematic approach to verify the performance of individual systems and the dynamic testing and adjustment of all systems operating together, including the building envelope, mechanical, electrical, fire alarm, communications, and others as may be appropriate;
- Develop an approach for seasonal commissioning of the project where appropriate; and
- Develop a familiarization training plan intended for the project's facility manager/operator, maintenance staff, security staff, and the occupants.

##### 2.3.4.7.3 Deliverables

In order to meet the objectives outlined, the Consultant shall, at a minimum, complete and prepare the following documentation, as required:

- Commissioning Plan;
- Final Commissioning Report containing the commissioning plan, schedule, minutes of meetings, warranties, static testing and verification reports for all disciplines and trades, seasonal performance testing reports, balancing reports, and issues log; and
- Training plan and orientation documents for the project's facility manager/operator, maintenance staff, security staff, and the occupants.

### 2.3.4.8 Post-Construction & Project Close-out Services

#### 2.3.4.8.1 Objective

Ensure key project events and issues are documented.

#### 2.3.4.8.2 Tasks:

In order to meet the objectives outlined, the Consultant shall, at a minimum, conduct the following:

- Review deficiencies that may be warranty issues with the NRC Departmental Representative;
- Conduct a walk-through site visit to document warranty issues at least thirty (30) days prior to the expiration of the warranty period; and
- Review the project's history, events, and issues, interview key stakeholders and gather key documents that are necessary to draft the final construction report.

#### 2.3.4.8.3 Deliverables:

In order to meet the objectives outlined, the Consultant shall, at a minimum, complete and prepare the following documentation, as required:

- List of Equipment to be included in Maintenance Manuals;
- Deficiency Report;
- Lessons Learned Report;
- Update to building floor plan and evacuation route diagrams, as required; and
- As-Built CAD drawings, in AutoCAD format, based on Contractor provided redline mark-ups.

### 2.3.4.9 Proposed Project Timeline

Bidders are responsible to provide a proposed timeline as part of their tender response. NRC current expectation is that the Tender ready document package should be provided by November 29, 2024

A&E milestones are to be informed by proponents. CONST milestones are estimated by NRC and will be defined during design and finalized after the construction tender. NRC included our expectations for each milestone to match the current desired construction delivery date.

A&E	Project Kick off meeting (on site)	Week 0
A&E	Presentation and review of initial 3 conceptual design options (on site)	Week 5
A&E	Approval of selected conceptual design option	Week 7
A&E	Presentation of final design (on site)	Week 11
A&E	66% Design, drawings and specification review	Week 15
A&E	99% Design, drawings and specification review	Week 19



A&E	Tender ready document released	Week 21
CONST	Construction Kick off meeting (proposed)	Week 31
CONST	Construction completion (expected)	Week 65

## 3 Evaluation Criteria

### 3.1 Technical Evaluation Criteria and mandatory requirement

NRC is soliciting proposals in response to this public tender. The proposals will be evaluated based on the lowest price (60%) and technical understanding (40%). Proponents shall submit as part of their proposal a 2 pages (maximum) introduction section with a brief description of the proponent's company, their certificate of license to practice consulting engineering services in applicable province along with some notes on how the proponents' intents to approach the design development. This will ensure NRC has a complete understanding of the consultant offer to ensure a fair evaluation.

The certificate of license to practice consulting engineering services in the applicable province is mandatory and failure to provide this information will render the proposal invalid for further evaluation.

#### 3.1.1 Basis of Selection

The highest combined technical score (40%) and price (60%), with a minimum consensus score of 60% in each of the point-rated evaluation criteria requirements. To be declared responsive, a bid must:

- (a) comply with all the requirements of the bid solicitation; and
- (b) contain an introduction section with the license to practise information; and
- (c) obtain the required minimum consensus score of 60% in each of the point-rated evaluation criteria requirements.

Bids not meeting (a) or (b) or (c) will be declared non-responsive. Neither the responsive bid obtaining the highest number of points nor the one with the lowest evaluated price will necessarily be accepted.

A contract for engineering services described in this Statement of work is anticipated to be awarded to the Proponent with the highest combined technical score in accordance with contracting documents. However, NRC reserves the right to cancel this public tender in its entirety at any time.

TABLE A	Bidder #1	Bidder #2	Bidder #3
Technical score	90 points out of 100	80 out of 100	70 out of 100
Tendered amount	\$95,000	\$100,000	\$85,000

For information only:

	Technical score	Tendered amount score	Final score
<b>Bidder #1</b>	$\frac{90}{100} \times 40(\%) = 36.0$	$\frac{85k}{95k} \times 60(\%) = 53.7$	= 89.7 (Successful bid)
<b>Bidder #2</b>	$\frac{80}{100} \times 40(\%) = 32.0$	$\frac{85k}{100k} \times 60(\%) = 51.0$	= 83.0

	100		
<b>Bidder #3</b>	$\frac{70}{28.0} \times 40(\%) = 100$	$\frac{85k}{85 k} \times 60(\%) = 60.0$	= 88.0

### 3.1.2 Technical Evaluation Criteria

Technical proposals will be evaluated and scored in accordance with the following point-rated evaluation criteria.

Point-Rated Technical Criteria Requirements			
Requirement	Evaluation Criteria	Minimum Score	Maximum Score
Team experience	<p>[8 pts] Qualifications and experience of the proposed personnel must be appropriate to the nature of the requirement. Proponent shall provide a one-page resume/description for each of their main personal to be involved in the project and their professional experience the following disciplines shall be provided:</p> <ul style="list-style-type: none"> <li>• Project Manager;</li> <li>• Architect and facility Design;</li> <li>• Mechanical Engineer;</li> <li>• Electrical Engineer.</li> </ul> <p>[12 pts] Experience with similar type facilities shall be highlighted as well as how the professional exercise his Roles and Responsibilities on previous (similar) projects. One page per discipline.</p>	<b>12 points</b>	<b>20 points</b>

<p>Relevant Project Experience</p>	<p>Proponents shall demonstrate a proper level of experience for similar type work. This shall be demonstrated by presenting two (2) similar projects completed in the last ten (10) years.</p> <p>Proponents shall present each project information within no more than four pages (2 sheets), including but not limited to:</p> <ul style="list-style-type: none"> <li>• [2 pts] General description of the project;</li> <li>• [6 pts] Responsibilities of the proponent project team (applicable only to the same disciplines of this tender request);</li> <li>• [12 pts] Description of the strategy used to present project options for the client approval: i.e., method used, how information was presented and discuss, how comments were incorporated, etc.</li> <li>• [6 pts] Project budget and schedule information (approx.), and how the proponent managed those constrains during project execution.</li> <li>• [4 pts] One page maximum shall contain images of the facility concept design presented to the client and the final construction results (4 to 6 images).</li> </ul>	<p><b>18 points</b></p>	<p><b>30 points</b></p>
<p>Experience working with equipment integrators.</p>	<p>Proponents shall demonstrate experience working with equipment integrator(s), where the facility is being designed to accommodate the equipment. This shall be demonstrated by presenting two (2) equipment driven projects completed in the last ten (10) years.</p> <p>Proponents shall present each project information within no more than four pages (2 sheets), including but not limited to:</p> <ul style="list-style-type: none"> <li>• [2 pts] Type of equipment(s) being integrated;</li> <li>• [8 pts] Highlight one or two key design requirements that required significant site integration, how those requirements were incorporated in the design and how they were managed during construction;</li> <li>• [6 pts] Roles and responsibilities of the proponent project team during the project design, construction and commissioning;</li> <li>• [8 pts] Describe the design steps to define site capacity to accommodate equipment requirements, how this was presented and discussed with the equipment integrator;</li> <li>• [6 pts] Describe how the proponent managed the flow of information and documented scope requirements based on the client needs and the equipment integrator needs.</li> </ul>	<p><b>18 points</b></p>	<p><b>30 points</b></p>

Project understanding	<p>Proponents shall provide up to four pages (two sheets) describing their understanding of the project. The information provide shall demonstrate that the proponent has a clear understanding of the project and its main objective, in order to achieve that the following are expected to be provided;</p> <ol style="list-style-type: none"> <li>1. [5 pts] Describe each part of the scope development and the strategies to manage them;</li> <li>2. [7 pts] Explain the details involved in developing each step, and how the proponents will integrate the client and the integrator information to those steps (initial equipment requirements/facility design, site infrastructure to support the equipment, construction management and facility commissioning)</li> <li>3. [5 pts] Describe how the proponent is planning to present the facility design options to the client and the key discussion points.</li> <li>4. [3 pts] Present a preliminary schedule, with as a minimum the steps described above.</li> </ol>	12 points	20 points
<b>Total</b>			<b>100 points</b>

It is the responsibility of the Proponent to provide accurate and complete information to demonstrate how they meet each of the evaluation criteria. Include specific project examples as necessary to illustrate fulfillment of requirements.

### **3.1.3 Financial Proposal**

Technical proposals which meet the minimum consensus score for 60% in each of the point-rated evaluation criteria shall move onto the financial proposal evaluation.





---

### ANNEX C - BASIS OF PAYMENT

The Bidder must provide all of the pricing requested in the following Tables in accordance with Article 6.7.1 - Basis of Payment.

TOTAL EVALUATED PRICE is the Total of Sum A. Firm Requirement.  
*The Time-Based Fees will not be considered in the Evaluation process.*

#### A. Firm Requirement

Item	Description or "Deliverable"	Fixed Amount	Due Date or "Delivery Date"
1	Architectural and Engineering design services and tender support	\$ _____	
2	Translation of construction documents	\$ _____	
3	Construction management and commissioning support	\$ _____	
	<b>Total</b>	\$ _____	





### ANNEX C - BASIS OF PAYMENT

#### Time-Based Fees

(Architectural and Engineering Services)

IDENTIFY SERVICE *	ESTIMATED HOURS Column A	HOURLY RATES** Column B	TIME BASED FEE Columns AxB
<b>Architectural Services</b>  identify category of personnel i.e. consultant's site representative  based on ? hours per week X ? weeks		\$.....	\$.....
<b>Mechanical Engineering Services</b>  identify category of personnel i.e. consultant's site representative  based on ? hours per week X ? weeks		\$.....	\$.....
<b>Electrical Engineering Services</b>  identify category of personnel i.e. consultant's site representative  based on ? hours per week X ? weeks			
<b>Civil Engineering Services</b>  identify category of personnel i.e. consultant's site representative  based on ? hours per week X ? weeks			
<b>MAXIMUM TIME BASED FEES</b>			\$.....

\*Payment will be based on actual hours spent. Travel time and/or expenses will not be reimbursed separately.

\*\* All-inclusive hourly rate is applicable to both normal working hours and any other shift work as required.



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

**SECURITY REQUIREMENTS CHECK LIST (SRCL)  
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)**

**PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE**

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine	2. Branch or Directorate / Direction générale ou Direction
3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant

4. Brief Description of Work / Brève description du travail

5. a) Will the supplier require access to Controlled Goods? / Le fournisseur aura-t-il accès à des marchandises contrôlées?  No / Non  Yes / Oui

5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? / Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?  No / Non  Yes / Oui

6. Indicate the type of access required / Indiquer le type d'accès requis

6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? / Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS?  No / Non  Yes / Oui  
(Specify the level of access using the chart in Question 7. c) / (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c)

6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. / Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.  No / Non  Yes / Oui

6. c) Is this a commercial courier or delivery requirement with **no** overnight storage? / S'agit-il d'un contrat de messagerie ou de livraison commerciale **sans** entreposage de nuit?  No / Non  Yes / Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada <input type="checkbox"/>	NATO / OTAN <input type="checkbox"/>	Foreign / Étranger <input type="checkbox"/>
---------------------------------	--------------------------------------	---

7. b) Release restrictions / Restrictions relatives à la diffusion

No release restrictions / Aucune restriction relative à la diffusion <input type="checkbox"/>  Not releasable / À ne pas diffuser <input type="checkbox"/>  Restricted to: / Limité à: <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays:	All NATO countries / Tous les pays de l'OTAN <input type="checkbox"/>   Restricted to: / Limité à: <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays:	No release restrictions / Aucune restriction relative à la diffusion <input type="checkbox"/>   Restricted to: / Limité à: <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays:
---	--	--

7. c) Level of information / Niveau d'information

PROTECTED A / PROTÉGÉ A <input type="checkbox"/>	NATO UNCLASSIFIED / NATO NON CLASSIFIÉ <input type="checkbox"/>	PROTECTED A / PROTÉGÉ A <input type="checkbox"/>
PROTECTED B / PROTÉGÉ B <input type="checkbox"/>	NATO RESTRICTED / NATO DIFFUSION RESTREINTE <input type="checkbox"/>	PROTECTED B / PROTÉGÉ B <input type="checkbox"/>
PROTECTED C / PROTÉGÉ C <input type="checkbox"/>	NATO CONFIDENTIAL / NATO CONFIDENTIEL <input type="checkbox"/>	PROTECTED C / PROTÉGÉ C <input type="checkbox"/>
CONFIDENTIAL / CONFIDENTIEL <input type="checkbox"/>	NATO SECRET / NATO SECRET <input type="checkbox"/>	CONFIDENTIAL / CONFIDENTIEL <input type="checkbox"/>
SECRET / SECRET <input type="checkbox"/>	COSMIC TOP SECRET / COSMIC TRÈS SECRET <input type="checkbox"/>	SECRET / SECRET <input type="checkbox"/>
TOP SECRET / TRÈS SECRET <input type="checkbox"/>		TOP SECRET / TRÈS SECRET <input type="checkbox"/>
TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) <input type="checkbox"/>		TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) <input type="checkbox"/>

Security Classification / Classification de sécurité
--



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

**PART A (continued) / PARTIE A (suite)**

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?  No  Yes  
 Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS?  Non  Oui  
 If Yes, indicate the level of sensitivity:  
 Dans l'affirmative, indiquer le niveau de sensibilité :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets?  No  Yes  
 Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate?  Non  Oui  
  
 Short Title(s) of material / Titre(s) abrégé(s) du matériel :  
 Document Number / Numéro du document :

**PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)**

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

<input type="checkbox"/> RELIABILITY STATUS COTE DE FIABILITÉ	<input type="checkbox"/> CONFIDENTIAL CONFIDENTIEL	<input type="checkbox"/> SECRET SECRET	<input type="checkbox"/> TOP SECRET TRÈS SECRET
<input type="checkbox"/> TOP SECRET-SIGINT TRÈS SECRET - SIGINT	<input type="checkbox"/> NATO CONFIDENTIAL NATO CONFIDENTIEL	<input type="checkbox"/> NATO SECRET NATO SECRET	<input type="checkbox"/> COSMIC TOP SECRET COSMIC TRÈS SECRET
<input type="checkbox"/> SITE ACCESS ACCÈS AUX EMBLEMES			

Special comments:  
 Commentaires spéciaux : \_\_\_\_\_

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.  
 REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work?  No  Yes  
 Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?  Non  Oui  
 If Yes, will unscreened personnel be escorted?  
 Dans l'affirmative, le personnel en question sera-t-il escorté?  No  Yes  
 Non  Oui

**PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)**

**INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS**

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises?  No  Yes  
 Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS?  Non  Oui

11. b) Will the supplier be required to safeguard COMSEC information or assets?  No  Yes  
 Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC?  Non  Oui

**PRODUCTION**

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises?  No  Yes  
 Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ?  Non  Oui

**INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)**

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data?  No  Yes  
 Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS?  Non  Oui

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency?  No  Yes  
 Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale?  Non  Oui



**PART C - (continued) / PARTIE C - (suite)**

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.

Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.

Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

**SUMMARY CHART / TABLEAU RÉCAPITULATIF**

Category / Catégorie	PROTECTED / PROTÉGÉ			CLASSIFIED / CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET	NATO RESTRICTED / NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL / NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET / COSMIC TRÈS SECRET	PROTECTED / PROTÉGÉ			CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET
											A	B	C			
Information / Assets / Renseignements / Biens / Production																
IT Media / Support TI																
IT Link / Lien électronique																

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?  No  Yes  
 La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?  Non  Oui

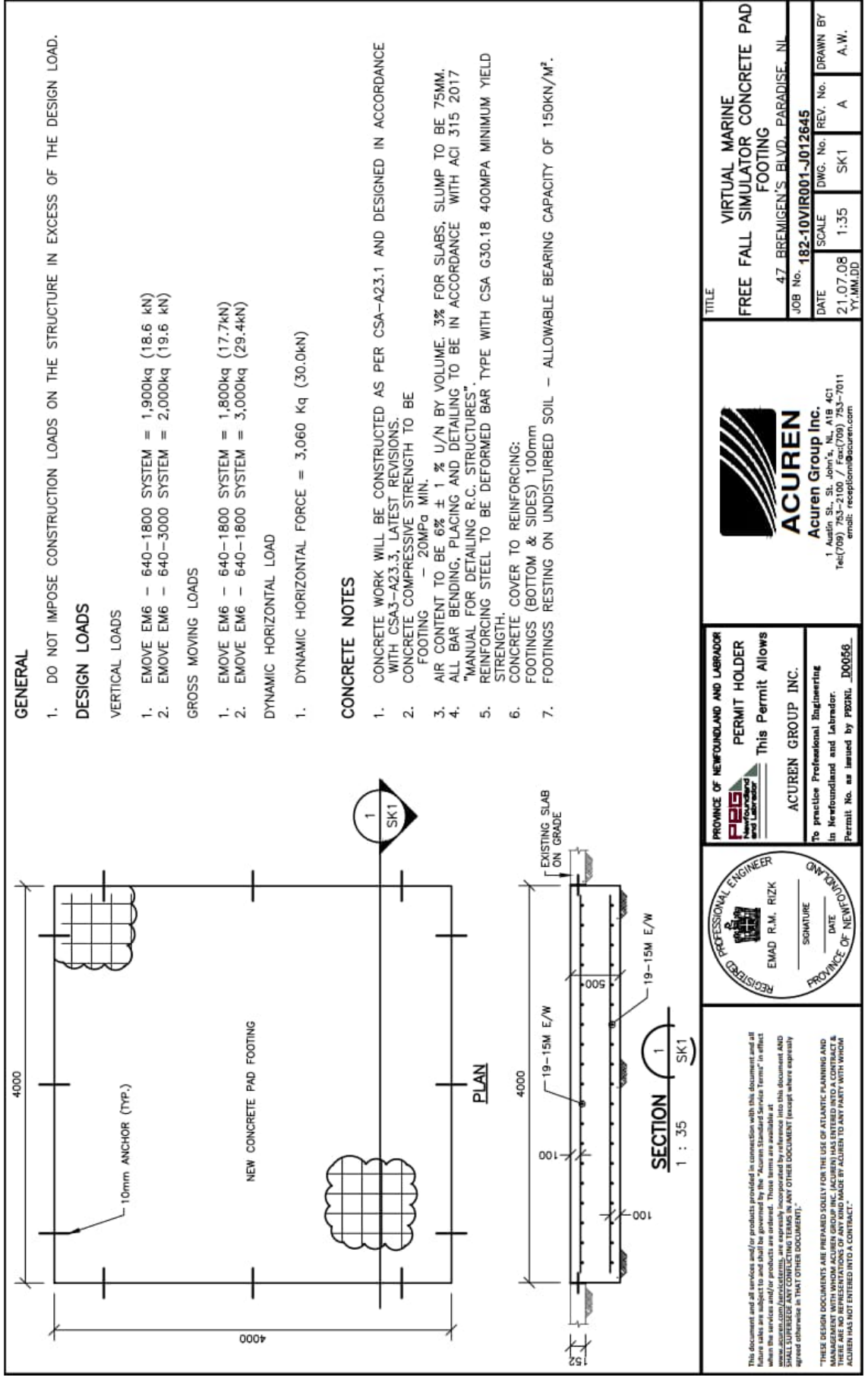
**If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".**  
**Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.**

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?  No  Yes  
 La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?  Non  Oui

**If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).**  
**Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquez qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).**



# Ship Bridge Motion Simulator Preferred Option – Pad Flush with Floor



TITLE		VIRTUAL MARINE FREE FALL SIMULATOR CONCRETE PAD FOOTING	
JOB No. 182-10VIR001-J012645		SCALE	DWG. No. REV. No.
DATE	21.07.08	1:35	SK1 A
TY:MM:DD	YY:MM:DD		A.W.

**ACUREN**  
Acuren Group Inc.  
1 Austin St. St. John's, N.S. A1B 4G1  
Tel:(709) 753-2100 / Fax:(709) 753-7011  
email: reception@acuren.com

PROVINCE OF NEWFOUNDLAND AND LABRADOR  
**PERMIT HOLDER**  
This Permit Allows  
**ACUREN GROUP INC.**  
To practise Professional Engineering  
in Newfoundland and Labrador.  
Permit No. as issued by PEERL: 000566

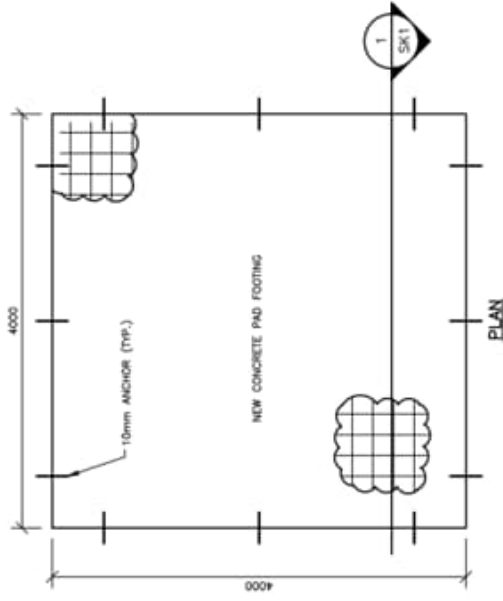
REGISTERED PROFESSIONAL ENGINEER  
EMAD R.M. RIZK  
SIGNATURE \_\_\_\_\_  
DATE \_\_\_\_\_  
PROVINCE OF NEWFOUNDLAND AND LABRADOR

This document and all services and/or products provided in connection with this document and all future services are subject to and shall be governed by the "Acuren Standard Service Terms" in effect when the services and/or products are ordered. These terms are available at [www.acuren.com](http://www.acuren.com). ALL SUPPLEMENTARY AND/OR AMENDMENTS TO THIS DOCUMENT SHALL SUPERSEDE ANY CONFLICTING TERMS IN ANY OTHER DOCUMENT (except where expressly agreed otherwise in THAT OTHER DOCUMENT).

THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE OF ATLANTIC PLANNING AND MANAGEMENT WITH WHOM ACUREN GROUP INC. (ACUREN) HAS ENTERED INTO A CONTRACT & ACUREN HAS NO LIABILITY OR OBLIGATION TO ANY OTHER PARTY. THESE DESIGN DOCUMENTS SHALL BE FOR THE USE OF ACUREN GROUP INC. ONLY AND SHALL NOT BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF ACUREN GROUP INC. ACUREN HAS NOT ENTERED INTO A CONTRACT.

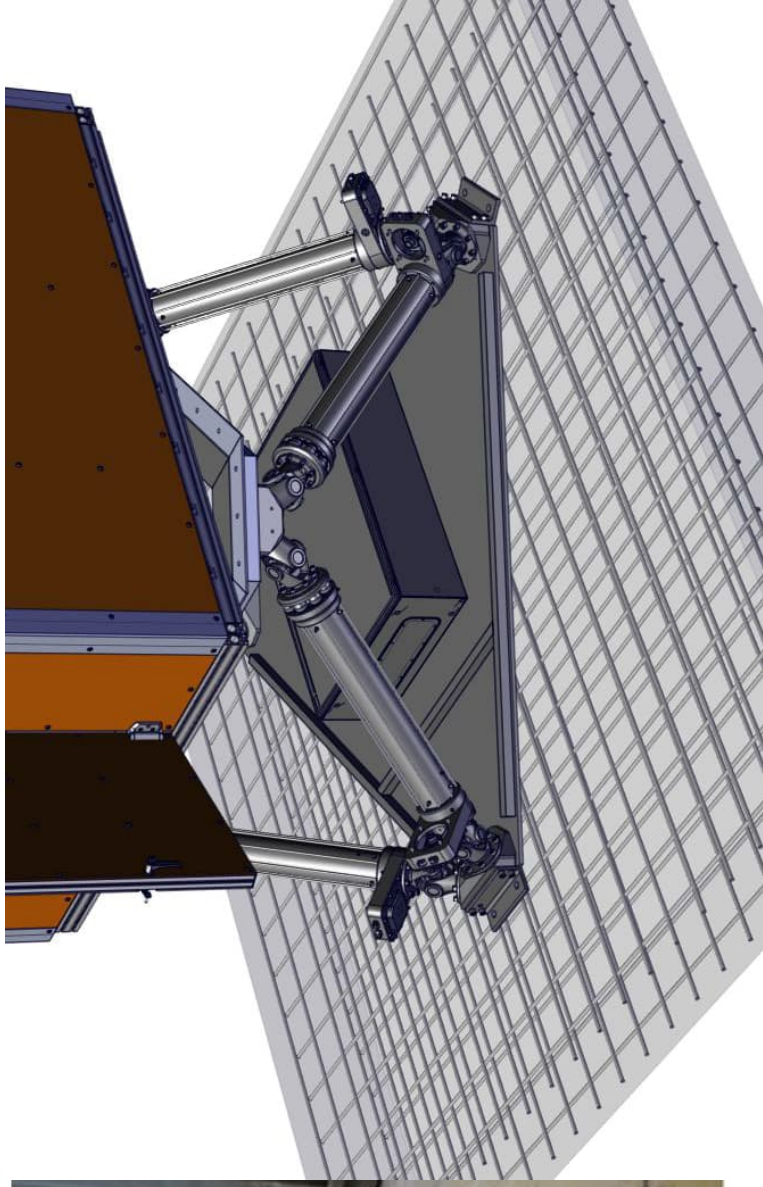


# Ship Bridge Motion Simulator Motion Bed Mounting



Clearly mark on the floor the location of reinforcement bar.

After concrete is poured, a chalk line can be drawn to identify potential conflicts with the rebar below.



# Ship Bridge Motion Simulator Power Requirement

## Simulator Power Requirements

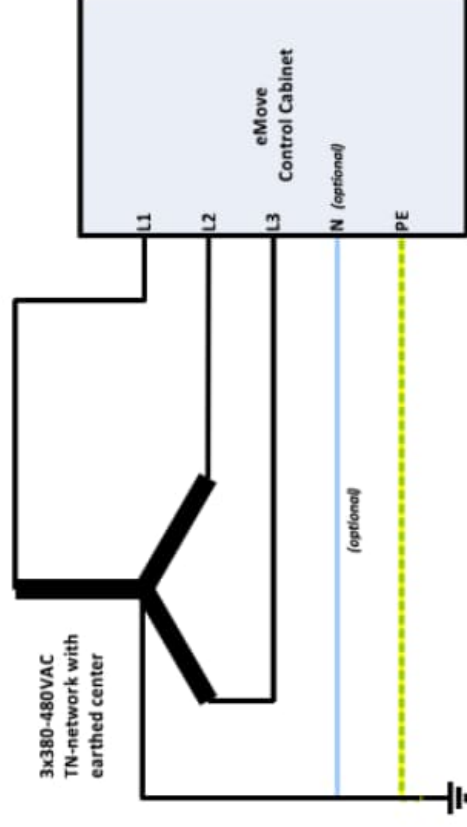
Voltage	120 VAC +/- 8%
Frequency	60Hz
Typical power consumption	2800 watts
Peak power consumption	4800 watts
Facility circuit breaker	4 x 15A
Facility connection	4 x NEMA 5-15R Duplex



Nema 5-15 Receptacle

## Motion Bed Power Requirements

Voltage	3 x 380-480 VAC +/- 10%
Frequency	50/60 Hz
Typical power consumption	5 kW
Peak power consumption	22 kW
Facility circuit breaker	32A type C
Facility shortcut current	< 6kA
Facility network type	TN-network, star with earth center
Facility connection	3 phase (L1, L2, L3), protective earth (PE) Neutral (N) is optional
Facility ground resistance	< 25 ohm
Facility ground fault interrupter	>= 300 mA





***NRC-CMRC***

# Construction Documentation and Deliverables Manual

Real Property Planning and Management

June 2020

Revision 2



National Research  
Council Canada

Conseil national de  
recherches Canada

**Canada**

## REVISIONS

VERSION	DATE	DESCRIPTION
0.1	11 18 2019	Draft Version for Consultation
0.2	11 28 2019	Draft Version for Review
1.0	12 05 2019	Original Issue – Revision 1
1.1	06 12 2020	Revision 2

# Table of Contents

1 General .....	6
1.1 Purpose .....	6
1.2 Scope .....	6
1.3 Harmonization with Project Specific Terms of Reference.....	6
1.4 Terminology.....	6
1.5 Definitions.....	6
2 Construction Documents.....	8
2.1 General.....	8
2.1.1 Principles of NRC Contract Documents .....	8
2.1.2 Translations .....	8
2.1.3 Meeting Minutes .....	8
2.1.4 Construction Document Definitions .....	8
2.1.5 Quality Assurance.....	9
2.1.6 Quality Assurance of Deliverables.....	9
2.1.7 Design Reviews .....	9
2.1.8 Terminology & Quantities .....	9
2.1.9 Units of Measure.....	10
2.2 Drawings.....	10
2.2.1 General .....	10
2.2.2 Information to be Included .....	10
2.2.3 Titleblocks and Revision Notes .....	10
2.2.4 Drawing Numbers .....	10
2.2.5 Presentation Requirements .....	10
2.2.6 Legends .....	11
2.2.7 Schedules and Tables .....	11
2.2.8 North Arrow.....	11
2.2.9 Drawing Symbols .....	11
2.2.10 As-Built Drawings .....	11
2.2.11 Drawing Submission Format .....	11

2.3 Specifications .....	11
2.3.1 National Master Specifications .....	11
2.3.2 Index .....	12
2.3.3 Specification Organization .....	12
2.3.4 Standards.....	12
2.3.5 Specifying Materials.....	12
2.3.6 Measurements for Payment.....	13
2.3.7 Cash Allowances .....	14
2.3.8 Warranties.....	14
2.3.9 Miscellaneous Requirements .....	14
2.3.10 Specification Coordination.....	14
2.3.11 Regional Guide .....	14
2.3.12 Health and Safety .....	14
2.3.13 Subsurface Investigation Reports.....	14
2.3.14 Prequalifications and Pre-Award Submissions.....	15
2.3.15 Contracting Issues .....	15
2.3.16 Specification Submission Format .....	16
2.4 Addenda .....	16
2.4.1 Format.....	16
2.4.2 Content .....	16
3 Cost Estimates .....	17
3.1 Cost Estimate Submission Formats .....	17
3.1.1 Format.....	17
3.1.2 Contents.....	17
3.2 Classes of Cost Estimates for Construction Projects .....	17
3.2.1 Class D (Indicative) Estimate .....	17
3.2.2 Class C Estimate .....	18
3.2.3 Class B (Substantive) Estimate .....	18
3.2.4 Class A (Pre-Tender) Estimate.....	18
4 Project Schedules .....	19
4.1 Schedule Format .....	19
4.2 Progress Reporting .....	19

4.2.1 Executive Summary .....19

4.2.2 Narrative Report .....19

4.2.3 Variance Report .....20

4.2.4 Exception Report .....20

4.2.5 Detailed Project Schedule .....20

# 1 General

## 1.1 Purpose

This document is intended to provide architectural and engineering consultants (Consultants) with the requirements for producing deliverables for National Research Council Canada (NRC) projects in order to ensure a well-documented design process, and facilitate engagement and review by NRC employees. This document has been assembled based upon documentation prepared by PSCP, “Doing Business with PWGSC Documentation and Deliverables Manual”.

## 1.2 Scope

This document shall apply to design-bid-build projects undertaken by NRC.

## 1.3 Harmonization with Project Specific Terms of Reference

This document shall be used in conjunction with project specific Request for Proposal (RFP) requirements. In case of a conflict between documents, the requirements of the RFP shall prevail over those of this document.

## 1.4 Terminology

This document utilizes the following terminology:

- **shall:** used to express a requirement, a provision the Consultant is obligated to meet;
- **should:** used to express a recommendation; and
- **may:** used to express an option or that which is permissible within the limits of this document.

## 1.5 Definitions

**Addenda:** changes to the construction documents or tendering procedures, issued during the tendering process.

**Construction Documents:** drawings and specifications (including addenda).

**Drawings:** graphic means of showing work to be done, as they depict shape, dimension, location, quantity of materials and relationship between building components.

**Reports:** written account given of a particular matter after thorough investigation or consideration prepared by the Consultant.

**Specifications:** written descriptions of materials and construction processes in relation to quality, colour, pattern, performance and characteristics of materials, installation and quality of work requirements.

**Indicative Estimate:** estimate that is not sufficiently accurate to warrant Treasury Board approval as a cost objective and provides a rough cost projection used for budgetary planning purposes in the early stages of concept design development. Based on an operational Statement of Requirements (SOR), market assessment of products and technologies available to meet requirements and considerations such as implementation, life cycle costs and operational savings.

**Substantive Estimate:** high quality and reliable estimate based on the following elements:

- Detailed system and component design, design adaptation, work plans and drawing for components, construction or assembly, and installation. Includes site acquisition, preparation and special requirement estimates. Contingency funding requirements must be justified based on line-by-line risk assessments including market factors, industrial capability and considerations.
- Significant and identifiable deliverables as well as the costs of the government contribution to employee benefit plans (20% of all salaries charged to the project).
- Agreed upon objectives, including those resulting from procurement review.
- Market assessment, where acquisition is through lease, lease purchase or capital lease. The provision allowance for fit-up or special tailoring requirements will be subject to review and possible revision at the contract approval stage.

## 2 Construction Documents

### 2.1 General

This section provides direction to Consultants on the preparation of construction documents (namely specifications and drawings) to be submitted to NRC for real property projects across Canada.

Specifications, drawings, and addenda shall be complete and clear in order to enable Contractors to prepare bids without guesswork.

#### 2.1.1 Principles of NRC Contract Documents

Contact documents shall be prepared based on common public procurement principles.

NRC is responsible for preparing and issuing the construction contract and the terms and conditions as well as all other related bidding and contractual documents. For detailed information, the standard acquisition clauses and conditions commonly used by NRC in the contracting process are available on the [buyandsell.gc.ca](http://buyandsell.gc.ca) website.

#### 2.1.2 Translations

When bilingual documents are required, as outlined by project specific RFPs, all documentation including drawings, specifications, reports as well as all bidder questions shall be prepared in both official languages.

Ensure English and French documentation is of equal quality in all respects.

#### 2.1.3 Meeting Minutes

Meeting minutes shall be prepared for all design meetings and distributed to all required within 1-week of meeting date. Unless otherwise indicated in the project specific RFP, it shall be the sole responsibility of the Consultant to prepare and distribute meeting minutes. Refer to meeting minutes sample template in Appendix F.

#### 2.1.4 Construction Document Definitions

Unless otherwise indicated in a project specific RFP, construction document submissions (33%, 66%, 99%, and Tender / 100%) shall meet the definitions outlined below. Further discipline based requirements may be included in the project specific RFP.

- **33%:** shall demonstrate general intent of design and compliance and alignment with relevant standards. Summary specification (table of contents) required, but not a full specification.
- **66%:** shall show full system, all components, requirements, and lack only minor details on drawings. Specifications shall be well advanced and contain major work and material requirements and lack only minor details.
- **99%:** shall be for final review by NRC, lacking no detail and complete with a project specific specification.



- **Tender** (100%): shall address comments by NRC as required, signed and sealed by the responsible design professional in compliance with various provincial jurisdiction requirements, ready for tender.

### 2.1.5 Quality Assurance

It is the sole responsibility of the Consultants to undertake their own quality control process and to review, correct, and coordinate their documents between disciplines. The Consultant shall also ensure constructability of their design.

### 2.1.6 Quality Assurance of Deliverables

For every construction document submission (33%, 66%, 99% and Tender), the Consultant shall provide:

- completed and signed Submission of Construction Documents Checklist (Appendix A); and
- index as per Appendix B.

### 2.1.7 Design Reviews

#### 2.1.7.1 General

Unless otherwise indicated in the project specific RFP, Consultants shall allow for a 2-week review period at each construction document submission (33%, 66%, 99%, and Tender) by NRC. NRC shall conduct architectural and engineering review at each specified construction document submission and provide comment utilising the Technical Services Review (Appendix C).

#### 2.1.7.2 Consultant Response

Consultants shall review the NRC prepared Technical Service Review at each construction document submission (33%, 66%, 99%, and Tender). In addition to any subsequent modifications required as a result of NRC review comments, Consultant shall provide a response to each item indicated in the Technical Service Review such as changes noted, clarifications made, or propose alternative solutions for further review with NRC.

### 2.1.8 Terminology & Quantities

The Consultant shall use the term **Departmental Representative** instead of Engineer, NRC, 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,” “equivalent to,” and “to be determined on site by Departmental Representative” shall not be indicated in specifications nor in drawings, as such wording promotes inaccurate and inflated bids.

Construction documents shall permit bidders to bid accurately. If a precise quantity is impossible to identify (e.g. cracks to be repaired), then provide an estimated quantity for bidding purposes (to be used in conjunction with unit prices). Ensure that the terminology used throughout construction documents is consistent and does not contradict applicable codes and standards.

### 2.1.9 Units of Measure

All units of measure indicated within drawings and specifications shall be based on the International System of Units (SI).

## 2.2 Drawings

### 2.2.1 General

Drawings shall be prepared in accordance with the NRC Engineering & Construction CADD Standard and the Canadian Standards Association CSA B78.5-93 (R2002): Computer-Aided Design Drafting (Buildings). Drawing shall also meet the following criteria:

- dimensions shall be in metric only (no dual dimensioning); and
- no trade names present on any drawings.

### 2.2.2 Information to be Included

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

### 2.2.3 Titleblocks and Revision Notes

NRC titleblocks shall be used for drawings and sketches, including addenda.

The percent of drawing completion should be included in the revision notes. Revision notes shall be input during design development, but cleared for Tender drawing (100% complete).

### 2.2.4 Drawing Numbers

Drawings shall be numbered in sets according to the type of drawing and discipline involved as indicated in the following table.

DISCIPLINE	DRAWING
Architectural	XXXX-A01, XXXX-A01F, XXXX-A02, XXXX-A02, etc.
Civil	XXXX-C01, XXXX-C01F, XXXX-C02, XXXX-C02, etc.
Mechanical	XXXX-M01, XXXX-M01F, XXXX-M02, XXXX-M02, etc.
Electrical	XXXX-E01, XXXX-E01F, XXXX-E02, XXXX-E02, etc.
Structural	XXXX-S01, XXXX-S01F, XXXX-S02, XXXX-S02, etc.

**Note:** XXXX denotes NRC project number and XXX-A01F denotes French drawing

### 2.2.5 Presentation Requirements

Present the drawings in sets, providing the applicable site plan, civil, architectural, structural, mechanical, and electrical drawings in that order. All drawings should be of uniform standard size.

## 2.2.6 Legends

Provide a legend of symbols, abbreviations, references, etc., on the front sheet of each set of drawings (discipline specific), or in the case of large sets of drawings, provided the legend immediately after the title sheet and index sheets.

## 2.2.7 Schedules and Tables

Where schedules or tables occupy entire sheets, locate them at the back of each set of drawings for convenient reference.

## 2.2.8 North Arrow

Include a north arrow on all plans. 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.

## 2.2.9 Drawing Symbols

Follow generally accepted drawing conventions, understandable by the construction trades.

## 2.2.10 As-Built Drawings

As-built drawings are official record drawings and shall represent as constructed conditions including location and size of equipment, devices, plumbing lines, mechanical and electrical equipment, structural elements etc. As-built drawings shall be updated in CADD and provided to NRC upon project completion. Handwritten notes are not acceptable.

## 2.2.11 Drawing Submission Format

Unless otherwise stated in the project specific RFP, drawing submissions shall be in electronic format.

### 2.2.11.1 Drawing Electronic Copy Deliverable Format

Drawing submitted electronically shall be provided:

- without password protection or printing restrictions;
- in two formats:
  - PDF/E-1 (in compliance with ISO 24517-1);
  - .dwg format; and
- in accordance with supplemental specific provisions indicated in project specific RFP.

## 2.3 Specifications

### 2.3.1 National Master Specifications

Specifications prepared for NRC shall follow the most current version of the **National Master Specification** (NMS) format offered by the National Research Council. In addition, Consultant shall incorporate NRC supplied General Specification sections, provided in NMS format, into specification package.

The Consultant has overriding responsibility for the content of construction project specifications. For each specification, the Consultant shall edit, amend, and supplement the NMS template as deemed necessary to produce an appropriate project specification free of conflict and ambiguity. The Consultant should refer

to the latest *NMS User's Guide* and *NMS Development Guide* issued by the National Research Council for further guidance on using the NMS.

### **2.3.2 Index**

Specifications shall include an index which list all specification sections, including numbers of pages, as well as the division and section names in the format shown in Appendix B.

### **2.3.3 Specification Organization**

Narrow scope sections describing single units of work should be used for complex work. Broad scope sections may be used for less complex work. The Consultant shall use consistently for the entire specification the NMS full-page format.

Start each section on a new right hand page and show the NRC project number, NMS section title, NMS section number, page number, and specification date on each page. The project title, and Consultant name are not to be indicated.

### **2.3.4 Standards**

Code and standard references in the NMS may not be up to date, the Consultant shall ensure that the project specification use the current applicable edition of all references quoted.

### **2.3.5 Specifying Materials**

Specifications should make use of generic names in referencing construction materials. The Consultant should refer to the latest version of the *NMS Development Guide* issued by the National Research Council for further details.

#### **2.3.5.1 Alternate Products and Materials**

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.

#### **2.3.5.2 Sole Sourcing**

Sole sourcing of materials and/or work is only allowed in exceptional and justifiable circumstances. Prior to including sole source materials and/or work, the Consultant shall contact the Departmental Representative to obtain approval for the sole sourcing. Consultants shall provide proper justification for all individual sole source requirements.

Sole sourcing for materials and work may be required when performing work on existing proprietary systems, such as fire alarm systems, building automation systems (BAS) etc.

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

Designated Contractor

.1 Retain the services of [\_\_\_\_\_] to do the work of this section.

Wording for the sole source of building automation system should be in Part 1 as follows:

Designated Contractor

.1 Retain the services of [\_\_\_\_\_] or its authorized representative to complete the work of all building automation system sections.

Wording for the sole source of building automation system should be in Part 2 as follows:

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 (i.e. fire alarm systems) should be in Part 2 as follows:

Acceptable Materials

.1 The only acceptable materials are [\_\_\_\_\_].

### 2.3.6 Measurements for Payment

The measurement for payment shall be provided in lump sum or unit prices.

#### 2.3.6.1 Unit Prices

Unit prices should only be used in instances where the quantity can only be roughly estimated (e.g. earth work). The approval of the Departmental Representative shall be sought in advance of their use. In each applicable NMS section where unit prices are used, add new or replace paragraph title “Measurement for Payment” with “Unit Prices.” and 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.

Provide a unit price table, sample shown below, to designate the work to which a unit price arrangement applies. The table shall include:

- the price per unit and the estimated total price for each item listed;
- a complete description of each type of work covered; and
- items 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
<b>TOTAL ESTIMATED AMOUNT</b>						

### 2.3.7 Cash Allowances

Construction documents shall be complete and contain all of the requirements for the contractual work. Cash allowances are to be used only under exceptional circumstances (i.e. utility companies, municipalities), where no other method of specifying pricing is appropriate.

To include cash allowances, obtain approval from the Departmental Representative in advance, and use Section 01 21 00 – Allowances of the NMS to specify the criteria.

### 2.3.8 Warranties

The 12-month warranty period specified in NRC’s standard acquisition clauses and conditions with regard to the contract should typically be retained as is. Extended warranties should only be used where experience has shown that serious defects are likely to appear after expiry of the standard one-year warranty period. When necessary to extend beyond the 12-month warranty period, 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 [\_\_\_\_] months.

Where the extended warranty is intended to apply to a particular part of a specification section, modify the previous text as follows:

For [\_\_\_\_], the 12-month warranty period is extended to [\_\_\_\_] months.

### 2.3.9 Miscellaneous Requirements

Paragraphs noted as “Scope of Work” shall not be included. Within Part 1 – General of specifications, the paragraphs “Summary” and “Section Includes” shall not be utilized.

### 2.3.10 Specification Coordination

All sections of the specifications shall be coordinated, including the “Related Sections” portion of specifications and appendices. References to non-existent sections shall not be present within the specifications.

### 2.3.11 Regional Guide

The Consultant should contact the Departmental Representative to obtain the region’s requirements for Division 01 (General Requirements) or other short-form specifications as appropriate.

### 2.3.12 Health and Safety

All project specifications are required to include Section 01 35 29 – Health and Safety Requirements. Confirm with the Departmental Representative to determine if there are any supplemental instructions to meet regional requirements.

### 2.3.13 Subsurface Investigation Reports

If required, subsurface investigation report(s) shall be included after Section 31, and the following paragraph added to Section 31:

## Subsurface Investigation Report(s)

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

If the Departmental Representative 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 providing the subsurface investigation report(s), the foundation information required by the current *National Building Code of Canada* (Division C, Part 2, 2.2.4.6) shall be included on foundation drawings.

### **2.3.14 Prequalifications and Pre-Award Submissions**

Do not include in the specifications 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 Departmental Representative.

There should be no references to certificates, transcripts, samples, the license numbers of a trade, or any other documentation or items being included with the bid.

### **2.3.15 Contracting Issues**

Specifications describe the workmanship and quality of the work and shall not contain any NRC Procurement Front End Contracting details. Division 00 of the NMS is not used by NRC, except for the Seals page 00 01 07, the Table of Contents 00 01 10, and the List of Drawing Sheets 00 01 15. In specifications, remove all references to the following:

- general instructions to bidders;
- general conditions;
- Canadian Construction Documents Committee (CCDC) documents;
- priority of documents;
- security clauses and clearances;
- terms of payment or holdback;
- the tendering process;
- bonding requirements;
- insurance requirements;
- alternative and separate pricing;
- site visits (mandatory or optional); and
- release of lien and deficiency holdbacks.

### **2.3.16 Specification Submission Format**

Unless otherwise stated in the project specific RFP, specification submissions shall be in electronic format.

#### **2.3.16.1 Specification Electronic Copy Deliverable Format**

Specifications submitted electronically shall be provided:

- without password protection or printing restrictions;
- in PDF/A (in compliance with ISO 19005) and .doc format; and
- in accordance with supplemental specific provisions indicated in project specific RFP.

## **2.4 Addenda**

### **2.4.1 Format**

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

Every page of the addendum, including attachments, shall be numbered consecutively. All pages shall have the NRC project number and the appropriate addendum number. Sketches shall appear in the NRC format, signed and sealed.

No Consultant information (name, address, phone #, Consultant project #, etc.) should appear in addenda or their attachments, except on sketches.

### **2.4.2 Content**

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

Where there are many or major changes to a section or drawing, consider deleting the entire section or drawing and replacing it with a new version.



## 3 Cost Estimates

### 3.1 Cost Estimate Submission Formats

#### 3.1.1 Format

Construction cost estimates for projects shall be prepared in the elemental analysis format, which is in accordance with the latest edition issued by the Canadian Institute of Quantity Surveyors (CIQS). Refer to Appendix E for Construction Estimate Preparation - Minimum Requirement Checklist.

#### 3.1.2 Contents

All cost estimates shall contain the following:

- introduction narrative complete with an outline description of the cost estimate basis;
- description of information obtained and used in the cost estimate including the date received;
- listing of notable inclusions;
- listing of notable exclusions;
- listing of items/issues carrying significant risk;
- summary of the itemized cost estimate;
- itemized breakdown of cost estimate by elemental analysis for Class B, C, and D; and
- itemized breakdown of costs estimate in both elemental analysis and National Master Specification division format for Class A, including measured quantities, unit rate pricings and amounts for each item of work.

Allowances, if deemed necessary by Consultant, shall contain the following:

- design allowance to cover unforeseen items during design phase;
- escalation allowance for changes in market conditions between the date of the cost estimate and the date tender is called;
- construction allowance to cover unforeseen items during construction; and
- the basis of calculations of the above allowances.

### 3.2 Classes of Cost Estimates for Construction Projects

NRC applies a detailed, four-level classification using the terms Class A, B, C and D. Apply these estimate classifications at the project stages as defined in the project specific RFP. For projects required to be submitted to Treasury Board (TB) for approval: an indicative estimate shall be at least a Class D and a Substantive Estimate shall be at least a Class B.

#### 3.2.1 Class D (Indicative) Estimate

Based upon a comprehensive statement of requirements, an outline of potential solutions and/or functional program, this estimate is to provide an indication of the final project cost that will enable ranking to be made for all the options being considered. This cost estimate shall be prepared in elemental analysis format, such as cost per square metre. The level of accuracy of a Class D cost estimate shall be such that no more than a 30% design allowance is required.

### **3.2.2 Class C Estimate**

Based on schematic/conceptual design and/or comprehensive list of project requirements, this estimate shall be adequately detailed and shall be sufficient for making the correct investment decision. This cost estimate shall be based on measured quantities of all items of work and prepared in elemental analysis format. The level of accuracy of a Class C cost estimate shall be such that no more than a 20% design allowance is required.

### **3.2.3 Class B (Substantive) Estimate**

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

This cost estimate shall be based on measured quantities of all items of work and prepared in elemental analysis format. The level of accuracy of a Class B cost estimate shall be such that no more than a 15% design allowance is required.

### **3.2.4 Class A (Pre-Tender) Estimate**

Based on completed construction drawings and specifications prepared prior to calling competitive tenders, this estimate shall be sufficient to allow a detailed reconciliation and/or negotiation with any contractor's tender submission. This cost estimate shall be based on fully measured quantities of all items of work and prepared in both elemental analysis and Trade division format as per MasterFormat™. The level of accuracy of a Class A cost estimate shall be such that no more than a 10% design allowance is required.

## 4 Project Schedules

### 4.1 Schedule Format

Project schedules shall be submitted in the .mpp file extension (compatible with MS Project). The schedule shall include:

- major and minor milestones;
- activities representing discrete elements of work assigned to one person which:
  - are named using verb-noun combination (i.e. Review Design Development Report);
  - contain realistic durations in days;
- project logic linking activities with appropriate relationships finish-start (FS), finish-finish (FF), start-start (SS); and
- identification of the critical path activities.

### 4.2 Progress Reporting

The progress report shall detail the progress of each activity up to the date of the report. It shall also include any logic changes made, both historic and planned; projections of progress and completion; as well as the actual start and finish dates of all activities being monitored.

The contents of each progress report will vary depending on the requirements at each project phase. A progress report should include:

- an executive summary;
- a narrative report;
- a variance report;
- a criticality report;
- an exception report (as required); and
- the detailed project schedule (network diagram or bar charts).

#### 4.2.1 Executive Summary

The executive summary should provide a synopsis of narrative, variance, and exception report and shall not exceed one page.

#### 4.2.2 Narrative Report

The narrative shall detail 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 Detailed Schedule, and Critical Paths.

### 4.2.3 Variance Report

The variance report, with supporting schedule documentation, should detail the work performed to date and compare work progress to work planned. It should summarize the progress to date and explain all causes of deviations and delays and the required actions to resolve delays and problems with respect to the detailed schedule and critical paths.

### 4.2.4 Exception Report

The exception report shall be provided when unforeseen or critical issues arise. The Consultant shall advise the Departmental Representative and submit the details and proposed solutions in the form of an exception report. The report shall include sufficient description and detail to clearly identify:

- scope changes, including identifying the nature, reason, and total impact of all identified and potential project scope changes affecting the project;
- delays and accelerations, including identifying the nature, reason, and total impact of all identified and potential duration variations; and
- options enabling a return to the project baseline, including Identifying the nature and potential effects of all proposed options for returning the project within the baselined duration.

### 4.2.5 Detailed Project Schedule

A detailed project schedule shall be provided along with a network diagram or bar charts in the following format:

- Paper size: 11X17
- Orientation: Landscape
- Columns: Activity ID, Activity Name, Duration, Activity % Complete, Start, Finish, Total Float
- Footer format: Project Title, Report Type, Print Date, Data Date, Revision Block
- Sorting: Early Start, then Early Finish, then Activity ID based on the WBS.

## APPENDIX A

### Submission of Contract Documents Checklist

## **APPENDIX B**

# **Drawings and Specifications Table of Contents Sample**

# APPENDIX C

## Technical Services Review

# APPENDIX D

## Addenda Template



## **APPENDIX E**

# **Construction Estimate Preparation – Minimum Requirement Checklist**

## APPENDIX F

# Meeting Minutes Sample Template



***NRC-CMRC***

# Engineering & Construction CADD Standards

Real Property Planning and Management

June 2020

Fifth Edition - Revision 2



National Research  
Council Canada

Conseil national de  
recherches Canada

**Canada**

## REVISIONS

This document has been prepared for the sole use of the Engineering & Construction Group within Real Property Planning and Management (RPPM) and Architectural and Engineering Consultants (Consultants) retained to prepare construction documentation. No part of the contents of this manual may be reproduced or transmitted in any form or by any means without permission of the Engineering & Construction Director.

Autodesk, Inc. registers AutoCAD, SoftDesk, and Auto-Architect in the U.S. Patent and Trademark Office and other jurisdictions. All other company names and product names mentioned are the property of their respective owners.

VERSION	DATE	DESCRIPTION
1.0	20 03 1994	Original Issue – First Edition
1.1	20 03 1995	Revised Layering Chapter – Revision 1
1.2	29 03 1995	Revised Plotting Chapter – Revision 2
1.3	05 04 1995	Revised Listing of Printers – Revision 3
1.4	18 04 1995	Revision to Graphics – Revision 4
1.5	17 05 1995	Revision to Typesetting – Revision 5
1.6	09 06 1995	Revised Plotter Pen Settings – Revision 6
1.7	08 08 1995	Revised Plotting Chapter – Revision 7
1.8	01 11 1997	Second Edition Preliminary Draft
1.9	01 03 1998	Second Edition Final Draft
2.0	01 06 1998	Second Edition Issue
3.0	30 09 1999	Third Edition Final Draft
3.1	01 01 2013	Fourth Edition Final Draft
4.0	30 01 2013	Fourth Edition Issue
4.1	15 11 2019	Fifth Edition, Preliminary Draft for Review – CAD Manual and Procedures Converted to Separate Documents
5.0	05 12 2019	Fifth Edition Issue
5.1	02 07 2020	Fifth Edition – Revision 1
5.2	06 12 2020	Fifth Edition – Revision 2

# Table of Contents

1 General Information .....	5
1.1 Purpose .....	5
1.2 Computer and IT Support .....	5
1.2.1 General IT Support.....	5
1.2.2 Software Specific Support.....	5
1.3 Project Organization .....	5
1.3.1 CADD Workstations .....	5
1.3.2 Files Server Storage .....	5
1.3.3 Templates .....	6
1.3.4 Designated CADD Representatives.....	6
1.3.5 Consultant Support .....	6
2 Typical Drawing Specifications .....	7
2.1 General .....	7
2.1.1 Information to be Included .....	7
2.1.2 Titleblocks and Revision Notes.....	7
2.1.3 Drawing Numbers .....	7
2.1.4 Presentation Requirements .....	8
2.1.5 Legends .....	9
2.1.6 Schedules and Tables .....	9
2.1.7 North Arrow .....	9
2.1.8 Drawing Symbols & Details Libraries.....	9
2.1.9 As-Built Drawings.....	9
3 Drawing Layer Conventions .....	10
3.1 General .....	10
3.2 General Discipline .....	11
3.3 Civil Discipline.....	12
3.4 Architectural Discipline .....	17
3.5 Structural Discipline.....	21
3.6 Mechanical Discipline .....	23

3.6.1 Supplemental Mechanical Specific Drawing Notes ..... 25

3.7 Electrical Discipline..... 27

4 Pen & Colour Assignments ..... 28

# 1 General Information

## 1.1 Purpose

This document is intended to provide guidelines for the preparation of construction documentation in a consistent, prescribed manner for all National Research Council Canada (NRC) construction projects.

## 1.2 Computer and IT Support

### 1.2.1 General IT Support

General computer, software and IT support can be obtained by contacting the NRC IT Service Center at (613) 990-0333 or by email at [clientservicecentre@nrc-cnrc.gc.ca](mailto:clientservicecentre@nrc-cnrc.gc.ca).

### 1.2.2 Software Specific Support

For software specific Engineering & Construction questions related to AutoCAD, CostWorks and alike software, please speak with the Engineering Manager.

## 1.3 Project Organization

A consistent system followed by everyone makes file management easier and improves efficiency. The project organization standards outline an organized and safe approach for our multi-disciplinary Engineering & Construction Team to store, save, update and retrieve drawing files. Please refer to (document currently under development) for details related to file management, naming convention and document organizational filing structure.

### 1.3.1 CADD Workstations

The hard-drive contained within the CADD workstations is primarily intended to be used as the device that stores and utilizes locally installed software programs. It should not be used to store data pertaining to work related projects or tasks, as the network back-up software cannot automatically back-up the local hard-drive. Temporary or personal files may be stored on the local hard-drive if the user wishes, an alternate location for these files is the user network home directory.

AutoCAD resides in the directory C:\Program Files\Autodesk\AutoCAD and users shall not copy project data files or other files to this directory.

### 1.3.2 Files Server Storage

The IMSB network consists of many file servers each containing many network volumes (drives). FEU on "imsbm60san1.imsb.nrc.ca\ibp\ASPM\Common\PM is the primary file server used for the storage of files by the Engineering & Construction Group and is usually mapped to the drive letter I:\. To a user, being connected to the file service is like an extension of the PC hard-drive.



**Note:** Throughout this document reference is made to I:\ drive and other network drives. Network drives letters are assigned or mapped for each user depending upon the particular user needs. Network drive letter can be thought of as aliases for the full network location on the Black (NRC Legacy) Network.

### 1.3.3 Templates

AutoCAD templates which include Engineering & Construction standardized layers for architectural, mechanical and electrical disciplines have been created. Each template contains various titleblock layouts which upon selection of a suitable layout for specific projects, all other layouts shall be deleted. These templates are stored in the following network directory:

I:\ASPM\Common\PM\FEU\Engineering Files\ASPM\_AUTOCAD\TEMPLATES

In addition, Engineering & Construction has created discipline specific libraries which include standardized blocks and details relevant to each architectural, mechanical and electrical disciplines respectively. These libraries are located in the following directory:

I:\ASPM\Common\PM\FEU\Engineering Files\ASPM\_AUTOCAD\ASPM-CAD Database

Engineering & Construction titleblocks and discipline specific libraries shall not be modified without approval of Engineering Manager, and associated discipline specific designated CADD representative.

### 1.3.4 Designated CADD Representatives

DISCIPLINE	NAME	CONTACT INFO
Architectural	Justin De Gagné Stephen Hebb	<a href="mailto:Justin.DeGagne@nrc-cnrc.gc.ca">Justin.DeGagne@nrc-cnrc.gc.ca</a> <a href="mailto:Stephen.Hebb@nrc-cnrc.gc.ca">Stephen.Hebb@nrc-cnrc.gc.ca</a>
Mechanical	John Goodwin	<a href="mailto:John.Goodwin@nrc-cnrc.gc.ca">John.Goodwin@nrc-cnrc.gc.ca</a>
Electrical	Frédéric Giroux	<a href="mailto:Frederic.Giroux@nrc-cnrc.gc.ca">Frederic.Giroux@nrc-cnrc.gc.ca</a>

### 1.3.5 Consultant Support

As required, and when requested, all NRC standard Titleblocks and CTB files will be provided to Consultants to ensure all drawings are prepared in accordance with the Engineering & Construction CADD Standards.

Questions or inquiries related to the Engineering & Construction CADD Standards should be directed to the Engineering Manager.

## 2 Typical Drawing Specifications

### 2.1 General

Drawings shall be prepared in accordance with this Engineering & Construction CADD Standard and the Canadian Standards Association CSA B78.5-93 (R2002): Computer-Aided Design Drafting (Buildings). Drawing shall also meet the following criteria:

- dimensions shall be in metric only (no dual dimensioning); and
- no trade names present on any drawings.

#### 2.1.1 Information to be Included

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

#### 2.1.2 Titleblocks and Revision Notes

In order to maintain continuity in our drawings, standardized discipline specific titleblocks have been created, and are stored in the following directory for reference and use:

I:\ASPM\Common\PM\FEU\Engineering Files\ASPM\_AUTOCAD\TEMPLATES

Engineering & Construction titleblocks shall be used for all drawings and sketches, including addenda.

The percent of drawing completion should be included in the revision notes. Revision notes shall be input during design development, but cleared for TENDER drawing (100% complete).

#### 2.1.3 Drawing Numbers

Drawings shall be numbered in sets according to the type of drawing and discipline involved as indicated in the following table.

DISCIPLINE	DRAWING
General (Site Plan)	XXXX-G01, XXXX-G01F, XXXX-G02, XXXX-G02F, etc.
Civil	XXXX-C01, XXXX-C01F, XXXX-C02, XXXX-C02F, etc.
Architectural	XXXX-A01, XXXX-A01F, XXXX-A02, XXXX-A02F, etc.
Structural	XXXX-S01, XXXX-S01F, XXXX-S02, XXXX-S02F, etc.
Mechanical	XXXX-M01, XXXX-M01F, XXXX-M02, XXXX-M02F, etc.
Electrical	XXXX-E01, XXXX-E01F, XXXX-E02, XXXX-E02F, etc.

**Note:** XXXX denotes NRC project number, and XXXX-G01F denotes French drawing

### 2.1.4 Presentation Requirements

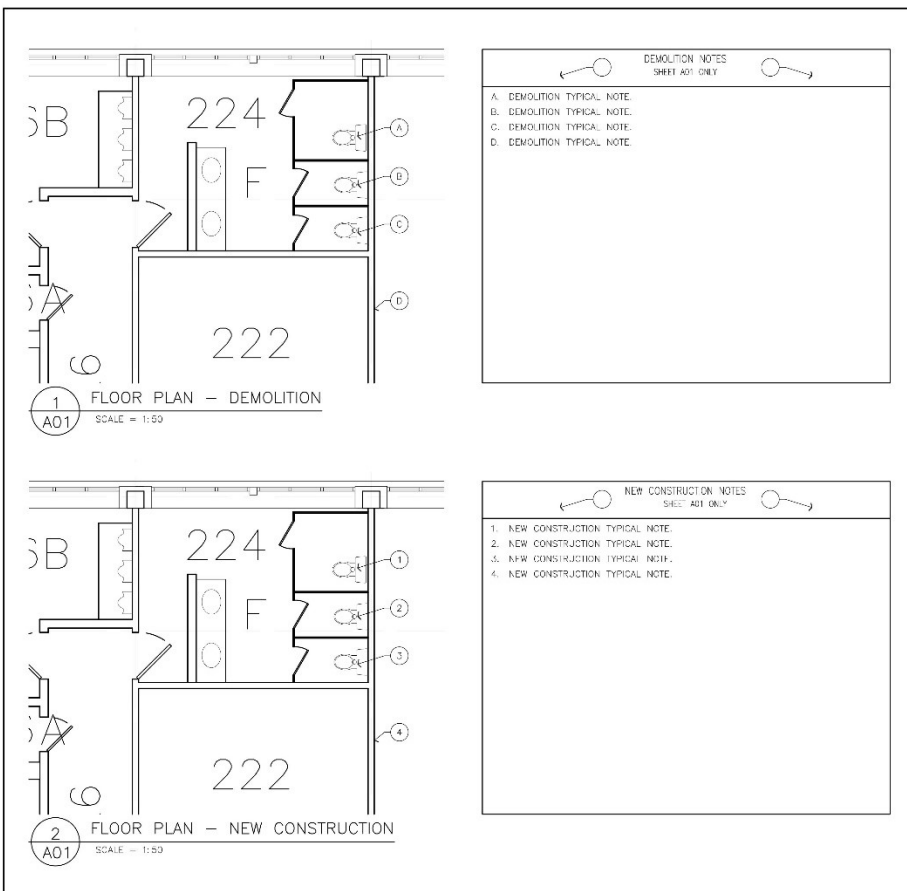
Present the drawings in sets, providing the applicable site plan, civil, architectural, structural, mechanical, and electrical drawings in that order. All drawings should be of uniform standard size.

Translation of drawings will be required for all public tenders, as such, for consistency the following general format guidelines shall be adhered to:

- Refrain from incorporating written notes in model space, unless absolutely necessary. Use note bubbles on paper space to accommodate this practice.
- Translation of English notes to French requires in general 30 – 40% more space, therefore leave adequate room on drawings to ensure English and French drawing layouts remain identical.
- Drawing notes shall be numbered and/or lettered in paper space and consolidated in one general area of the drawing.

Refer to Fig. 1 below for visual representation of drawing presentation requirements.

**Fig. 1 – General Layout Requirements**



### **2.1.5 Legends**

Provide a legend of symbols, abbreviations, references, etc., on the front sheet of each set of drawings (discipline specific), or in the case of large sets of drawings, provided the legend immediately after the title sheet and index sheets.

### **2.1.6 Schedules and Tables**

Where schedules or tables occupy entire sheets, locate them at the back of each set of drawings for convenient reference.

### **2.1.7 North Arrow**

Include a north arrow on all plans. 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.

### **2.1.8 Drawing Symbols & Details Libraries**

In order to maintain continuity in our drawings, standardized discipline specific libraries for both symbols and standard details have been created to represent common drawing elements, and are stored in the following directory for reference and use:

I:\ASPM\Common\PM\FEU\Engineering Files\ASPM\_AUTOCAD\ASPM-CAD Database

When symbols are not provided in the Engineering & Construction standardized discipline specific libraries, follow generally accepted drawing conventions, understandable by the construction trades for creation of appropriate drawing symbols. Seek approval of Engineering Manager and designated discipline CADD representative for inclusion and addition of new symbols to the libraries.

### **2.1.9 As-Built Drawings**

As-built drawings are official record drawings and shall represent as constructed conditions including location and size of equipment, devices, plumbing lines, mechanical and electrical equipment, structural elements etc. As-built drawings shall be updated in CADD and provided to NRC upon project completion. Handwritten notes are not acceptable.

## 3 Drawing Layer Conventions

### 3.1 General

Layer conventions are an important aspect of CADD standardization and critical to the sharing of electronic data. Typically, layers are used to group information by function, and to enforce linetype, colour and other standards.

Three (3) specific elements define a layer: name, colour, and linetype. When a CADD user draws an element on a particular layer, the element is shown in the specific colour and linetype defined for the current layer, provided that the colour and linetype settings are set to BYLAYER.

Engineering & Construction has adopted a modified version of the PSPC National Computer Aided Design and Drafting Standard 5.0 developed by the Architectural & Engineering Services Group. For more information on this system please refer to the PSPC National Computer Aided Design and Drafting Standard 5.0.

In general, all layer names for specific disciplines shall already be loaded in the drawing template files used to start a new drawing. Refer to section 1.3.3 of this document for additional details. However, should the need arise to create a new layer, please refer to the Annex A-CADD Layers in the PSPC National Computer Aided Design and Drafting Standard 5.0 for details on how to name the new layer(s).

## 3.2 General Discipline

The following table is for general use on drawing(s). The colours and linetypes have been set-up to facilitate easy viewing and plotting of the information.

**Note:** add extensions below as required

- N New Work
- X Demolition

Layer Name	Color	Linetype	Description
<b>GENERAL</b>			
G-GL-CAL	red	Continuous	Callout blocks
G-GL-SYM	red	Continuous	Symbols, key plan, north arrow, bar scale
G-GL-TXT	red	Continuous	Text
G-GL-TXT-E	red	Continuous	English text
G-GL-TXT-F	red	Continuous	French text
G-GL-XRE	red	Continuous	External reference
<b>LEGEND INFORMATION</b>			
G-LG-LIN	green	Continuous	Symbol legend line work
G-LG-TXT	red	Continuous	Symbol legend text
<b>TITLE BLOCK</b>			
G-TL-ATT	red	Continuous	Attributes for title block
G-TL-LAY	white	Continuous	Paper space metaview boundaries
G-TL-LIN	yellow	Continuous	Line work for title block
G-TL-LOG	green	Continuous	Logos
G-TL-RME	white	Continuous	Title block Read Me layer
G-TL-TIL	white	Continuous	Title Block Insertion Layer
G-TL-TXT	white	Continuous	Text for title block

### 3.3 Civil Discipline

The following table is for use on civil drawing(s). The colours and linetypes have been set-up to facilitate easy viewing and plotting of the information.

**Note:** add extensions below as required

- N New Work
- X Demolition

Layer Name	Colour	Linetype	Description
<b>BOREHOLE</b>			
C-BH-IDN	190	Continuous	Boreholes identification number
C-BH-LOG	8	Continuous	Borehole logs and data
C-BH-MON	190	Continuous	Geotechnical monitoring well
C-BH-SMP	190	Continuous	Soil sample location
C-BH-STP	8	Continuous	Stratigraphic profile
C-EN-PLM	yellow	Continuous	Plume outline
C-EN-SIT	yellow	Continuous	Boundary limits of contaminated site
C-EN-TNK	yellow	Continuous	Holding tanks for environmental issues
C-EN-WEL	yellow	Continuous	Environmental monitoring wells
<b>GASES AND FUELS</b>			
C-GF-DPI	161	Continuous	Diesel fuel pipelines
C-GF-DSE	161	Continuous	Diesel fuel valves, manholes, meters, storage
C-GF-NPI	161	Continuous	Natural gas pipelines
C-GF-NSE	161	Continuous	Natural gas valves, manholes, meters, storage
C-GF-OPI	161	Continuous	Oil pipelines
C-GF-OSE	161	Continuous	Oil valves, manholes, meters, storage
C-GF-PPI	161	Continuous	Propane pipelines
C-GF-PSE	161	Continuous	Propane valves, manholes, meters, storage
C-GF-TXT	161	Continuous	Gas and fuels text/description
<b>GENERAL</b>			
C-GL-PIC	magenta	Continuous	Inserted pictures
<b>HYDROLOGY</b>			
C-HY-CAT	8	Continuous	Catchment area
C-HY-DRA	8	Continuous	Drainage area
C-HY-FLO	8	Continuous	Flow/discharge
C-HY-ICE	8	Continuous	Ice thickness
<b>LANDSCAPE</b>			
C-LD-ART	8	Continuous	Artwork, Special Features
C-LD-FLG	8	Continuous	Flagpoles
C-LD-FTN	8	Continuous	Fountains, pools

C-LD-FUR	8	Continuous	Site furnishings, benches, garbage cans
C-LD-IRP	8	Continuous	Irrigation System Piping
C-LD-IRR	8	Continuous	Irrigation Heads, Controls
C-LD-LWN	8	Continuous	Lawn area
C-LD-PLT	8	Continuous	Plant materials
C-LD-SPO	8	Continuous	Sport facilities, goal nets, shooting targets
C-LD-TER	8	Continuous	Terraces, courtyards, patios
C-LD-TXT	white	Continuous	Descriptive information text
<b>PROFILE DATA</b>			
C-PR-HOR	white	Continuous	Horizontal profiles
C-PR-VER	white	Continuous	Vertical profiles
<b>ROADS</b>			
C-RO-ACR	white	Continuous	Fire department access routes
C-RO-ALI	white	Continuous	Alignment
C-RO-BRG	white	Continuous	Bridges, overpasses
C-RO-CLI	white	CENTER	Road centreline
C-RO-CON	8	Continuous	Construction Staging
C-RO-CRB	15	Continuous	Curbs
C-RO-GRL	green	Continuous	Guide/guard rails, median dividers, bollards
C-RO-GUT	15	Continuous	Gutter line
C-RO-HWY	cyan	Continuous	Highway plan
C-RO-MRK	8	Continuous	Markings and road striping
C-RO-MSH	red	Continuous	Mass Haul Diagram
C-RO-RMP	white	Continuous	Ramps, on-ramps, loading docks
C-RO-ROD	white	Continuous	Drivable road limits (asphalt) road, lots
C-RO-ROD-APP	8	Continuous	Drivable road limits approximate location
C-RO-ROD-CON	white	Continuous	Drivable road limits (concrete) road, lots
C-RO-ROD-GRV	white	Continuous	Drivable road limits (gravel), shoulder of road
C-RO-SHO	yellow	Continuous	Edge of Shoulder
C-RO-STG	8	Continuous	Staging Layout Plans
C-RO-STR	white	Continuous	Bridge abutments, piers, supports
C-RO-TUN	white	Continuous	Road tunnels, underpasses
C-RO-TXT	white	Continuous	Road description/information text
<b>RAILWAY</b>			
C-RW-ALI	white	Continuous	Alignment
C-RW-BRG	white	Continuous	Bridges
C-RW-CLI	white	Continuous	Rail centerline
C-RW-RAI	white	Continuous	Railway lines, switches
C-RW-RMP	white	Continuous	Ramps
C-RW-STR	white	Continuous	Bridge abutments, piers, trestles, supports



C-RW-TUN	white	Continuous	Tunnels
<b>SANITARY SEWERS</b>			
C-SA-ABN	white	Continuous	Abandoned sanitary sewer line
C-SA-CMB-MLI	white	Continuous	Combined main sewer line
C-SA-CMB-SLI	white	Continuous	Combined service sewer line
C-SA-DRA	white	Continuous	Drainage catch areas
C-SA-IOT	white	Continuous	Sanitary inlet outlet structure
C-SA-JUN	white	Continuous	Junction symbols
C-SA-JUN-IDN	8	Continuous	Text description type of junction
C-SA-MAN	white	Continuous	Sewer manholes, pumping stations
C-SA-MAN-IDN	8	Continuous	Text regarding t/g elevation, inverts elevation
C-SA-MLI	white	Continuous	Sanitary main sewer line
C-SA-SEW	white	Continuous	Sanitary sewer
C-SA-SLI	white	Continuous	Sanitary service sewer line
C-SA-TMT	white	Continuous	Sewage treatment areas
C-SA-TXT	white	Continuous	General text; length of sewer, slope, material
<b>SITE FEATURES</b>			
C-SF-ARM	8	Continuous	Erosion control, armourstone, riprap
C-SF-BRG	8	Continuous	Foot bridges
C-SF-CON	8	Continuous	Concrete features, slabs
C-SF-DBR	8	Continuous	Debris, rubble, loose rock and soil
C-SF-FEN	8	Continuous	Fencing
C-SF-GRA	8	Continuous	Grading, ditches, berms, dykes
C-SF-MAR	131	Continuous	Marshes, wetlands
C-SF-PIT	8	Continuous	Borrow Pit
C-SF-RWL	8	Continuous	Retaining walls
C-SF-STR	white	Continuous	Stairs not attached to buildings
C-SF-SWK	8	Continuous	Sidewalks
C-SF-TOS	8	Continuous	Top of Slope
C-SF-TRE	green	Continuous	Trees, tree lines
C-SF-TRL	8	HIDDEN	Trails, footpaths
C-SF-TUN	8	Continuous	Utility /Pedestrian service tunnels
C-SF-TXT	8	Continuous	Site feature description text
C-SF-WTR	131	Continuous	Watercourses, shorelines
<b>SIGNS AND GUIDE POSTS</b>			
C-SI-GDP	red	Continuous	Guideposts
C-SI-SGL	white	Continuous	Sign layouts and details
C-SI-SGN	8	Continuous	Signs
C-SI-TXT	8	Continuous	Signage text

<b>STORM DRAINAGE AND SYSTEMS</b>			
C-SM-ABN	green	Continuous	Abandoned storm sewer line
C-SM-CUL	green	HIDDEN	Culverts
C-SM-DCL	green	CENTER	Ditch centre line
C-SM-DRA	green	Continuous	Drainage catchment area, storm water ponds
C-SM-IOT	green	Continuous	Storm inlet outlet structure
C-SM-JUN	green	Continuous	Junction symbols
C-SM-JUN-IDN	8	Continuous	Junction description text
C-SM-MAN	green	Continuous	Catch basins, manholes, pumping stations
C-SM-MAN-IDN	white	Continuous	Manhole description text; elevation, direction
C-SM-MLI	green	Continuous	Storm main sewer line
C-SM-MNG	white	Continuous	Storm water management pond
C-SM-SEW	green	Continuous	Storm sewer
C-SM-SLI	green	Continuous	Storm service sewer line
C-SM-SUB	green	Continuous	Sub drains
C-SM-TXT	green	Continuous	Text describing length of sewer, slopes, material
<b>SURVEY CONTROL, NON LEGAL</b>			
C-SV-BEN	white	Continuous	Local bench mark
C-SV-BND	white	Continuous	Non-legal boundaries
C-SV-CHN	white	Continuous	Chainage
C-SV-CTL	white	Continuous	Control point
C-SV-GRD	white	Continuous	Survey grid
C-SV-HOR	white	Continuous	Horizontal alignment
C-SV-HPT	white	Continuous	Horizontal control point
C-SV-LIM	white	Continuous	Limits of contract, non-legal
C-SV-LIN	white	Continuous	Survey feature connectivity line work
C-SV-MON	white	Continuous	Found legal monument
C-SV-PAR	white	Continuous	Parcel line work
C-SV-PAR-TXT	white	Continuous	Parcel text
C-SV-PNT	white	Continuous	Survey point
C-SV-SEL	white	Continuous	Super elevation
C-SV-SET	white	Continuous	Setback
C-SV-STA-EQU	white	Continuous	Station equation labels
C-SV-STA-LBL	white	Continuous	Station labels
C-SV-STA-PTS	white	Continuous	Station points
C-SV-TRA	white	Continuous	Traverse line work
C-SV-VER	white	Continuous	Vertical alignment
C-SV-VPT	white	Continuous	Vertical control point

<b>TOPOGRAPHICAL INFORMATION</b>			
C-TP-BNK	8	Continuous	Embankments, cliffs
C-TP-MAJ	251	Continuous	Major contours
C-TP-MIN	254	Continuous	Minor contours
C-TP-SPT	8	Continuous	Spot elevation
C-TP-SRF	37	Continuous	Surface model line work
C-TP-SRF-BRK	8	Continuous	Surface model break lines
C-TP-SRF-TXT	white	Continuous	Surface calculation text
<b>WATER AND FIRE</b>			
C-WM-FHY	cyan	Continuous	Fire hydrants
C-WM-FRL	cyan	Continuous	Fire lines
C-WM-IRP	cyan	Continuous	Irrigation system piping
C-WM-IRR	cyan	Continuous	Irrigation heads, controls, valves
C-WM-JUN	cyan	Continuous	Junction symbols
C-WM-JUN-IDN	8	Continuous	Text describing type of junction
C-WM-MAN	cyan	Continuous	Manholes, pumping stations, storage, valves
C-WM-MAN-IDN	8	Continuous	Text describing t/g elevation, t/pipe elevation
C-WM-MLI	cyan	Continuous	Water main
C-WM-RAW	cyan	Continuous	Raw water lines
C-WM-SLI	cyan	Continuous	Water service line
C-WM-TXT	cyan	Continuous	Water main descriptive text
C-WM-WTR	cyan	Continuous	Water wells

### 3.4 Architectural Discipline

The following table is for use on architectural drawing(s). The colours and linetypes have been set-up to facilitate easy viewing and plotting of the information.

**Note:** add extensions below as required

- N New Work
- X Demolition

Layer Name	Color	Linetype	Description
0 NON PLOT	white	Continuous	Non Plot Information
0 VIEWPORT	white	Continuous	Viewports
<b>CIRCULATION</b>			
A-CI-CVY	yellow	Continuous	Horizontal conveyors, moving sidewalks
A-CI-ELE	yellow	Continuous	Elevators
A-CI-ELE-BRF	yellow	Continuous	Lift platforms for barrier-free access
A-CI-RMP	yellow	Continuous	Ramps
A-CI-RMP-BRF	yellow	Continuous	Barrier-free ramps
A-CI-STR	yellow	Continuous	Stairs, stair wells and ladders
A-CI-STR-ESC	yellow	Continuous	Escalators
<b>CEILINGS</b>			
A-CL-BKH	red	Continuous	Bulkheads
A-CL-FIN	green	Continuous	Finishes
A-CL-GRD	11	Continuous	Physical ceiling grid
A-CL-GRD-SCD	11	Continuous	Planning grid lines
A-CL-OPN	blue	Continuous	Openings, penetrations, skylights
<b>DOORS</b>			
A-DR-EXT	red	Continuous	Exterior doors, jambs, casework, swing
A-DR-EXT-IDN	green	Continuous	Exterior doors identification number
A-DR-INT	red	Continuous	Interior doors, jambs, casework, swing
A-DR-INT-IDN	green	Continuous	Interior doors identification number
A-DR-INT-PAR	11	Continuous	Interior doors in a demountable wall
A-DT-DIM	yellow	Continuous	Detail Dimensions - Dimensions
A-DT-HAT	yellow	Continuous	Detail Hatching
A-DT-TXT	yellow	Continuous	Text - Annotations,

<b>EMERGENCY</b>			
A-EM-COR-HAT	11	Continuous	Corridor hatching
A-EM-COR-OLN	yellow	Continuous	Corridor outline
A-EM-OLN	red	Continuous	General outline
A-EM-OLN-HAT	11	Continuous	General hatching
A-EM-STR-HAT	11	Continuous	Staircase hatching
A-EM-STR-OLN	red	Continuous	Staircase outline
A-EM-TXT	red	Continuous	Text
A-EM-WAL-HAT	11	Continuous	Wall hatching
A-EM-WAL-OLN	red	Continuous	Wall outline
<b>ELEVATIONS</b>			
A-EV-DIM	yellow	Continuous	Elevation dimensions
A-EV-HAT	8	Continuous	Elevation hatch
A-EV-LIN			Elevation line work
A-EV-OLN			Elevation outline
A-EV-TXT	yellow	Continuous	Elevations text, annotations
<b>EQUIPMENT</b>			
A-EQ-EXT	yellow	Continuous	Equipment exterior
A-EQ-DIM	yellow	Continuous	Equipment dimension
A-EQ-HAT		Continuous	Equipment hatching
A-EQ-INT	red	Continuous	Equipment Interior
A-EQ-TXT	green	Continuous	Equipment text
<b>FLOORS</b>			
A-FL-CTP	red	Continuous	Counter tops
A-FL-CTP-PAR	red	Continuous	Counter tops on partitions
A-FL-DIM	green	Continuous	Floor dimensions
A-FL-FIN	red	Continuous	Floor finishes
A-FL-FIN-IDN	red	Continuous	Floor finishes description
A-FL-FUR	yellow	Continuous	Furniture
A-FL-LEV	red	Continuous	Floor level changes, ramps, truck well
A-FL-MIL	yellow	Continuous	Architectural specialties, casework and millwork
A-FL-OPN	8	Continuous	Openings, floor hatches
A-FL-OVH	8	HIDDEN	Overhead items, skylights, overhangs, soffits
A-FL-RAS	8	Continuous	Raised floors
A-FL-TXT	green		Floor text

<b>GENERAL</b>			
A-GL-ATT	white	Continuous	Attributes
A-GL-CLN	white	Continuous	Under construction lines, temporary aids
A-GL-DIM	white	Continuous	General architectural dimensions
A-GL-IDN	white	Continuous	Identification, elevation point
A-GL-RME	white	Continuous	Read-me general drawing info.
A-GL-TXT	white	Continuous	General text (street names)
<b>GRIDS</b>			
A-GR-EXT	252	DASHDOT	Grid lines exterior
A-GR-INT	252	DASHDOT	Grid lines interior
<b>PLAN INFORMATION</b>			
A-PL-OLN	8	Continuous	Open to below plan information outline
<b>ROOFS</b>			
A-RF-OLN	magenta	Continuous	Roofs edge and features
A-RF-OPN	8	Continuous	Roof openings for fans, stacks and ducts
A-RF-OVH	8	HIDDEN	Overhead items, roof above, canopies, soffits
A-RF-WLK	8	Continuous	Roof board walks, cat walks
<b>ROOMS</b>			
A-RM-IDN1	white	CONTINUOUS	Room names - existing
A-RM-IDN2	white	CONTINUOUS	Room names - existing
A-RM-IDN-N	yellow	CONTINUOUS	Room names - new
A-RM-NUM	white	CONTINUOUS	Room numbers - existing
A-RM-NUM-N	yellow	CONTINUOUS	Room numbers
<b>SCREENS</b>			
A-SY-SCR	yellow	CONTINUOUS	Screens
A-SY-SCR-N	yellow	CONTINUOUS	Screens - new
A-SY-SUR	yellow	CONTINUOUS	Work surfaces
A-SY-SUR-N	yellow	CONTINUOUS	Work surfaces - new
<b>SECTIONS</b>			
A-ST-DIM	yellow	Continuous	Section dimensions
A-ST-HAT	8	Continuous	Section hatch
A-ST-TXT	yellow	Continuous	Section text, annotations

<b>WINDOWS</b>			
A-WD-EXT	green	Continuous	Exterior window panes and frames
A-WD-INT	green	Continuous	Interior window panes and frames
A-WD-INT-PAR	green	Continuous	Window headers in a demountable wall
A-WD-OVH	8	HIDDEN	Overhead window/skylight
A-WD-SIL	8	Continuous	Window sill
<b>WALLS</b>			
A-WL-ACC	red	Continuous	Architectural or protection elements, guards
A-WL-ACC-BRF	yellow	Continuous	Barrier - free accessories (grab bars, etc.)
A-WL-COL	red	Continuous	Columns
A-WL-EXT	cyan	Continuous	Exterior walls
A-WL-EXT-HAT	8	Continuous	Exterior walls hatch
A-WL-FIN	8	Continuous	Wall finishes
A-WL-HED	8	Continuous	Door and window headers
A-WL-HED-PAR	8	Continuous	Door and window headers on partition
A-WL-INT	green	Continuous	Interior walls
A-WL-INT-LOW	green	Continuous	Interior walls - low walls
A-WL-INT-LOW-PAR	green	Continuous	Interior partition - low walls
A-WL-INT-PAR	green	Continuous	Interior demountable walls
A-WL-OLN	8	Continuous	Wall outlines, building footprints
A-WL-WRM	8	Continuous	Washroom partitions
A-WL-INT-X	yellow	HIDDEN2	Interior walls - Demolition
A-WL-EXT-X	yellow	HIDDEN2	Exterior walls - Demolition

### 3.5 Structural Discipline

The following table is for use on structural drawing(s). The colours and linetypes have been set-up to facilitate easy viewing and plotting of the information.

**Note:** add extensions below as required

- N New Work
- X Demolition

Layer Name	Color	Linetype	Description
<b>CEILINGS</b>			
S-CL-BEM	8	Continuous	Ceiling beams
<b>FLOORS</b>			
S-FL-BEM	8	Continuous	Floor beams
S-FL-BRC	white	Continuous	Bracing
S-FL-DEK	white	Continuous	Decking, waffle
S-FL-FRM	white	Continuous	Framing
S-FL-JNT	8	Continuous	Joints, expansion, construction
S-FL-JST	white	Continuous	Joists
S-FL-OLN	white	Continuous	Floor outline
S-FL-OPN	8	Continuous	Floor openings
S-FL-SLB	8	Continuous	Floor slab
S-FL-STR	white	Continuous	Stairs
<b>FOUNDATION</b>			
S-FN-FIL	white	Continuous	Backfill, soil-line
S-FN-FTG	white	Continuous	Footings
S-FN-OLN	white	Continuous	Foundation outline
S-FN-PIL	white	Continuous	Piles, caissons, piers
<b>STRUCTURAL GRIDS</b>			
S-GR-EXT	8	CENTER	Structural grid lines outside building
S-GR-INT	8	CENTER	Structural grid lines inside building
<b>ROOFS</b>			
S-RF-BEM	8	HIDDEN	Beams
S-RF-BRC	white	Continuous	Bracing
S-RF-DEK	white	Continuous	Decking, waffle
S-RF-FRM	white	Continuous	Framing
S-RF-JNT	white	Continuous	Joints, expansion, construction
S-RF-JST	white	Continuous	Joists
S-RF-OLN	white	Continuous	Roof outline
S-RF-OPN	white	Continuous	Roof openings
S-RF-SLB	8	Continuous	Roof slab



<b>WALLS AND COLUMNS</b>			
S-WL-BRC	8	Continuous	Cross bracing
S-WL-BRG	yellow	Continuous	Bearing walls
S-WL-COL	yellow	Continuous	Columns
S-WL-JNT	8	Continuous	Joints, expansion, construction
S-WL-OPN	white	Continuous	Wall openings
S-WL-RWL	yellow	Continuous	Retaining walls

### 3.6 Mechanical Discipline

The following table is for use on mechanical drawing(s). The colours and linetypes have been set-up to facilitate easy viewing and plotting of the information.

**Note:** add extensions below as required

- N New Work
- X Demolition

Layer Name	Colour	Linetype	Description
H-CS-AIR	136	Continuous	Control air piping
H-CS-DAM	136	Continuous	Damper actuators, controllers
H-CS-EQP	136	Continuous	Energy management systems and other control equipment
H-CS-THR	136	Continuous	Thermostats, humidistat, sensors
H-CS-VAV	136	Continuous	Valve actuators, controllers
H-DD-COA	46	Continuous	Combustion air ductwork
H-DD-EXH	46	Continuous	Exhaust air ductwork
H-DD-FLU	16	Continuous	Flue, vent, breaching
H-DD-INS	251	Continuous	Duct insulation, acoustical lining
H-DD-OUT	116	Continuous	Outside air ductwork
H-DD-REL	16	Continuous	Relief air ductwork
H-DD-RET	146	Continuous	Return ductwork
H-DD-SUP	216	Continuous	Supply ductwork
H-DE-BYP	216	Continuous	By-pass box
H-DE-EXH	46	Continuous	Exhaust grilles
H-DE-FAN	136	Continuous	Fans, dampers, coils, filters and other equipment
H-DE-OUT	116	Continuous	Outside air grilles
H-DE-RET	146	Continuous	Return grilles
H-DE-SUP	216	Continuous	Supply diffusers, grills, vents
H-DE-VAV	136	Continuous	Variable air volume boxes
H-DT-DIM	yellow	Continuous	Detail Dimensions - Dimensions
H-DT-HAT	251	Continuous	Detail Hatching - Hatching - Insulation, Wood Grain, etc.
H-DT-TXT	yellow	Continuous	Text - Annotations, Title, Graphic Scale, etc.
H-EQ-ACE	136	Continuous	Air conditioning equipment
H-EQ-CMA	96	Continuous	Compressed air equipment
H-EQ-CNV	176	Continuous	Convectors
H-EQ-FEQ	176	Continuous	Fuel equipment
H-EQ-HYD	46	Continuous	Hydronic equipment

H-EQ-REF	106	Continuous	Refrigerant equipment
H-EQ-STM	66	Continuous	Steam equipment
H-EQ-WPM	86	Continuous	Domestic water tanks, pumps, water softeners
H-FD-CEX	16	Continuous	Chemical extinguishing piping
H-FD-FEX	16	Continuous	Foamed extinguishing piping
H-FD-SPP	16	Continuous	Sprinkler piping
H-FD-STP	16	Continuous	Standpipe piping
H-FE-CAB	16	Continuous	Fire hose cabinet
H-FE-CEX	16	Continuous	Chemical extinguishing equipment
H-FE-EPE	16	Continuous	Explosion-proof equipment
H-FE-EXG	16	Continuous	Fire extinguisher
H-FE-FDP	16	Continuous	Fire dampers
H-FE-FEX	16	Continuous	Foamed extinguishing equipment
H-FE-FHY	16	Continuous	Building fire hydrants
H-FE-FIT	16	Continuous	Sprinklers
H-FE-SMC	16	Continuous	Smoke control equipment
H-FE-SPE	16	Continuous	Sprinkler equipment
H-FE-SPH	254	Continuous	Sprinkler heads
H-FE-SSZ	176	Continuous	Sprinkler system zones
H-FE-STE	16	Continuous	Standpipe equipment
H-FP-MAN	16	Continuous	Manholes, valves, meters and fueling stations
H-FP-SER	16	Continuous	Fuel and process piping
H-FP-TNK	16	Continuous	Fuel tanks
H-PD-CHR	136	DASHED	Chilled water return
H-PD-CHS	136	Continuous	Chilled water supply
H-PD-CMA	96	Continuous	Compressed air
H-PD-CTR	156	DASHED	Cooling tower return
H-PD-CTS	156	Continuous	Cooling tower supply
H-PD-CWR	156	DASHED	Condenser Water Return
H-PD-CWS	156	Continuous	Condenser Water Supply
H-PD-DCW	86	DASHDOT	Domestic cold water
H-PD-DHR	246	DIVIDE	Domestic hot water recirculation
H-PD-DHW	246	DIVIDE	Domestic hot water
H-PD-DRA	246	Continuous	Drainage waste and vents
H-PD-FIT	yellow	Continuous	Fittings
H-PD-FOR	226	DASHED	Fuel oil return
H-PD-FOS	226	Continuous	Fuel oil supply
H-PD-GLR	106	DASHED	Glycol return
H-PD-GLS	106	Continuous	Glycol supply
H-PD-HWR	196	DASHED	Heating water return
H-PD-HWS	196	Continuous	Heating water supply

H-PD-MAN	251	Continuous	Access holes
H-PD-NGA	56	Continuous	Natural gas
H-PD-PGA	56	Continuous	Propane gas
H-PD-RAD	196	Continuous	Radiant heat tubing
H-PD-RCK	196	Continuous	Pipe Rack
H-PD-RFG	106	Continuous	Refrigerant gas
H-PD-RFL	146	Continuous	Refrigerant liquid
H-PD-RHR	196	DASHED	Reheat Return
H-PD-RHS	196	Continuous	Reheat Supply
H-PD-SAN	36	Continuous	Sanitary
H-PD-STC	66	DASHED	Steam condensate
H-PD-STM	66	Continuous	Steam
H-PD-VNT	16	Continuous	Vent Pipe
H-PF-BIB	8	Continuous	Hose bib connectors
H-PF-FDR	8	Continuous	Floor drains
H-PF-FIX	8	Continuous	Fixtures
H-PF-RDR	8	Continuous	Roof drains
H-SM-CSY	144	Continuous	Control system schematics
H-SM-DRS	94	Continuous	Duct riser diagrams
H-SM-DUC	104	Continuous	Duct schematic diagrams
H-SM-PIP	164	Continuous	Piping schematic diagrams
H-SM-PRS	164	Continuous	Piping riser diagrams
H-SM-WST	34	Continuous	Waste schematics

### 3.6.1 Supplemental Mechanical Specific Drawing Notes

Show valves, fittings, meters, regulators and all other piping distribution related items on the layer of the system to which these items are associated.

Show pumps, expansion tanks, storage tanks and other major pieces of equipment on the appropriate piping equipment layer.

Piping distribution layers starting with an “H” (mechanical) are normally meant to show piping distribution inside of buildings. However, it is asked that all services other than those specifically named in the civil layers (i.e. sewers (sanitary, storm or combined), natural gas, and water mains (fire protection and potable water)) be shown as mechanical piping distribution on layers starting with “H”. The mechanical / civil transition point should be as follows:

- Sewers: 3'-0" (1m) outside of building foundation or wall;
- Natural gas: at the outlet of the utility meter; and
- Watermains: at the building isolation or post indicator valve.

Show balancing dampers, fire dampers, extractors, turning vanes and other similar duct mounted equipment on the layer of the ductwork system to which these items are related. On the same basis, duct insulation and acoustical lining shall be shown on the layer of the related ductwork system; however, duct insulation and acoustical lining shall be drawn with a fixed colour of 8 and hidden line type to ensure good plot visibility.

Labels for equipment shall be inserted on the same layer as the equipment.

Show related technical information on the same layer as the item it relates to (i.e. Rating of a portable fire extinguisher (10BC), setting of a thermostat or pressure switch etc.).

When equipment is connected to two (2) or more different services, this item shall be drawn on each respective piping equipment layer. Both entities shall be superimposed so that the plotted result will only show one item (i.e. a steam to hot water heat exchanger shall be drawn both on H-EQ-STM and on H-EQ-HYD).

### 3.7 Electrical Discipline

The following table is for use on electrical drawing(s). The colours and linetypes have been set-up to facilitate easy viewing and plotting of the information.

**Note:** add extensions below as required

- N New Work
- X Demolition

Layer Name	Colour	Linetype	Description
E-DA-EQP	green	Continuous	Data/voice Equipment
E-DA-TXT	yellow	Continuous	Data/voice Text
E-DA-WRG	green	Continuous	Data/voice Wiring
E-FA-EQP	green	Continuous	Fire Alarm Equipment
E-FA-TXT	yellow	Continuous	Fire Alarm Text
E-FA-WRG	green	Continuous	Fire Alarm Wiring
E-L-EQP	green	Continuous	Lighting Equipment
E-L-TXT	yellow	Continuous	Lighting Text
E-L-WRG	green	Continuous	Lighting Wiring
E-P-EQP	green	Continuous	Power Equipment
E-P-TXT	yellow	Continuous	Power Text
E-P-WRG	green	Continuous	Power Wiring
E-P-PAN	green	Continuous	Distribution equipment such as panels, transformers etc.
E-P-PAN-TXT	yellow	Continuous	Distribution text
E-TB-DET	green	Continuous	Details, single lines, etc. that are located in paper space on a drawing
E-TB-TXT	green	Continuous	Paper space detail text
NOTES_NO_PRINT	red	Continuous	For adding notes to record drawings such as project/drawing names etc.

## 4 Pen & Colour Assignments

The following colour and pen width assignments for Engineering & Construction are predefined and contained within Plotting Control Parameter (PCP) files stored as CTB files on the network in the following directory:

I:\ASPM\Common\PM\FEU\Engineering Files\ASPM\_AUTOCAD\Plot Styles

CTB files will be provided to Consultants to ensure all drawings are prepared in accordance with the Engineering & Construction CADD Standards. For reference, PCP details provided below and ASPMFULL corresponds to CTB 1050C Greyscale and ASPMHALF to CTB 8000 Greyscale.

<b>Pen No. 1</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.006" (0.15mm)	100%	8, 17, 27, 37, 47, 57, 67, 77, 87, 97, 107, 117, 127, 137, 147, 157, 167, 177, 187, 197, 207, 217, 227, 237, 247
ASPMHALF.PCP	0.003" (0.08mm)	100%	

<b>Pen No. 2</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.012" (0.30mm)	100%	2, 3, 16, 26, 36, 46, 56, 66, 76, 86, 96, 106, 116, 126, 136, 146, 156, 166, 176, 186, 196, 206, 216, 226, 236, 246
ASPMHALF.PCP	0.006" (0.15mm)	100%	

<b>Pen No. 3</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.018" (0.45mm)	100%	4, 7, 11, 21, 31, 41, 51, 61, 71, 81, 91, 101, 111, 121, 131, 141, 151, 161, 171, 181, 191, 201, 211, 221, 231, 241
ASPMHALF.PCP	0.009" (0.23mm)	100%	

<b>Pen No. 4</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.024" (0.60mm)	100%	1, 6, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100,
ASPMHALF.PCP	0.012" (0.30mm)	100%	110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240

<b>Pen No. 5</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.030" (0.75mm)	100%	5
ASPMHALF.PCP	0.015" (0.38mm)	100%	

<b>Pen No. 100</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.012" (0.30mm)	0% (Invisible)	250
ASPMHALF.PCP	0.006" (0.15mm)	0% (Invisible)	

<b>Pen No. 120</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.012" (0.30mm)	20% (Very light grey)	251
ASPMHALF.PCP	0.006" (0.15mm)	20% (Very light grey)	



<b>Pen No. 140</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.012" (0.30mm)	40% (Light grey)	252
ASPMHALF.PCP	0.006" (0.15mm)	40% (Light grey)	

<b>Pen No. 160</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.012" (0.30mm)	60% (Medium grey)	253
ASPMHALF.PCP	0.006" (0.15mm)	60% (Medium grey)	

<b>Pen No. 180</b>			
<b>PCP File</b>	<b>Width</b>	<b>Density</b>	<b>AutoCAD Colour</b>
ASPMFULL.PCP	0.012" (0.30mm)	80% (Very dark grey)	9, 254
ASPMHALF.PCP	0.006" (0.15mm)	80% (Very dark grey)	



**NRC-CNRC**

# NRC Workplace Furniture, Carpet and Colour Standards

## Real Property Planning Management Branch

May 2022



National Research  
Council Canada

Conseil national de  
recherches Canada

Canada

Enclosed Office work space:

Hard walls, lockable door, and meeting area.

Office allowance will be assigned based on position classification.

Examples: Director, Director General and higher.

As well as all equivalent NRC classifications to these roles

Enclosed office work space footprint (size): 10 m<sup>2</sup> to a maximum of 18.5 m<sup>2</sup>



Standard Features:

- Free standing furniture
- sit/stand desk with modesty panel
- stationary work surface to complete an "L" configuration or back configuration. (as seen in the picture)
- over head hutch (lockable)
- double monitor arms
- personal storage credenza
- consultation area (depending on size of the room small round table with 3 to 4 visitor chairs or larger)
- lockable standard office door

Accessories: (acceptable additions)

- wall mounted TV, white board, smart board or interactive video conference system
- extra storage (PED, secure cabinet, regular lateral filing cabinet)
- personal art work
- door mounted hooks

Finishes:

Wood/laminate in maple for surfaces and fronts,

Silver or gray for legs and supports

Door color – gauntlet gray

With frame color choice (overt green, bee, dynamic blue or verve violet)

Carpet tile in field color with the choice of an accent color insert.

Walls to be eider white (field color) with one accent wall choice.

*\*note: executive offices DG or higher level may choose gauntlet gray as the accent color for their office.*

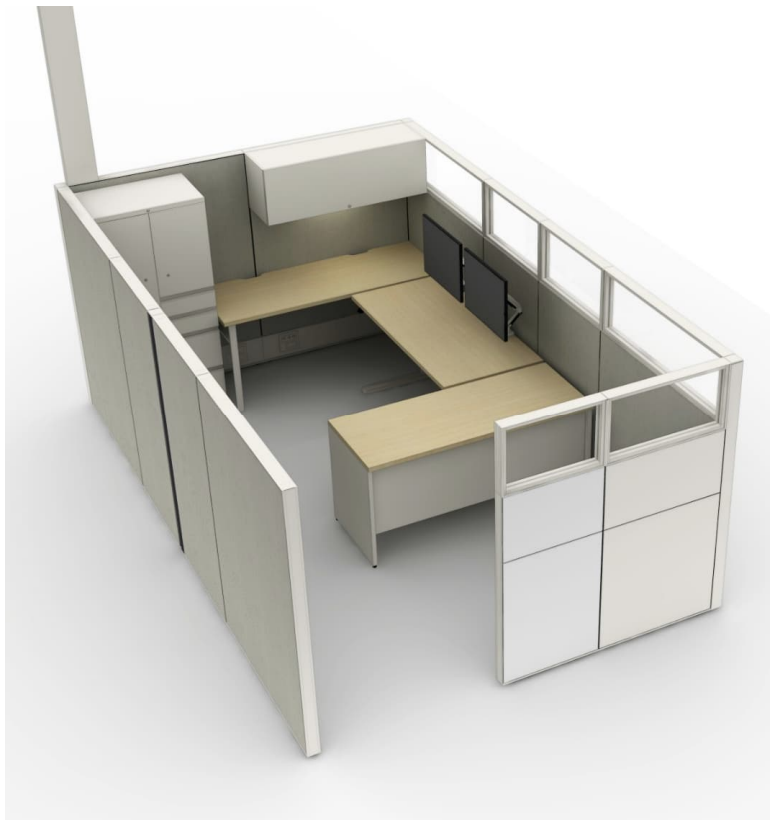
### Supervisor Work space:

Panel/screened work space with consultation area

A unique work area created within NRC's standard to address the research base positions and classifications.

Examples: supervisor, and team lead positions.

As well as all equivalent NRC classifications to these roles



### Standard Features:

- Panel/ screen hung furniture, (*Max. Panel Height 1676mm*)
- sit/stand desk
- stationary work surface to complete an "U" configuration
- double monitor arms
- personal storage locker
- lockable over head storage
- LED task light
- integrated panel tool bar sized to match panel width
- 1-2 visitor chair(s)
- 8" glass topper on all panels - 450mm (18") framed glass stacker.

### Accessories: (acceptable additions)

- extra storage (PED, secure cabinet, regular lateral filing cabinet)

### Finishes:

- Fabric panel/screens with white or gray metal frame
- work surfaces to be gray, or maple laminate
- Silver, gray, white for legs and supports
- visitor chair to be stream line black/gray

*\* note the visitor chair can also be chosen in one of the accent colors to match the Over all color palette of the space.*

Standard Work space:

Panel/screened work space. Assigned to the majority of employees at NRC.



Standard Features:

- Panel/ screen hung furniture, (*Max. Panel Height 1676mm*)  
(shorter panels on the exterior with a higher center spine *Max. Panel Height 1676mm*)
- sit/stand desk
- stationary work surface to complete an "L" configuration
- double monitor arms
- personal storage locker
- open over head shelf storage (lockable on exception)
- LED task light
- integrated panel tool bar sized to match panel width
- ~~8" glass topper on low panels~~ 450mm (18") framed glass stacker.

Accessories: (acceptable additions)

- phone tray, paper trays and office items available for panel tool bar

Finishes:

- Fabric panel/screens with white or gray metal frame
- work surfaces to be maple laminate
- Silver, gray, white for legs and supports

Administrative assistant Work space:

Panel/screened work space. Assigned to support staff in an administrative role



Standard Features:

- Panel/ screen hung furniture (shorter panels on the exterior with a higher center spine)
- sit/stand desk
- stationary work surface to complete an "L" configuration
- Transaction top mounted at front of work station
- double monitor arms
- personal storage locker
- open over head shelf storage (lockable on exception)
- LED task light
- integrated panel tool bar sized to match panel width
- 8" glass topper on low panels

Accessories: (acceptable additions)

- phone tray, paper trays and office items available for panel tool bar

Finishes:

- Fabric panel/screens with white or gray metal frame
- work surfaces to be gray, or maple laminate
- Silver, gray, white for legs and supports

### Hoteling Work space:

Open cluster or line of work surfaces with Panel/screened partitions.

Assigned to students, casual workers, contractors and all employees where the nature of their work only requires them to be in the office for short amounts of time.



### Standard Features:

- Panel/ screen hung furniture
- stationary work surface
- 8" glass topper on dividing panels

### Accessories: (acceptable additions)

- sit/stand desk
- personal storage locker
- small PED storage unit

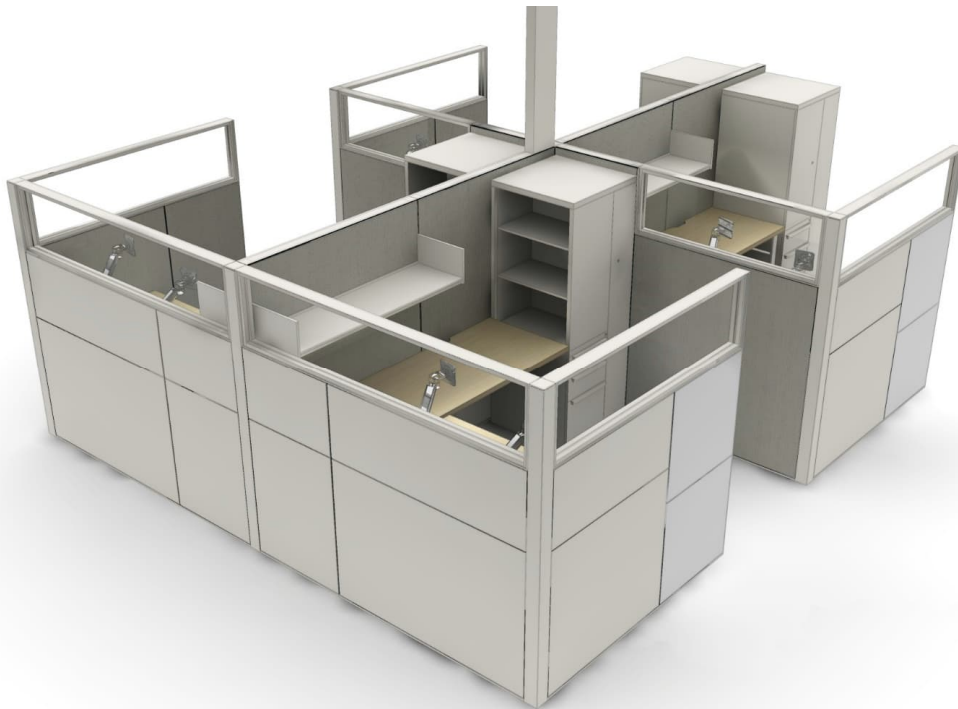
### Finishes:

- Fabric panel/screens with white or gray metal frame
- work surfaces to be gray, or maple laminate
- Silver, gray, white for legs and supports



### Alternate Work space 1 of 2

Panel/screened work space. Assigned to the majority of employees at NRC.



### Features:

- Panel/ screen hung furniture. 450mm (18") framed glass stacker.

(shorter panels on the exterior with a higher center spine)

- sit/stand desk
- stationary work surface to complete an "L" configuration
- double monitor arms
- personal storage locker
- open over head shelf storage (lockable on exception)
- LED task light
- integrated panel tool bar sized to match panel width
- 450mm (18") framed glass stacker.

### Accessories: (acceptable additions)

- phone tray, paper trays and office items available for panel tool bar

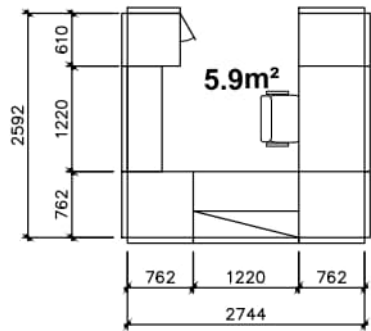
### Finishes:

- Fabric panel/screens with white or gray metal frame
- Painted metal panel/screens with white or gray metal frame along common space or frequent pathways (or as required)
- work surfaces to be maple laminate
- Silver, gray, white for legs and supports

Alternate Work space 2 of 2

Panel/screened work space. Assigned to the majority of employees at NRC.

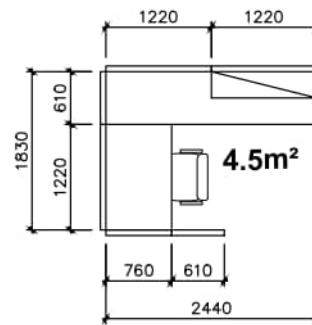




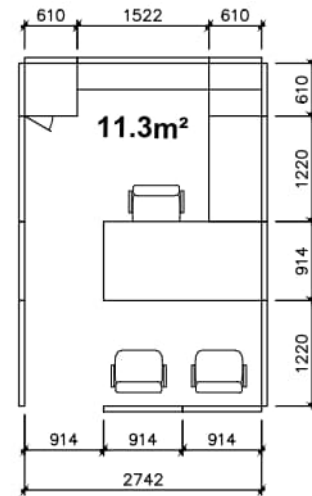
**ASSIGNED  
TECHNICAL  
WORKSTATION**



**UNASSIGNED  
TECHNICAL  
WORKSTATION**



**UNASSIGNED  
NON TECHNICAL  
WORKSTATION**



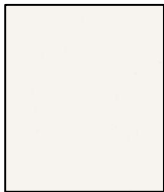
**ASSIGNED  
MANGER  
WORKSTATION**

# Finishes within NRC Workspace Standards

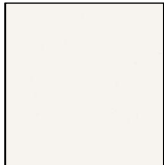
## Furniture finishes:



Surfaces: Maple or grey laminate



Legs and supports: Silver, grey or white.



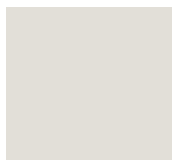
Panel/Screens: grey with white or gray metal frame.

## Paint Colors:

The colors were chosen to reflect the NRC corporate colors. This color pallet is reflected in all NRC branding both internally and externally.

The colors are dynamic to compliment the neutral furniture pallet. Furniture traditionally has a much longer life cycle than paint, therefore the addition of "color" is achieved through the paint design, using a pop of color on the walls to contrast against the neutral furniture pallet, creating a welcome, engaging and vivacious workplace. At some point an update/refresh or modernization of the space will be required and it is easier and much more cost effective to change the paint.

Below is the paint color pallet within NRC Workspace Standard:



Elder White: *Base/field color*



Overt Green: *Accent color and door frames*



Bee: *Accent color and door frames*



Dynamic Blue: *Accent color and door frames*

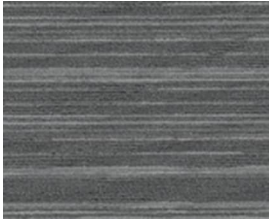


Violet Verne: *Accent color and door frames*



Gauntlet Grey: All doors, executive offices (DG/VP or higher), and Meeting room/conference rooms accent wall color

Carpet Colors:



Shaw Contract Group – Current Tile, Weathered, *Main Colour*. Size: 230mm x 915mm (9" x 36").



Shaw Contract Group – Hyper Green: *Accent Colour*. Size 230mm x 915mm (9" x 36").



Shaw Contract Group – Glowing: *Accent Colour*. Size 230mm x 915mm (9" x 36").



Shaw Contract Group– Hyper Blue: *Accent Colour*. Size 230mm x 915mm (9" x 36").



Shaw Contract Group - Puzzle: *Accent Colour*. Size 230mm x 915mm (9" x 36").