



Architectural & Engineering Services **DESIGN BUILD TERMS OF REFERENCE**

Replacement of Elevators

For:
**Natural Resources Canada
(NRCAN)**
**Northern Forestry Centre
Edmonton, Alberta**

September 22, 2021



Table of Contents:

1	PROJECT DESCRIPTION	3
1.1	GENERAL	3
1.2	BACKGROUND INFORMATION	3
1.3	OUTLINE OF WORK	5
1.4	SUMMARY OF SERVICES	7
1.5	SUMMARY OF REQUIREMENTS	7
1.6	OBJECTIVES	8
1.7	SCHEDULE	10
1.8	COST	10
1.9	EXISTING DOCUMENTATION	11
1.10	CODES, ACTS, STANDARDS, REGULATIONS	11
2	REQUIRED SERVICES	13
2.1	GENERAL REQUIREMENTS	13
2.2	PROJECT REVIEW AND ACCEPTANCE	13
2.3	DESIGN BUILDER FEE PROPOSAL	14
2.4	DESIGN REQUIREMENTS	14
2.5	DESIGN CONSIDERATIONS	15
2.6	ELEVATORS AND SUPPORTING INFRASTRUCTURE	15
2.7	CONSTRUCTION DOCUMENTS FOR REVIEW	15
3	PROJECT ADMINISTRATION	19
3.1	GENERAL	19
3.2	ROLES AND RESPONSIBILITIES	19
3.3	COMMUNICATIONS AND MEETINGS	20
3.4	DELIVERABLES	21
3.5	REVIEW AND ACCEPTANCE	22
3.6	TECHNICAL REPORTS	23
4	GENERAL REQUIREMENTS (DIVISION 01)	25
4.1	ELEVATOR REPLACEMENT	25
5	DEFINITIONS	25
5.1	PURPOSE	25
5.2	DEFINITIONS	25



1 PROJECT DESCRIPTION

1.1 GENERAL

1.1.1 PURPOSE OF THE TERMS OF REFERENCE (TOR)

- .1 These Terms of Reference (TOR) have been developed to ensure that the Design-Builder has a clear understanding of the project scope, procedures and performance requirements, in order to deliver the completed project within the agreed to budget and schedule.

1.1.2 THE TOR AND THE DOING BUSINESS WITH PWGSC DOCUMENTATION AND DELIVERABLES MANUAL

- .1 This TOR document must be read, used and applied in conjunction with the terms and conditions of the contract, Division 01 of the specifications and the *Doing Business with PWGSC Documentation and Deliverables Manual*, as all these documents are complimentary.
- .2 The TOR describes project-specific requirements, performance requirements, services and deliverables while the Doing Business document outlines minimum requirements common to all PWGSC projects.
- .3 In the event of a conflict between any of these documents, the contents of a higher precedence document shall govern and override a lower precedence document. The order of precedence of the documents is as follows:
 - .1 The TOR,
 - .2 General Requirements (Division 01 – see appendix)
 - .3 The *Doing Business with PWGSC Documentation and Deliverables Manual*.
- .4 Incorporate good building practices for this elevator replacement project for NRCan in Edmonton, Alberta.

1.1.3 PROJECT INFORMATION

Project Information	
Project Title:	Northern Forestry Elevator Replacement
Project Address:	5320-122 Street, NW, Edmonton, Alberta
Solicitation Number:	tbd
Contract Number:	tbd
PWGSC Project Number:	R.117146.001
PWGSC Contracting Officer:	Dan McRuer
PWGSC Departmental Representative:	Ron Seto

1.2 BACKGROUND INFORMATION

1.2.1 USER DEPARTMENT

- .1 The User Department referred to throughout the TOR is Natural Resources Canada (NRCan).



- .1 NRCan is an economic, science-based department with a mandate to promote the sustainable development and responsible use of Canada's mineral, energy, and forestry resources, develop an understanding of Canada's landmass, and to collect and disseminate knowledge on sustainable resource development.

1.2.2 USER DEPARTMENT'S NEED

- .1 NRCan requires the design, procurement and installation/replacement of two existing older electric passenger elevators at their Northern Forestry office in Edmonton, with two new passenger elevators which adhere to all the latest elevator safety and serviceability standards and provide the same or better service, performance, durability and maintainability. The replacement is to be like for like.
- .2 The elevators are aged and beyond the serviceable life, and need to be decommissioned and replaced.
- .3 NRCan will need on-going maintenance services for the elevator, and there is the potential of this being an optional service for the Design Builder.

1.2.3 EXISTING CONDITIONS

- .1 The Northern Forestry Centre is one of five research centres operated by the Canadian Forest Service. The work at the centre supports Natural Resources Canada's national research priorities, and addresses forestry issues in the three Prairie Provinces and the Northwest Territories. The centre's program includes four main areas of research: Boreal ecosystem, Climate change and forests research, reclamation, and Wildling fire.
- .2 The Northern Forestry building (NoFC) was constructed in 1969, and is a 3 story concrete framed structure with a basement and penthouse primarily clad in precast concrete panels.
- .3 There are two traction passenger elevators in the facility, each of the two existing passenger elevators are manufactured by OTIS. They are traction type.
- .4 The elevators are 15 horse power DC motors, and original to the building.
- .5 The elevators are fully bilingual and include all braille markings on controls and signage.
- .6 The existing elevator speed is 200 fpm, service passenger weight is 2500 lbs.
- .7 One elevator has four stops and the other has five stops.

1.2.4 CHALLENGES AND CONSTRAINTS

- .1 The Design Builder will be required to become familiar with the project site and obtain local information as required.
- .2 The Design-Builder must obtain security clearances for all the firm's personnel in order to visit the project site for reasons, such as: site reviews, attendance for site design meetings, etc. Security clearance checks may include credit checks.



- .3 All site visits must be arranged through the Departmental Representative. Design Builder's staff must sign-in and sign-out for all site visits.
 - .1 Visits to the Work site may be affected by Provincial Public Health measures implemented as a result of the COVID-19 pandemic. Access may be restricted or completely prohibited at any time and alternate means of gathering the information relevant to the design may be required.
 - .2 All access throughout the facility will require NRCan commissioner escorts.
- .4 Construction on the project site will be performed during the full operation of the facilities.
 - .1 Project phasing must be planned to avoid disruptions to the daily operation of the facilities.
- .5 The construction and associated works are situated in a Federal facility where existing operations must be continuous and unimpeded throughout the term of the project. Work on the project site will be performed from 0800 to 1600 hours.
- .6 The work will be carried out during normal working hours, when the Centre is fully occupied and operational. The building must have elevator access at all times during the entire process of elevator removal and replacements.
- .7 Indoor environmental conditions must be kept under control and within Canada Labour Code requirements during all phases of the work.
- .8 The date for substantial completion will be confirmed upon contract award. The Design-Builder is solely responsible for all arrangements and costs involved with delivering the project before this date.
- .9 The project scope must be tailored to meet the User Department's budget. Diligent cost estimating and cost control is required.

1.2.5 HAZARDOUS MATERIALS

- .1 No hazardous materials have been identified in the anticipated area of work for this project.

1.3 OUTLINE OF WORK

1.3.1 ELEVATOR REPLACEMENT DESIGN BUILD APPROACH TO THE WORK

- .1 The Design-Builder is fully responsible for provision of design and construction services. Including all labour, elevator equipment and material needed to execute the Work as well as all design drawings, specifications and reports needed to support the execution of the Work and confirm conformance to all applicable codes, acts, standards and regulations.

1.3.2 DESIGN SERVICES

- .1 The Design-Builder will be retained by PWGSC and report directly to the PWGSC Departmental Representative.
- .2 Design Services, will be engaged directly by the Design-Builder, who will direct and co-ordinate all the design related work.



- .3 The elevators will require smart motors, and solid state controllers, which will be installed in the penthouse, the new elevators will tie into the fire alarm, and control which floors the elevators will open on.
- .4 All work and materials shall conform to the requirements set out in the 2015 National Building Code of Canada, and all applicable Codes, CSA standards, and safety standards, latest editions.
 - .1 ED 16200 - 2013
 - .2 Elevators are to be fully compliant with CSA B651 2018.
 - .3 Design and construct elevator in accordance with ASME A17.1/CSA B44, local codes and regulations
 - .4 American National Standards Institute (ANSI)/National Electrical Manufacturers Association (NEMA)
 - .1 ANSI/NEMA MG1-2016, Motors and Generators.
- .5 Adhere to the Government of Canada sustainability requirements.
- .6 NRCAN may require touchless technology in the future. Control board and elevator equipment to be able to accommodate touchless technology in the future.
- .7 Design any additional architectural, electrical, structural, or mechanical system upgrades required for code compliance, life safety and proper equipment installation and operation.
- .8 Prior to finalizing the design, the Design Builder is to review and confirm with Departmental Representative and the Authority Having Jurisdiction any additional, remedial or preparatory work required.

1.3.3 CONSTRUCTION SERVICES

- .1 The Design-Builder will deliver the project utilizing industry best practices in conformance with standards noted in the Doing Business with PWGSC Manual, respecting the defined scope, quality and schedule deliverables.
- .2 Procurement of two passenger elevators adhering to the approved and accepted design.
- .3 The Design-Builder will remove and dispose of the existing elevators and perform the elevator replacements using:
 - .1 An engineered design that complies with all codes, acts, standards and regulations.
 - .2 Industry best practices related to conveyancing and accessibility.
 - .3 Proper equipment suitable for the task.
 - .4 Safe work practices compliant to local, provincial and federal safety legislation.
 - .5 Integrated phased construction methodologies in conjunction with design, in order to meet project timelines and objectives.
- .4 Both elevator's DC motors are to remain with the facilities, as with any copper cabling.
- .5 Construct any additional architectural, electrical, structural, or mechanical system upgrades required for code compliance, life safety and proper equipment installation and operation.



1.3.4 MAINTENANCE SERVICES (POTENTIAL ON GOING SERVICE)

- .1 NRCan will require an annual maintenance service for the two passenger elevators. This is a potential service which the Design Builder may be requested to participate in through a separate contract with NRCan.

1.4 SUMMARY OF SERVICES

1.4.1 CONTEXT

- .1 All design and construction services will be provided by the Design-Builder.

1.4.2 DESIGN SERVICES

- .1 All professional services shall be conducted by those licensed to practice in Alberta.
- .2 The Design-Builder must have specific and substantial (minimum of 10 years) documented recent experience in Canada in design and construction performing:
 - .1 Conveyancing Design and Installation Services,
 - .1 Provide documentation that experience is confirmed and approved by elevator systems manufacturer.
 - .2 Engineering Design Services (confirming existing building integrity of all building infrastructure.)

1.4.3 CONSTRUCTION SERVICES

- .1 The Design-Builder shall deliver complete construction services in accordance with the duties outlined in the terms and conditions of the contract and the requirements of this Terms of Reference.
- .2 The Design-Builder is responsible for the implementation of Division 01 contained in this Terms of Reference.

1.5 SUMMARY OF REQUIREMENTS

1.5.1 GENERAL DESCRIPTION

- .1 NRCan needs two existing elevators removed and new elevators installed, and confirmation of all supporting engineering services, including structural and electrical assessment.

1.5.2 DESIGN-BUILD EXPECTATIONS

- .1 The Design-Builder shall deliver the project in such a way that optimizes quality and schedule;
 - .1 It is the responsibility of the Design-Builder to provide and produce adequate construction drawings, specifications and details over the course of the project to ensure that the Work is executed to industry standard, in compliance with all codes, acts, standards and regulations.
 - .2 It is the responsibility of the Design-Builder to prepare and submit for PWGSC review and acceptance, the design solution proposed for the elevator replacement before proceeding to construction.



- .3 It is the responsibility of the Design-Builder to carry out the construction/ elevator installation and all commissioning to deliver a complete and fully operable elevator installation project.

1.6 OBJECTIVES

1.6.1 GENERAL GOALS

- .1 Quality Design through the:
 - .1 Appropriateness of the real property solution for its use and location;
 - .2 Collaborative Project Delivery process – refer to Definitions;
 - .3 Economic viability of the real property solution considered and/or developed;
 - .4 Maintenance and development of effective and efficient facilities;
 - .5 Appropriate incorporation of innovations within the project delivery and solutions, and;
 - .6 Achievement through the design delivery of public policy, program and services to Canadian citizens resulting in inspiring and timeless solutions.
- .2 Fully integrate all new components and systems with existing including architectural, structural, mechanical, and electrical (building controls).
- .3 Provide an integrated design and construction process involving:
 - .1 Interdisciplinary collaboration, including all stakeholders as identified, design builder and authorities having jurisdiction;
 - .2 Agreed upon design principles and decision making protocols.
- .4 Consider the User Department’s changing needs and future uses to create solutions that are flexible and that are able to evolve over time:
 - .1 Employ advanced systems and technologies to support contemporary operating requirements with capacity for growth and change.
- .5 Review trends and identify, through benchmarking, requirements necessary to provide creative, functional and cost effective elevator solution.
- .6 Integrate innovative universal design and accessibility.
- .7 Deliver the project to the satisfaction of PWGSC, while applying rigorous schedule and quality controls throughout the design, construction, and post-construction warranty inspection phase of the project.
- .8 Comply with all sustainable development requirements (waste management, environmental responsibility, etc.).

1.6.2 ELEVATOR REPLACEMENT EXPECTATIONS

- .1 Construct the Work in a manner that will:
 - .1 Enable long-term efficient and cost effective life cycle elevator performance for a 25 years lifespan.
 - .2 The Design-Builder will provide a final design that will ensure that the elevators will:



- .1 Provide an accessible, efficient, reliable elevator replacement solution, addressing all the sustainability and operational requirements of NRCan.

1.6.3 QUALITY CONTROL AND ASSURANCE

- .1 Quality control and assurance throughout the project are to be carried out by the Design-Builder to fulfill ethical due diligence in confirming that the project is built according to all applicable codes, acts, standards and regulations.
- .2 The Design-Builder shall produce a final report for each elevator which:
 - .1 Summarizes the final design;
 - .2 Provides all commissioning documentation, and confirms that a interim and final commissioning and inspection was performed and when it was performed;
 - .3 Confirms that the design intent has been achieved, in compliance with all applicable codes, acts, standards and regulations;
 - .4 Includes drawing(s) or detail(s) which illustrate pertinent design methodology and considerations compliant with the Doing Business with PWGSC Manual.
 - .5 Includes all inspections and acceptances from Alberta Elevating Devices and Amusement Rides Safety Association (AEDARSA), who are the independent provincial regulatory body responsible for ensuring all elevating devices in Alberta comply with provincial safety codes and regulations.

1.6.4 ENVIRONMENTAL/SUSTAINABLE DEVELOPMENT

- .1 Construction documentation to include waste management specifications for appropriate separation, recovery and recycling (disposal) of:
 - .1 Recyclable materials;
 - .2 Compostable materials and/or;
 - .3 Construction waste.

1.6.5 PROJECT DELIVERY

- .1 Project delivery will be Design Build.
- .2 Provide fully integrated and coordinated professional and design services for the delivery of a project in accordance with the requirements in the TOR and as contained herein.
- .3 Obtain written authorization from the Departmental Representative before proceeding from one project milestone to another.
- .4 Coordinate all services with the Departmental Representative.
- .5 Establish and maintain a Project Management Plan.
- .6 Maintain continuity of key personnel and a dedicated working team for the life of the project.
- .7 Deliver the project to be within:
 - .1 The construction Budget established during preliminary project approval, and;
 - .2 The Project Milestones in this TOR.



- .8 Conduct Quality Assurance reviews during the Project Milestones, including the application of Value Engineering principles during the design of all complex systems.

1.7 SCHEDULE

1.7.1 GENERAL

- .1 The scope of Design Builder Work for this project will be separated into two phases to ensure at least one elevator is operational.
- .2 Deliver the project to be ready for use in accordance with the project milestone listing identified below.
- .3 Prepare a Project Schedule in accordance with the milestone list.

1.7.2 ANTICIPATED MILESTONE DATES

Project Phase	Milestone Completion Date	Duration	Number of Weeks
ITEM	MILESTONE		COMPLETION DATE
1.0	Design-Build Contract Award		December 15, 2021
2.0	Interim 66% shop drawing/construction documents submission for review	4 weeks	
2.1	PSPC and NRCan Quality Assurance Review	2 weeks	
2.2	Final 99% shop drawing/completion design submission for review	3 weeks	
2.3	PSPC and NRCan Quality Assurance Review	2 weeks	
2.4	Design Completion ready for ordering	2 weeks	March 16, 2022
3.0	Elevator 1 Construction Substantial Completion		May 27, 2022
3.2	Elevator 1 commissioning and acceptance		May 27, 2022
4.0	Elevator 2 Construction Substantial Completion		July 8, 2022
4.2	Elevator 2 commissioning and acceptance		July 8, 2022
5.0	Post-Construction Warranty Inspection		March 15, 2023

1.8 COST

1.8.1 CONSTRUCTION BUDGET



- .1 The Construction Budget is anticipated at this time to be \$600,000.
 - .1 The Construction Budget includes project management fees, administrative costs, Design Builder fees, risk allowance, escalation and GST and is in 'Budget-Year (Current)' dollars.

1.9 EXISTING DOCUMENTATION

1.9.1 AVAILABLE FOR THE DESIGN BUILDER

- .1 Limited as-built drawings and Operation & Maintenance Manuals will be available at the start of the project. The Consultant will be responsible for verifying the accuracy of the information incorporated into the design.
- .2 Building drawings are in AutoCAD (dwg) format.
 - .1 The drawings will require modifications by the Design Builder.
 - .2 The drawings will require the Design Builder's verification of all critical dimensions and features pertaining to the fit-up.
- .3 Elevator Inspection Reports for lift serial number E002934 and E002935.
- .4 ED 16200-2013 - elevators, dumbwaiters and escalators : guidelines for building owners, design professionals, and maintenance personnel
<https://publications.gc.ca/site/eng/446234/publication.html>
- .5 Greening Government Strategy
 - .1 <https://www.canada.ca/en/treasury-board-secretariat/services/innovation/greening-government/strategy.html>

1.9.2 DISCLAIMER

- .1 Reference information will be available in the language in which it is written.
- .2 The documentation may be unreliable and is offered, "as is" for the information of the Consultant.
- .3 The Consultant is responsible for verifying the accuracy of the information incorporated into the final design.

1.10 CODES, ACTS, STANDARDS, REGULATIONS

1.10.1 GENERAL

- .1 In addition to Provincial and Municipal Acts, Codes, By-laws and Regulations appropriate to the area of concern, the following Codes, Acts, Standards and Guidelines are applicable to this project (in the event of a conflict between codes, the more stringent shall take precedence):
 - .1 NRC National Building Code of Canada 2015;
 - .2 NRC National Fire Code of Canada 2015;
 - .3 NRC National Energy Code of Canada for Buildings 2017;
 - .4 CSA/B561-18, Accessible Design for the Built Environment;
 - .5 ED 16200-2013 (or latest edition) Elevators, Dumbwaiters, and Escalators. Guidelines for Building owners, design professionals and maintenance personnel (August 2013).



- .6 ASME A17.1/CSA B44 (latest version), Safety Code for Elevators and Escalators (Bi-national Standard, with ASME A17.1).
- .7 International Performance Measurement and Verification Protocol (IPMVP).
- .8 CSA C22. 1 Canadian Electrical Code
- .9 CSA Z320 Building Commissioning Standard
- .10 The Canada Labour Code (CLC);
- .11 The Canada Occupational Health and Safety Regulations;
- .12 Greening Government Strategy: A Government of Canada Directive.
- .2 At the start-up meeting the Departmental Representative will provide additional codes and standards unique and not published by the Federal Government.
- .3 The Authorities Having Jurisdiction (AHJ) on this project are:
 - .1 City of Edmonton AHJs.
 - .2 Alberta Elevating Devices and Amusement Rides Safety Association (AEDARSA).
- .4 Identify, analyse and design the project in accordance with the requirements of all AHJs and all applicable Codes, Acts, Standards and Guidelines and Legislation:
 - .1 Be versed with the legislation and requirements that are unique to Federal Government buildings in Canada;
 - .1 Standard Operation Procedures to meet CLC.
 - .2 Be versed with the legislation and requirements that are unique to Federal Government projects tendered through Public Works and Government Services Canada.



2 REQUIRED SERVICES

2.1 GENERAL REQUIREMENTS

2.1.1 SERVICES

- .1 The Design-Builder is solely responsible for the design and implementation of the project.
- .2 The Design-Builder is solely responsible to confirm the design deliverables have been met according to any and all AHJs and all applicable Codes, Acts, Standards and Guidelines and Legislation.
- .3 The Design Builder is responsible to apply for and obtain all permits and approvals as applicable to the elevator replacement.

2.2 PROJECT REVIEW AND ACCEPTANCE

2.2.1 GENERAL

- .1 Comply with all applicable laws and regulatory requirements as required by the General Conditions of the Contract.

2.2.2 QUALITY ASSURANCE REVIEWS, ACCEPTANCE AND DEMONSTRATION

- .1 Each submission is subject to reviews by the Departmental Representative, the User Department, PWGSC Architecture and Engineering Centre of Expertise (AECOE), AEDARSA, and other project stakeholders.
- .2 The federal government generally defers to provincial and municipal authorities for specific regulations, standards and inspections but in areas of conflict, the more stringent authority prevails.
 - .1 Review by AEDARSA
 - .1 AEDARSA will review of construction documentation plans to ensure they meet safety requirements and codes.
 - .2 AEDARSA will conduct inspections/granting acceptance of the newly installed elevating devices to ensure compliance with provincial conveyancing codes and regulations.
- .3 At each submission:
 - .1 Review submissions to be posted on AutoDesk BIM 360 Docs in searchable PDF format;
 - .2 Expected turnaround time for each review is ten (10) working days;
 - .3 The Consultant Team will receive review comments in the form of an editable MS Word document or MS Excel document;
 - .1 Provide a single coordinated written response within five (5) working days of receiving review comments;
 - .2 The purpose of this review is information and awareness for PWGSC and not quality control for the Consultants. The Consultant Team must employ their own quality control program and remain fully responsible for the design and services provided.



- .4 At the final completion of each elevator installation:
 - .1 Prior to first use, perform tests to demonstrate full operational performance, compliance with all design specifications, to the Departmental Representative, the User Department, and AEDARSA.

2.3 DESIGN BUILDER FEE PROPOSAL

2.3.1 FEE BREAKDOWN

- .1 The Design Builder is to provide a full breakdown of fees for the design outlining each discipline and stage of work, and for the construction for each discipline and trade, including commissioning.

2.4 DESIGN REQUIREMENTS

2.4.1 DESIGN QUALITY

- .1 Incorporate good design practices in conformance with all applicable codes and standards, throughout the design of the elevator replacement.
- .2 Provide a high standard of design, based on recognized contemporary design principles. Design to be coordinated and consistent with current building and elevator/conveyancing practices.
- .3 Avoid experimental materials and take into account the total life cycling of the elevators and supporting infrastructure.
- .4 Minimize operating and maintenance costs.
- .5 The character, scale and materials will be compatible with the building interior and context.

2.4.2 ELEVATOR PERFORMANCE

- .1 General
 - .1 Provide design that will enable long-term, efficient and cost effective life cycle performance for the elevators.
- .2 Sustainable Design
 - .1 Incorporate, where possible, sustainable design features.
- .3 Energy Efficiency
 - .1 Implement design strategies, systems and equipment, which result in energy efficient design, where possible.
- .4 Minimized operating and maintenance costs
 - .1 Operations involving minimal 'hands-on' maintenance and repairs.
- .5 Fire Protection
 - .1 Employ industry best practice regarding use of fire resistant materials for elevator and finishes.

2.4.3 CONSTRUCTION QUALITY

- .1 Maintain appropriate security measures on site for safety of workers and third parties, in conformity with all levels of authorities governing construction in Alberta.



- .2 Provide necessary temporary heating or electricity that may be required for execution of work.
- .3 Supply tools, equipment and certified personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, troubleshooting and servicing all systems and equipment, prior to final acceptance.

2.5 DESIGN CONSIDERATIONS

2.5.1 GENERAL

- .1 Design to include any considerations with elevator safety, high quality components and finishes, durability and longevity, service speed requirements, and all other considerations to suit NRCan operations, accessibility, sustainable operations and maintenance, elevator operations tying into building automation and control, touch free operations.

2.6 ELEVATORS AND SUPPORTING INFRASTRUCTURE

2.6.1 DETAILED REQUIREMENTS

- .1 Confirm that existing building infrastructure will support new elevators.
- .2 Confirm in writing the User Department functional and operational requirements prior to proceeding.

2.6.2 GENERAL REQUIREMENTS:

- .1 All work and materials shall conform to the requirements set out Part 1 of this TOR.
- .2 All aspects of the Elevator replacements are to be designed and certified by the Design-Builder.

2.7 CONSTRUCTION DOCUMENTS FOR REVIEW

2.7.1 GENERAL

- .1 Develop construction documents for review.

2.7.2 SCOPE AND ACTIVITIES

- .1 Prepare construction documents for review showing all drawings and specifications required to illustrate the work.
- .2 Provide a cost breakdown by design discipline and building trade for review by User Department and Departmental Representative.
- .3 Establish a quality control process.
- .4 Update the BOD and OPR.
- .5 Develop commissioning construction documentation complete with verification forms using National Master Specifications (NMS) Division 01 specifications including:
 - .1 An updated Cx Plan with detailed commissioning strategies, Cx forms/check sheets and training requirements;



- .2 Cx forms and verification check sheets ready for commissioning of specific components, equipment, systems and integrated systems specific to the project;
 - .1 Component verification (Static Verification),
 - .2 Installation verification,
 - .3 Start-up,
 - .4 Systems verification test,
 - .5 Integrated system functional performance verification for dynamic operation, and;
 - .6 Cx issue log.
- .3 Expected design performance parameters;
 - .1 Observed performance including any indication of whether or not this performance is acceptable, and;
 - .2 Design Builder date and signatures along with those performing and witnessing the test.
- .6 Provide written response to PWGSC comments and integrate comments into the design.

2.7.3 DELIVERABLES

- .1 Include items listed in the "Scope and Activities" section above, the *Doing Business with PWGSC Documentation and Deliverables Manual* and items listed below.
- .2 Submit a 66% complete Construction Documents and shop drawings (minimum requirements):
 - .1 Construction Drawings and Specifications;
 - .1 All drawing sheets and specification sections required for delivering the work should be included in this submission.
 - .2 Elevator Shop Drawings.
 - .2 One (1) electronic searchable PDF copy on BIM 360.
- .3 99% complete Construction Documents, fully coordinated as if ready for tender:
 - .1 This submission incorporates all revisions required by the review of the previous submission and a written response to the PWGSC 66% review;
 - .2 Construction Drawings;
 - .1 Drawings should reflect 99% completeness as a complete design without any incomplete drawings (as if ready for tendering).
 - .3 Complete Specifications;
 - .1 Including all required sections coordinated with the drawings;
 - .2 Commissioning specifications, including forms applicable to Pre-Functional verification (Static Verification, installation & start-up) and Functional Performance Verification Testing (operational and dynamic).
 - .4 One (1) electronic searchable PDF copy on BIM 360.



- .5 Incorporate all revisions required by the review of the previous submission and a written response for the PWGSC 99% review;
- .6 The Design Builder must confirm in writing that:
 - .1 The checklist in the *Doing Business with PWGSC Documentation and Deliverables Manual* has been reviewed in concert with the requirements of the Consultant Agreement, and;
 - .2 A full review and coordination of the Contract Documents are complete and in accordance with professional standard of care.
- .4 Submission Ready for Ordering
 - .1 Submission containing complete Construction Documents, addressing all issues above, fully coordinated and ready for tender;
 - .2 This submission incorporates all revisions required by the review of the previous submission and a written response to the PWGSC 99% review.

2.7.4 FINAL REPORT

- .1 For each elevator; review, witness, verify test, approve and sign off all commissioning submittals for performance parameters before test and after test including:
 - .1 All factory test reports and data;
 - .2 Installation, start-up and Testing, Adjusting and Balancing (TAB);
 - .3 Components, systems and integrated systems based checks;
 - .4 Cx forms and verification checklists, process and procedures specific to components, systems and different levels of integration between systems;
 - .5 Cx schedule;
 - .6 Deferred, seasonal and re-test system deficiency;
 - .7 Review and assist with O&M and Owner Training Manual;
 - .8 Oversee and Document Functional Performance Testing;
 - .1 Follow up on testing issues as required.
 - .9 Update the Cx Issues Log;
 - .10 Conduct field reviews complete with Cx site reports verifying components and systems being commissioned in accordance with the OPR and the BOD;
 - .11 Chair Cx Team meetings and report progress as required, complete with minutes for distribution;
 - .12 Provide verification of final reports upon completion of the entire project;
 - .13 Lead and facilitate the Cx Team's Interim Acceptance Report sign-off, and;
 - .14 Design Builder's Engineer(s) Record Letter of Acceptance.



2.7.5 RECORD DOCUMENTS

- .1 Ensure record documents comply with the Doing Business with PWGSC Manual.



3 PROJECT ADMINISTRATION

3.1 GENERAL

- .1 Security
- .2 The Design-Builder shall:
 - .1 Protect the documents in their care and the information to which they have access.
 - .2 The Design-Builder is responsible for maintaining appropriate security measures on site to ensure that equipment and various components are temporarily stored and protected against the elements, damage, theft and vandalism.

3.2 ROLES AND RESPONSIBILITIES

3.2.1 GENERAL

- .1 The responsibilities identified in this section are in addition to the requirements in the Doing Business with PWGSC Manual.

3.2.2 DESIGN-BUILDER

- .1 The Design-Builder shall:
 - .1 Assign qualified staff or engage the services of Specialist Consultants licensed to practice in Alberta as required to provide the design services to meet the design deliverables.
 - .2 Complete the Work using the Design-Builder's Own Forces and the Design-Builder's contracted Sub-Trades.
 - .3 Provide all necessary personnel to perform the Services and duties for the Project, either by assignment of Design-Builder qualified staff or by engagement of services contracted directly to the Design-Builder.
 - .4 Engage and manage the Services and Work of qualified and experienced individuals or firms to provide the Services for which the Design-Builder does not have qualified personnel on staff.
 - .5 Ensure continuity of key personnel and maintain a dedicated working team for the life of this project.

3.2.3 THE DESIGN BUILDER TEAM

- .1 The Design-Builder team shall:
 - .1 Have an in-depth understanding and collective 'buy-in' of the project requirements, including scope, quality and schedule objectives,
 - .2 Work constructively to ensure a collaborative and cooperative team approach with knowledgeable and timely input and contribution by all project team members.

3.2.4 PWGSC

- .1 PWGSC will manage the project through managing the contract with the Design-Builder.



3.2.5 THE PWGSC PROJECT MANAGER

- .1 The PWGSC Project Manager is the Departmental Representative during the design and construction phase of the project, and
- .2 The PWGSC Project Manager is the liaison between the Design-Builder, Public Works and Government Services Canada and the User Departments.

3.2.6 USER DEPARTMENT RESPONSIBILITIES

- .1 Is accountable for the expenditure of public funds and delivery of the project in accordance with the terms accepted by the Treasury Board.
- .2 Reports to the senior User Department executive management.
- .3 Will play several critical roles for the successful implementation of the project, including:
 - .1 Coordination of the quality, timing and completeness of information and decisions relating to issues related to the functional performance of the facility.

3.3 COMMUNICATIONS AND MEETINGS

3.3.1 COMMUNICATION

- .1 Unless otherwise directed by the Departmental Representative, the Design-Builder will conduct all project communication through the Departmental Representative only.
- .2 If any unforeseen activity or site condition affects the Project's scope of work, quality, or schedule, the Design-Builder shall inform the Departmental Representative, and seek direction before taking any action.
- .3 Correspondence:
 - .1 All correspondence from the Design-Builder shall be distributed as directed by the Departmental Representative.
 - .2 There shall be no correspondence between Design-Builder and any other governmental department or member of the public unless previous authorization is given by the Departmental Representative
- .4 The Design-Builder shall:
 - .1 Direct communication and correspondence between members of the PWGSC Project Team, Design-Builder and the User Department on routine matters as may be required to enable the project to proceed in a timely and efficient manner.
 - .1 No communication shall alter the terms of the project scope, price or schedule unless directed in writing by the Departmental Representative.

3.3.2 MEETINGS DURING THE PROJECT

- .1 There shall be one kick-off meeting at the onset of the project between PWGSC and the Design-Builder.



- .2 Additional meetings with PWGSC and the Design-Builder shall be no more than bi-weekly during construction and only upon request of the PWGSC Departmental Representative.
- .3 Design-Builder shall be responsible for preparing and submitting meeting minutes for review and acceptance by the Departmental Representative no more than 3 business days after a formal meeting takes place.
- .4 Design-Builder will be responsible for:
 - .1 Preparing minutes of meetings for any formal meetings.
 - .2 Forwarding minutes to the Departmental Representative for review and acceptance.
 - .3 These meetings are for the accurate exchange of information.

3.3.3 SUBMISSIONS TO PWGSC

- .1 Where submissions to PWGSC are required, include summaries, reports, drawings, plans, specifications or schedules, submit one complete original to the Departmental Representative in electronic format on BIM 360, unless otherwise directed in writing.
- .2 Electronic format:
 - .1 The electronic deliverables shall be provided using Microsoft applications.
 - .2 Alternatively, the Design-Builder may submit all work in Adobe Acrobat *.pdf format.

3.3.4 PROJECT RESPONSE TIME

- .1 Key personnel of the Design-Builder are personally available to attend all meetings and respond to inquiries promptly and shall be:
 - .1 Available to attend meetings and respond to inquiries within one (1) working days' notice,
 - .2 Able to respond to emergencies within four (4) hours, including those occurring during off-hours and on weekends/ holidays.

3.4 DELIVERABLES

3.4.1 ACCEPTANCE OF PROJECT DELIVERABLES

- .1 While PWGSC acknowledges the Design-Builder's obligations to meet project requirements, the project delivery process entitles PWGSC to review all work.
- .2 PWGSC reserves the right to reject undesirable or unsatisfactory work.
- .3 The Design-Builder must obtain Departmental Representative acceptance of all required deliverables for the Project.
- .4 Acceptance does not relieve the Design-Builder of responsibility for the work and compliance with the contract.

3.4.2 PROJECT MONITORING AND REPORTING

- .1 The Design-Builder shall provide weekly updates that include:



- .1 The percent complete progress of the work scope, including any relevant expected completion dates of work or design milestones.
- .2 Any safety or environmental issues or concerns.
- .3 Any scope deliverable difficulties or complications.

3.4.3 CONSTRUCTION DOCUMENT PROGRESS SUBMISSIONS

- .1 Submit to the Departmental Representative for review, the 66 and 99% construction documents in a form suitable to the Departmental Representative.

- .1 Design-Builder shall respond in writing to Departmental Representative's written review comments.

3.4.4 FINAL INSPECTION & CLOSE-OUT SUBMISSION

- .1 The Design-Builder shall submit the final inspection report as per TOR section 1.6.3.2.
- .2 The Design-Builder shall submit operation and maintenance manuals.

3.4.5 POST-CONSTRUCTION WARRANTY INSPECTION

- .1 The Design-Builder shall conduct a warranty inspection, repair and restore any noted deficiencies, before the expiration of the one (1) year warranty period.

- .1 Conduct a warranty inspection for each elevator.

3.5 REVIEW AND ACCEPTANCE

3.5.1 FEDERAL GOVERNMENT

- .1 The PWGSC Departmental Representative, as well as the Federal Authorities identified below will review work in progress on a continuing basis.
- .2 The following are authorities having Federal Government jurisdiction over the project:
 - .1 Public Works and Government Services Canada.
 - .1 Contracting authority and project delivery.

3.5.2 PROVINCIAL, MUNICIPAL AND OTHER AUTHORITIES HAVING JURISDICTION

- .1 Although the Federal Government is not formally subject to jurisdictions at other levels of government, compliance with the requirement of these other Authorities is a requirement unless otherwise directed by the Departmental Representative.
 - .1 Codes, regulations, by-laws and decisions of authorities identified herein as having jurisdiction shall be observed.
 - .2 In areas of conflict between authorities, the Federal authority prevails.
 - .3 In areas of conflict between codes, standards and regulations, the most rigid requirements shall be adhered to.
 - .4 The Design-Builder shall identify other jurisdictions appropriate to the project.
- .2 Provincial Acts, Regulations, Standards and Inspections:



- .1 The Federal government does not defer to provincial and local authorities, except for specific regulations, standards and inspections noted below.
- .2 Unless directed otherwise by the Departmental Representative, the Design-Builder will:
 - .1 Adhere to all applicable provincial Construction Health and Safety Acts and regulations, in addition to the related Canada Occupational Safety and Health Regulations.
 - .3 Adhere to the requirements of Alberta for:
 - .1 Employment Standards
 - .2 Construction Safety
 - .3 Designated Substance Management
 - .4 Workers Compensation
- .3 Municipal By-laws, Regulations, Standards and Inspections:
 - .1 The Federal government does not defer to municipal authorities, except for specific by-laws, regulations, standards and inspections noted below.
 - .2 Unless directed otherwise by the Departmental Representative, the Design-Builder will:
 - .1 Provide all required supporting documentation for permit applications,
 - .2 Apply for, obtain, and pay for all permits and approvals necessary for the work,
 - .3 Provide fire safety equipment and access for fire-fighting services, as required by the municipality,
 - .4 Provide local authorities with access to the site as required and arrange for inspections as required by any officials having jurisdiction.

3.6 TECHNICAL REPORTS

- .1 Technical Reports are official government documents, which are used to support an application for approval or to obtain authorization or Acceptance. Technical Reports must:
 - .1 Be complete, clear and professional in appearance and organization, with proper reference to related parts and contents in the report;
 - .2 Clearly outline the intent, objectives, process, results and recommendations;
 - .3 Present the flow of information and conclusions in a logical, easy to follow sequence;
 - .4 Be in written narrative, graphic, model (traditional and/or computer generated), and photographic format, which can be web enabled;
 - .5 Have all pages are numbered in sequence, and;
 - .6 Be printed double-sided, if hard copies are produced.
- .2 Standard practice for the organization of technical reports include:



- .1 A cover page, clearly indicating the nature of the report, the date, the PWGSC project number and who prepared the report;
 - .2 A Table of Contents;
 - .3 An Executive Summary;
 - .1 A true condensed version of the report following the identical structure, including only key points and results/recommendations requiring review and/or approval;
 - .4 The body of the report is to be structured such that the reader can easily review the document and locate, respond to and/or reference related information contained elsewhere in the report easily;
 - .5 Appendices are to be used for lengthy segments of the report, supplementary and supporting information and/or for separate related documents.
- .3 The report content must:
- .1 Use a proper numbering system (preferably legal numbering), for ease of reference and cross-reference;
 - .1 The use of 'bullet points' are to be avoided.
 - .2 Use proper grammar, including using complete sentences, for clarity, to avoid ambiguity and facilitate easy translation into French, if required;
 - .1 The use of undefined technical terms, industry jargon and cryptic phrases are to be avoided.
 - .3 Be written as efficiently as possible, with only essential information included in the body of the report and supporting information in an appendix if needed.



4 GENERAL REQUIREMENTS (DIVISION 01)

4.1 ELEVATOR REPLACEMENT

4.1.1 SEE APPENDIX 1 FOR ALL DIVISION 01 SECTIONS.

5 DEFINITIONS

5.1 PURPOSE

5.1.1 DOCUMENT DEFINITIONS:

- .1 Definition of words and phrases in the Terms of Reference (TOR), and *Doing Business with PWGSC – Documentation and Deliverables Manual* to:
 - .1 Expand the detail associated with the services and deliverables addressed in the above Documents, and;
 - .2 Provide a clear understanding of the project scope, procedures, and quality performance requirements.

5.2 DEFINITIONS

5.2.1 ACCEPTANCE

- .1 A formal action taken by an assigned person with authority (contractual or otherwise) to declare some aspect of the project is permitted to proceed.

5.2.2 BASIS OF DESIGN (BOD)

- .1 Refer to CSA Z320 Article 3, Definitions.
 - .1 For further detail refer to ASHRAE 202, Article 8 – Basis of Design, Article 8.2 – Requirements.
- .2 A dynamic narrative document throughout the Project Milestones, recording the rationale for decisions and confirming to the Project Team design conformance to the ideas, concepts and criteria considered important to the owner as contained in the Owner Project Requirements (OPR) - for OPR see Definition;
 - .1 As the Design Builder's BOD also outlines the intended systems for the project, the Design Builder's Cx Process Manager/Cx Authority, using a compliance evaluation/tracking matrix, confirms the BOD's compliance to the OPR.
- .3 Documents the primary thought processes and assumptions behind design and implementation decisions.
- .4 Text and graphics are organized to facilitate future use as a building reference document.
 - .1 The O&M Manual describes "what" components/systems have been selected, the BOD describes "why" and "how" the design achieves the performance requirements of the OPR, and;
 - .2 BOD and OPR are components of the Cx Manual.
 - .1 OPR - refer to Definition for further information.
- .5 Includes:



- .1 A Summary:
 - .1 Project's conceptual framework;
 - .2 Compliance with OPR statement (including new Owner directives);
 - .3 Compliance with the Functional Program, and;
 - .4 Rationale for decisions made throughout the specific Project Milestone.
- .2 Design assumptions, such as:
 - .1 Anticipated future changes not included in the project, and;
 - .2 Selected assembly and system performance requirements.
- .3 A Uniformat™ Level 3 detail narrative description and statement on the purpose of the selected components, assemblies, systems and methods – see PPDFormat™ Definition, including:
 - .1 Areas served by the respective components, assemblies and systems, and;
 - .2 Illustrations of system configurations, including single line and plan drawings of each system.
- .4 Design options and analysis considered during the:
 - .1 Life Cycle Costing and Value Engineering workshops, and;
 - .2 Development of sustainable features and strategies.
- .5 Calculations and option analysis matrixes, organized by discipline, including:
 - .1 Connected or related loads and system capacities, and;
 - .2 Design criteria and the applicable codes/standards used in the calculations.
- .6 Special features or unique supply items/sources, general control strategies, sequences, and reset schedules, such as:
 - .1 Building components and connectivity;
 - .2 Seasonal switch-over procedures, and;
 - .3 Emergency procedures during a fire condition, power or equipment failure, including:
 - .1 Reference to Standard Operating Procedures requirements and definition.
- .7 Interfaces with existing systems, and;
- .8 Maintenance issues.

5.2.3 BASIS OF ESTIMATE (BOE)

- .1 A "living" document throughout the project design, construction process and project life cycle.
- .2 Provides a framework for progress monitoring and reporting.
- .3 Prepared and updated to facilitate the understanding, assessment and validation of the estimated value breakdowns, independent of any other supporting documentation.
- .4 Includes:
 - .1 Level of consensus between concurrent/third party estimates;



- .2 Estimate methodology;
- .3 Basis of pricing - cost data sources, and allowances;
- .4 Description of information obtained and used in the estimate including the date received;
- .5 Notable assumptions, exclusions and inclusions;
- .6 Listing of items/issues carrying notable risks;
- .7 Opportunities, and any deviations from standard practices;
- .8 Record of pertinent communications and agreements that have been made between the estimator and other project stakeholders;
- .9 Major changes relative to previous estimates;
- .10 Significant market events that may have an effect on the costs, and;
- .11 Estimate reconciliation.
- .5 With the last submission include:
 - .1 Variances related to:
 - .1 Change Orders;
 - .2 Work Package estimate, and;
 - .3 Estimate Construction Cost.
 - .2 And, any additional relevant information.
- .6 Refer also to the "Cost Estimate" Definition.

5.2.4 BUDGET

- .1 Developed using Cost Estimates and the Project Schedule.
- .2 Provides a view of how much the project is estimated to cost both in total and periodic terms.
- .3 Determines the cost performance baseline for use in cost management variance analysis such as, determining earned performance value.
- .4 Is aligned with funding limits to confirm funding availability/appropriation.
- .5 Also refer to - Estimated Construction Cost definition.

5.2.5 "CANADA", "CROWN"/"HER MAJESTY"

- .1 Her Majesty the Queen in right of Canada.

5.2.6 COLLABORATIVE PROJECT DELIVERY

- .1 The Collaborative Project Delivery approach promotes and facilitates knowledge collaboration between design and construction professionals and subject matter experts to create optimal design and construction solutions and methodologies in order to achieve an appropriate, timely and fiscally responsible Quality project delivery.
 - .1 Recognizes that project success is tied to all Project Team members' success in the integrated process.
 - .1 The Collaborative Project Delivery process starts at the Pre-Design with Departmental Representative as Lead Partnering Session and the Consultant, as Lead, project start-up meeting early in Schematic Design.



- .1 Collaborative Project Delivery is an interactive process which continues throughout the project life cycle.
- .2 Joint Project Team goals include:
 - .1 Ownership and focus on Quality including, Owner Project Requirements (OPR), Basis of Design (BOD) as well as Budget and schedule performance;
 - .2 Focus on optimizing the design and construction as a whole to fulfill the PWGSC Quality expectations;
 - .3 Mutual support for the project procedures and management;
 - .4 Leveraging Value Engineering, Life Cycle Costing and commissioning skills, and;
 - .5 Creation of an innovative learning environment.

5.2.7 COMMISSIONING AUTHORITY

- .1 Refer to the:
 - .1 Commissioning Process Manager (CPM) Definition for description of Cx Authority and part of the Consultant Team;
 - .2 CSA Z 320, Article 3 Definitions for Third Party description;
 - .3 TOR for the requirement of a Cx Authority as a part of the Consultant Team membership or of an independent third party Cx Authority to be separately engaged by PWGSC.

5.2.8 COMMISSIONING EVALUATION REPORT

- .1 A Cx Manual component.
- .2 Includes a debriefing report, with aspects such as:
 - .1 A complete assessment of the project;
 - .2 Lessons learned;
 - .3 Variances between the actual and planned levels of performance;
 - .4 A listing of components and systems not commissioned and the reasons;
 - .5 Recommended follow-up actions including Re-commissioning.

5.2.9 COMMISSIONING (Cx) MANUAL

- .1 Deliverable by Design Builder's Cx Process Manager/Cx Authority.
- .2 Contains the following:
 - .1 Updated Owner Project Requirements (OPR);
 - .2 Updated Basis of Design (BOD);
 - .3 Updated Commissioning Plan;
 - .4 Static Verification, start-up and Functional Performance Testing reports;
 - .5 Commissioning Report;
 - .6 User and operator training reports;
 - .7 Occupancy and operations evaluation reports;
 - .8 All relevant project reports and correspondence, and;
 - .9 Recommendations for Re-commissioning and frequency by equipment type and system.



- .3 Requires Cx Process Manager/Cx Authority sign-off at a Construction Contract Substantial Performance and Completion (final) milestones.

5.2.10 COMMISSIONING (Cx) PLAN

- .1 Deliverable by Design Builder's Cx Process Manager/Cx Authority.
- .2 Refer to CSA Z320 Article 4.2.3 Commissioning Plan.
 - .1 For further detail refer to the following ASHRAE 202 Articles:
 - .1 Article 7 – Commissioning Plan, Article 7.2 – Requirements;
 - .2 Article 10 – Design Review, Article 10.2 – Requirements;
 - .3 Article 11 – Commissioning Submittal Review – Article 11.2 Requirements;
 - .4 Article 15 – Training, Article 15.2 Requirements.
 - .3 A dynamic document throughout the project life cycle.
 - .4 Outlines a Plan to execute the scope of Work.
 - .1 The ongoing Plan development is carried out through iterative reviews, workshops, and meetings to ultimately become the complete plan including construction and occupancy milestones of the project.
 - .5 "Design Phase" (Pre-Design) Cx Plan:
 - .1 Cx Plan is based on the Programming, OPR and Acceptance of risk and Budget;
 - .1 Outlines a preliminary execution plan including activities, Cx Team roles and responsibilities, schedules and deliverables for pre design and subsequent design and BOD ultimately be updated and completed during the construction and occupancy milestones.
 - .6 "Design Phase" (Schematic Design, Design Development and Construction Documents) Cx Plan:
 - .1 Cx Plan is updated to address the remaining Project Milestones including construction documentation, construction and occupancy. The Cx Plan includes;
 - .1 Detailed tasks, roles and responsibilities, schedule, work flow processes and a list of the systems to be commissioned, and;
 - .2 Coincides with the design documents such as the specifications so that the Commissioning Team is clear on the goals and process.
 - .3 Refer to CSA Z320 Article 4.3. – Design Phase, Article 4.3.1, General.
 - .1 For further detail refer to ASHRAE 202, Article 10 Design Review – Article 10.2 Requirements.
 - .7 "Construction Phase" Cx Plan:
 - .1 During the Construction milestone, the updated Cx Plan continues to outline the Cx Team's roles and responsibilities, implementation of issues resolution protocol, the procedures and forms for documenting commissioning activities and the schedules for commissioning activities, reporting and deliverables.



- .2 Refer to CSA Z320 Article 4.4 – Construction Phase, Article 4.4.1, General.
 - .1 Add the following requirements:
 - .1 Cx schedule, and Installation start-up lists.
 - .2 For further detail refer to ASHRAE 202, Article 11 Commissioning Submittal Review –Article 11.2 Requirements.

5.2.11 COMMISSIONING (Cx) PROCESS

- .1 Refer to CSA Z320 Article 4, Commissioning Process.
- .2 A dynamic document throughout the project life cycle.
- .3 The process by which the design and construction documents (plans, sections, specifications, BOD, etc.) are confirmed to be consistent with each other; includes the commissioning requirements and the OPR.
- .4 During the Cx design reviews the Consultant is ultimately responsible for the project design and final decisions regarding the design expected performance.
 - .1 Supporting the Cx Process may also be the Consultant’s Commissioning Process Manager/Cx Authority to lead the Cx Team in the design and implementation of the Process that may involve, for example either;
 - .1 A third party Cx Provider company, procured by PWGSC) or,
 - .2 A Contractor’s Cx Agent.

5.2.12 COMMISSIONING PROCESS MANAGER (CPM)

- .1 Cx functional entity:
 - .1 May also be identified as Cx Authority entity.
- .2 Member of the Consultant Team.
- .3 Overall functional responsibilities is to lead the Commissioning Team in the:
 - .1 Design of the Commissioning Process so that it begins with commissioning of individual components and progresses to commissioning the complete integrated building system as a whole, and;
 - .2 Update of the BOD and OPR during design and construction.
- .4 Dependent the requirement for independence from the design and construction management, the CPM may include the functional role and be identified as a functional Commissioning Authority entity in, for example, the Cx Plan Specification, article - Roles and Responsibilities of the Cx Team:
 - .1 Regarding “independent Commissioning Authority” requirements, refer to Canada Green Building Council (CGBC).
- .5 Requires a unique combination of engineering, design fundamentals and building operations knowledge including: energy systems design, installation and operation, commissioning planning and process management, hands-on field experience with energy systems performance, interaction, start-up, balancing, testing, troubleshooting,



operation and maintenance procedures, and energy systems automation and controls.

- .6 Responsible for Cx deliverables, such as:
 - .1 Sequencing;
 - .2 Means and methods;
 - .3 Verification of installation and performance to BOD and OPR;
 - .4 Documentation and related sign-offs, and;
 - .5 Manuals.
- .7 Cx Process Manager/Cx Authority, unless otherwise stated, will only make recommendations, and observations during the design review.

5.2.13 COMMISSIONING RECORD CHECKLIST

- .1 Refer to CSA Z320 Article 4.9, Final Documentation.
 - .1 Add to Article 4.9.3, Additional Commissioning Documentation, the following requirements:
 - .1 Certificate of Interim Acceptance;
 - .2 Final Certificate of Completion;
 - .3 Deferred Cx Test Report;
 - .4 System and Environmental Check Reports e.g. Storage Tanks;
 - .5 Final Cx Report;
 - .6 Cx Evaluation Report, and;
 - .7 Final Standard Operation Procedures.
 - .2 Cx Record Checklist outlines the deliverables to be assembled and updated over the course of the Design, Construction and Delivery Close Out.
 - .3 Cx Record Checklist may include sections such as:
 - .1 Commissioning Plan;
 - .2 Commissioning Schedule;
 - .3 Owner's Project Requirements (OPR);
 - .4 Basis of Design (BOD);
 - .5 Project Team, complete with functional entity titles;
 - .6 Design QA Review compiled reports;
 - .7 Project Issues/Resolutions Logs;
 - .8 Cx Issues/Resolutions Logs;
 - .9 Commissioning meeting minutes;
 - .10 Commissioning specifications;
 - .11 Commissioning forms and check sheets;
 - .12 Commissioning site reports;
 - .13 Coordination drawings;
 - .14 Testing and inspection procedures;
 - .15 System start-up plans;
 - .16 Construction Checklists;
 - .17 Inspection reports;
 - .18 Test reports;



- .19 Commissioning test certifications;
- .20 Training plans;
- .21 Training documentation – electronic and hard copy;
- .22 Deferred testing documentation;
- .23 Post-construction review/re-inspection report;
- .24 Systems Manual;
- .25 Operations and Maintenance Manual; and
- .26 Re-commissioning Manual.

5.2.14 COMMISSIONING REPORT

- .1 Deliverable by Design Builder’s Cx Process Manager/Cx Authority.
- .2 A Cx Manual Component (at Construction Contract Substantial Performance and Completion – final/post Warranty) milestone.
 - .1 Requires CPM/Cx Authority sign-off and Design Builder verification at Substantial Performance and Completion.
- .3 The Cx Report (at Substantial Performance) is based on:
 - .1 Final BOD and OPR;
 - .2 System components list requiring commissioning;
 - .3 Final performance verification forms and check sheets: component, systems and integrated systems - design values to actuals;
 - .1 Static, installation, start-up, functional performance and integrated system verification;
 - .4 All commissioning site review reports;
 - .5 Commissioning issue logs and progress reports;
 - .6 Final training sessions;
 - .7 Post occupancy changes;
 - .8 Deferred commissioning; and
 - .9 Current information not available or incomplete at Interim Acceptance/Substantial Performance.
- .4 A Final Commissioning Report (prior to end of Warranty Period), which includes:
 - .1 Final Cx Evaluation Report;
 - .2 Updated Cx Report from Substantial Performance;
 - .3 Post-Occupancy test results and evaluations; and
 - .4 Updated Issues/Resolutions Log – highlighting documented Cx resolutions.
- .5 All progressive/interim Acceptances requiring all Project Team members to sign-off.

5.2.15 COMMISSIONING RISK ASSESSMENT

- .1 Deliverable by Design Builder’s Cx Process Manager/Cx Authority.
- .2 The Cx Risk Assessment aligns the rigor of the Commissioning Process with the following 2 risk items associated with Architectural and Engineering systems:
 - .1 Building: The function and performance; and



- .2 Deliverables: The deficiencies, such as, inaccurate as-built documentation, ineffective owner/occupant training, lack of documented system performance testing, and lack of comprehensive systems manuals.
- .3 The Cx Risk Assessment is often summarized in a matrix and accompanied by a basis of assessment narrative.
- .4 The premise of the Cx Risk Assessment is to identify:
 - .1 Building type and the intended use as a guide for Cx risk associated with the intended building systems; and
 - .2 How the performance of each system will affect the performance of all other systems, and how non-performance in the building may have a negative impact on function and operational confidence.

5.2.16 COMMISSIONING SCOPE

- .1 Facilitated deliverable by Design Builder's Cx Process Manager/Cx Authority.
- .2 Conducted by a Cx Team.
- .3 An integrated developmental process for determining the level of Cx effort based on the scope, rigor, OPR, building operation and function, including:
 - .1 Cx prioritization; and
 - .2 Cx Risk Assessment.

5.2.17 COMMISSIONING TEAM (CX TEAM)

- .1 The objective of the team is to encourage interdisciplinary collaboration to confirm the Cx Process is completed and the facility criteria has been achieved.
- .2 Cx Team composition is first identified and defined at the Pre-Design milestone, followed by an integrated development of a Cx Process and the assignment of the Cx roles and responsibilities and corresponding services and deliverables.
- .3 Size and membership varies depending on the project size, complexity and phase of design and construction.
- .4 Team make-up may consist of a:
 - .1 Departmental Representative – including PWGSC Cx Manager;
 - .2 User Department – O&M Personnel;
 - .3 Consultant(s) (dependant on the TOR, including Consultant's Cx Authority);
 - .4 Contractor's Agent; and
 - .5 Contractor's Agencies.

5.2.18 DESIGN BUILDER'S COMMISSIONING AGENCIES

- .1 To be identified as the in the specifications as the "Contractor's Sub-Contractor Commissioning Agency/Agencies" (CS-CCxA) functional entity/entities, in the Cx Plan Specifications, article - Roles and Responsibilities of the Cx Team. Includes Agencies, such as:
 - .1 Installing contractor/sub-contractor;



- .2 Equipment manufacturers, such as, elevators, emergency generators;
 - .3 Specialist Cx Agency, Cx Work outside the scope or expertise of other Cx Agencies, Work such, as environmental space condition, air quality; and
 - .4 TAB Agency, such as adjusting flow rated and pressure related to ducted air and hydronic systems, fans and pumps.
- .2 Available for emergency and troubleshooting service during the first year of occupancy and modification outside the responsibilities of the O&M personnel.

5.2.19 DESIGN BUILDER'S COMMISSIONING AGENT

- .1 Responsibilities are distinct from the Design Builder's site supervisor.
- .2 To be identified in the specifications (Cx Plan Section, article – Roles and Responsibilities of the Cx Team,) as the "Contractor's Commissioning Agent" (CCxA) functional entity.
- .3 Responsible for the implementation of all commissioning activities required by the specifications, including demonstrations, training, testing, preparation and submission of testing reports.
- .4 Available for emergency and troubleshooting service during the first year of occupancy and modification outside the responsibilities of the O&M personnel.

5.2.20 CONSTRUCTABILITY

- .1 The extent to which the design of the building facilitates the ease of construction, which is subject to the overall requirements for the completed building project.
- .2 The effective and timely integration of construction knowledge into the conceptual planning, design, construction, and field operations of a project to achieve project goals and building performance at the optimal level by:
 - .1 Implementing a Quality project delivery process which also meets the project objectives in the best possible time and accuracy at the most cost-effective levels; and
 - .2 A balance of various project, environmental and market constraints.

5.2.21 CONSTRUCTION CHECKLIST – CHECKS AND TESTS

- .1 Also known as Design Builder's Cx "systems readiness checklist".
- .2 Confirms specified equipment is provided, undergone Static Verification, properly installed, initially Started-up and checked out in preparation for full operation and Functional Performance Testing.
- .3 Refer to CSA Z320 Article 4.4 – Construction Phase.
 - .1 Add to Article 4.4.2 – Pre-construction the following requirements:
 - .1 Cx schedule, and Installation start-up lists.

5.2.22 DESIGN BUILDER

- .1 The Design Builder team of architectural, conveyancing, engineering professionals and Contractor with whom PWGSC has contracted to provide services described in this TOR.



5.2.23 COST ESTIMATE

- .1 Refer to the *Doing Business with PWGSC Documentation and Deliverables Manual*, Section 3 - Cost Estimates for further Cost Estimate details.
- .2 Cost Estimate as compared to the Budget – see Definition.
- .3 Estimates cost of the Work associated with the overall project at each Project Milestone, and tender packages, Division 01 General Requirements and other supporting activities within the project lifecycle.
- .4 Cost breakdown estimating is formatted as per PPDFormat™ and MasterFormat™ National Master Specifications:
 - .1 During Schematic Design (SD) – Uniformat™ Level 3 detail;
 - .1 For further detail refer to Preliminary Project Description (PPD/PPDFormat™) Definition.
 - .2 During Design Development (DD) – as per Uniformat™ Level 4 detail;
 - .1 For further detail refer to Preliminary Project Description (PPD/PPDFormat™) Definition, and;
 - .3 During Construction Documentation (CD) – as per Uniformat™ Level 5 detail and as per MasterFormat™ - Divisional and Sectional details;
 - .1 National Master Specifications (NMS) is the basis for construction specifications.
- .5 For all Cost Estimates include the Basis of Estimate (BOE) – refer to Definition.

5.2.24 CONSTANT DOLLAR ESTIMATE

- .1 This is an estimate expressed in terms of the dollars of a particular base fiscal year.
- .2 It includes no provisions for inflation.
- .3 Cash Flow over a number of fiscal years may also be expressed in constant dollars of the base year including no allowance for inflation in the calculation of costs.
 - .1 For Current Dollar Estimates – see Definitions.

5.2.25 CURRENT DOLLAR ESTIMATE

- .1 Budget Year Dollars is also to be referred to as Nominal dollars.
- .2 An estimate based on costs arising in each Fiscal Year (FY - ending March 31) of the project schedule.
- .3 Escalated to account for inflation and other economic factors affecting the period covered by the estimate.
- .4 Costs and benefits across all periods should initially be tabulated in Budget Year Dollars for the following reasons:
 - .1 It is the form in which financial data is usually available;
 - .2 Tax adjustments are accurately and easily made in Budget year dollars; and
 - .3 It enables during analysis, the construction a realistic picture which takes into account changes in relative prices.



.5 Constant Dollar Estimate – see Definitions.

5.2.26 DEPARTMENTAL REPRESENTATIVE (DR)

.1 The person designated in the Contract, or by written notice to the Design Builder, to act as the Departmental Representative for the purposes of being a Contract entity.

5.2.27 ESTIMATED CONSTRUCTION COST

.1 The Budget identified in the TOR or subsequently in writing by the Departmental Representative:

.1 Also stated as “Cost Estimate”.

5.2.28 FACILITY TURNOVER

.1 Refer to CSA Z320 Article 4.7, Facility Turnover Activities.

.1 Add to Article 4.7 the following review requirements:

.1 Review signatories, client/stakeholder, of a document agreeing to accept project outcomes and/or on the condition that all recorded deficiencies are to be addressed as appended;

.1 Facility Turnover Activities are required where the project or part of the project (“partial interim occupancy”) is being turned over.

5.2.29 FUNCTIONAL PERFORMANCE TESTING

.1 Refer to CSA Z320 Article 4.5, Functional Performance Testing.

.1 For further detail refer to ASHRAE 202, Article 13 Issues and Resolution Documentation – Article 13.2 Requirements.

.1 Review Functional Performance Testing data entry in the Issues and Resolutions log according to ASHRAE 202, Section 13, including:

.1 Tests at peak load conditions as identified in the Cx Plan.

5.2.30 INTERIM ACCEPTANCE

.1 Refer to CSA Z320 Article 4.6, Interim Acceptance.

.1 Add to Article 4.6 (i) the following requirements:

.1 System Operations Manual and Standard Operating Procedures, including;

.1 Normal and emergency mode of operations, and;

.2 Life and Safety Compliance Report.

.2 Interim Acceptance will be synonymous with Substantial Completion as per GC’s of the Construction and Consultant Contract.

5.2.31 ISSUES/RESOLUTION (I/R) LOG

.1 The I/R Log contains description of project issues and/or variances ranging from specifics such as with the Owner Project Requirements (OPRs) to general design and construction and related processes and deliverables.

.1 On an ongoing basis the log maintains the status of current/ongoing and resolved issues;

.2 Issues are identified and tracked as encountered during all design phases, construction and operations of the facility.



- .2 I/R Log is also included as an item in:
 - .1 The meeting Design and Construction agenda; and
 - .2 The monthly construction phase report on the Cx Plan.
- .3 For more information on what needs to be documented also refer to ASHRAE Guideline, The Commissioning Process.

5.2.32 LIFE CYCLE COSTING (LCC)

- .1 LCC methodology, used during investment analysis and planning, design, construction and procurement, employs a comprehensive economic comparison of competing options.
- .2 Comparison of competing options is to be made between ideas similar in nature that are designed to satisfy the same basic function or set of functions.
- .3 LCC interpretation, as related to competing options assessment.
 - .1 The sum of the present values that are associated with investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs, over the lifetime of the project.
- .4 Refer to industry standard practices for measuring life cycle costs of the building and building systems such as, ASTM Standards.
- .5 Also refer to Value Engineering (Assessment) Definition.

5.2.33 MASTER SCHEDULE (MASTER PROJECT SCHEDULE)

- .1 Refer to the Doing Business with PWGSC Documentation and Deliverables Manual.

5.2.34 OPERATION AND MAINTENANCE MANUAL(S) (O&M)

- .1 Developed throughout the project lifecycle.
- .2 Produced by the Design Builder and is part of the Collaborative Project Delivery integrated process and is supported by Departmental Representative.
- .3 Requires Cx Process Manager sign-off at contract Substantial Performance.
- .4 Prepared using product information report forms/data provided by Subcontractors, Own Forces and information from other sources as required.
- .5 Refer to NMS Division 01 General Requirements document for further detail.

5.2.35 OWNER PROJECT REQUIREMENTS (OPR)

- .1 Refer to CSA Z320 Article 3, Definitions.
 - .1 For further detail refer to ASHRAE 202, Article 6 - Owner's Project Requirements, Article 6.2 – Requirements.
- .2 Developed by the Design Builder, in consultation with "the Owner" - PWGSC/User Department, during the Pre-Design Project Milestone.
- .3 Text and graphics are organized to facilitate future use as a building reference document.
 - .1 BOD and OPR are components of the Cx Manual.



- .4 A dynamic document throughout the project lifecycle that defines the Owner's values and end goals; their ideas, concepts and end state quantifiable and measurable performance benchmarks/criteria by usage, by systems and/or by occupancy classification associated with topics such as:
 - .1 Project Program – pertinent Functional (Space) Program extracts, such as;
 - .1 Basic facility data (such as, area, number of stories Occupancy and construction type(s)), user/area usage schedules, restrictions and limitations, expandability, flexibility and durability (life span).
 - .2 Environmental and Sustainability Goals including;
 - .1 LEED® certification, CO₂ monitoring, and resource reuse.
 - .3 Energy Efficiency Goals including;
 - .1 Measures affecting lighting and HVAC energy efficiency such as orientation shading, ventilation and renewable power.
 - .4 Indoor Environmental Quality Requirements regarding;
 - .1 Lighting, temperature and humidity, acoustics, air quality, ventilation and filtration, controls adjustability, after hour's accommodations, natural daylighting, ventilation and views.
 - .5 Equipment and system Expectations, such as;
 - .1 Levels of quality, reliability, flexibility, maintenance, complexity and target efficiencies, building system technologies regarding manufactures, acoustics, vibration, degree of integration, automation and functionality for controls load shedding and demand and response energy management.
 - .6 Building Occupant and O&M Personnel Expectations;
 - .1 Building operation description and by whom and at what capability, level of training and orientation for occupants and O&M staff.
 - .7 Cx Process Manager Information;
 - .1 Name of Agency/Firm and contact person(s) and address name, address and personnel contact.
- .5 Starting with the Pre-Design project milestone the OPR is the foundation of the Commissioning Process - an integral part of Commissioning and future Re-Commissioning.
 - .1 Working through the various other Project Milestones is supported by the BOD documenting that the various decisions, concepts, designs, calculations, and product selections to meet the OPR.

5.2.36 PARTNERING SESSION WORKSHOP(S)

- .1 Partnering is used in the architecture, engineering and construction industry and is intended to assist Project Teams with setting goals, resolving disputes and improving project outcomes.
- .2 Workshop(s) are facilitated by the Consultant or designate. Participants include the Owner/User Department, Project Team and other



stakeholders. Initial workshops establish relationships and ground rules, and then draw out essential client needs and design requirements.

- .3 Topics include, but are not limited to:
 - .1 Role and responsibilities matrix;
 - .2 Rules of engagement;
 - .3 Communication plan;
 - .4 Project status, goals, objectives, elements, scope, funding, and preliminary schedule;
 - .5 Deliverables plan;
 - .6 Measures of percentage complete and delivered;
 - .7 Issues tracking and documentation systems;
 - .8 Project risks and the initial Risk Management Plan;
 - .9 Review of existing available documentation and project site conditions;
 - .10 Schedule of biweekly (or as otherwise determined by the Departmental Representative) project and milestone meetings; and
 - .11 Communication and document control plan.

5.2.37 PERMITS AND FEES

- .1 Refer to the Contract Documents, General Conditions (GCs).

5.2.38 PRELIMINARY PROJECT DESCRIPTION (PPD/PPDFORMAT™)

- .1 PPDFormat™ is a guideline document published by the Construction Specification Institute (CSI).
 - .1 A tool to evaluate the design practicality during the design phase.
 - .2 The guide assists with an appropriate level of documenting qualitative and quantitative descriptions of “functional elements” – Elements and their respective Elemental Components, systems and assemblies comprising the project during the Schematic Design (SD) and Design Development (DD) Project Milestones.
 - .1 Associated deliverables are integral documents of the SD and DD Reports.
 - .3 PPD is organized using the Uniformat™ hierarchical structure and corresponding Level of Detail (LoD) - levels 1–5.
 - .1 Elemental and Elemental Components LoD breakdowns parallel preliminary project cost estimating formats, providing corresponding quantitative cost estimates per functional element, elemental component and related qualitative descriptions.
 - .2 The Consultant and Departmental Representative are to agree on the LoD based on the required accuracy of the Cost Estimate to secure funding, manage cash flow or address risk.
 - .4 LoD may also be dependent on factors such as:
 - .1 How PPD may be used to throughout the design and documentation process to provide for opportunities, such as;



- .1 Tracking decision progressions during design options development and final selection of preferred/optimum solution;
 - .2 Function elements complexities, and;
 - .3 Design decisions progression, such as, designing from the exterior into the interior.
- .2 Preferred delivery format during the SD and DD Project Milestones is the "Outline Format Full Page Example" on page number 25 of the PPDFormat™ Guide.
 - .1 The Outline Format facilitates design progression tracking throughout the design phase Project Milestones.
- .3 With reference to the "Outline Format Full Page Example" and the outlined Element Levels, the LoD during the SD and DD Project Milestones is as follows:
 - .1 SD, Level 3 detail, complete with a "Description" article providing a generic description of the Level 3 functional element supported by a Basis of Design narrative may also be substantiated by the OPR;
 - .1 Corresponding, per Level 3 detail, Cost Estimate – Class 'C', +/- 15%.
 - .2 DD, Level 4 detail, complete with a "Description" article providing a generic description of the functional element supported by a Basis of Design narrative may also be substantiated by the OPR;
 - .1 Corresponding, per Level 4 detail, Cost Estimate – Class B, +/- 10%.
- .4 Construction Documents, Level 5 detail:
 - .1 While Levels 1-4 may be defined in PPDFormat™ for Levels 5 and beyond, UniFormat™ 2010 considers these Levels discretionary requiring user definition;
 - .2 Level 5 detail includes, as per "Outline Format Full Page Example", the following articles:
 - .1 Functional Requirements addressing Element overall requisite including;
 - .1 Performance Requirements of the assembly that are quantifiable, measurable and,
 - .2 Design Requirements that, for example, may affect cost or be related to design quality regarding aesthetic, utility, performance or impact, but are not directly component attributes.
 - .2 Components, a parts listing making up the functional element, complete with attributes that are prescriptive and/or performance based;
 - .1 Each Component is accompanied by a corresponding MasterFormat™ Section number to be the basis for Construction Documentation (CD) specifications.
 - .3 Additional outline headings to be considered include;



- .1 Alternates, for consideration of their effect on cost or schedule,
 - .2 Material/equipment Location Schedules,
 - .3 Workmanship and Fabrication requirements affecting cost,
 - .4 Reports associated with Codes, fire and zoning searches.
- .3 Corresponding, per Level 5 detail, Cost Estimate – Class 'A', +/- 5%.

5.2.39 PROJECT PROCEDURES PLAN

- .1 A dynamic and evolving Plan to establish how the design, construction and closeout process will be structured to deliver projects on time and within budget and scope.
- .2 A measure against which performance is evaluated and success is judged.
- .3 Includes items such as:
 - .1 Organization and communication charts;
 - .2 Master Project Schedule complete with a detailed Work Breakdown Structure;
 - .3 Quality Management Plan, a procedures and documentation plan to determine for example documentation completeness and suitability, testing, inspection and submissions requirements;
 - .4 Construction procurement options and /or number and sequence of tender packages;
 - .5 Contracting/procurement strategies, bid packaging description, bidders' cost breakdowns;
 - .6 Site mobilization;
 - .7 Swing space;
 - .8 Commissioning Plan;
 - .9 Commissioning Issues Log;
 - .10 Project Decision Log;
 - .11 Risk issues log;
 - .12 Record management plan (including e-mails) establishing procedure regarding collection recording, tracking, access and storage.

5.2.40 PROJECT MILESTONES

- .1 Construction Documentation:
 - .1 Refer to Doing Business with PWGSC Documentation and Deliverables Manual.
- .2 Tender:
 - .1 The Design Builder's Required Service includes activities such as;
 - .1 Provide assistance and advisory services as may be necessary to the Departmental Representative in, obtaining a competitive bid and in awarding a construction contract.
 - .2 Deliverables, such as;
 - .1 Addenda;
 - .2 Written responses to questions, and



- .3 Bid analysis and/or recommendations.
- .3 Construction:
 - .1 The Design Builder's Required Services includes activities such as;
 - .1 Provide assistance and advisory contract administration services to the Departmental Representative to administer the contract as set out in the general conditions of the contract.
 - .2 Review the construction.
 - .2 Deliverables;
 - .1 Multiple deliverables as per;
 - .1 Design Builder's contract general conditions, and;
 - .2 TOR specified Deliverables.
- .4 Close Out:
 - .1 The Design Builder Required Service includes activities such as;
 - .1 Provide assistance in the use and occupancy of the facility.
 - .1 Prior to the 12 month warranty period, review defects or deficiencies observed by the Departmental Representative;
 - .1 Compile items that require the Design Builder's attention to complete the terms of the Contract.
 - .2 Final Deliverable;
 - .1 Year End Warranty Review – defect status.
 - .3 Progressive Deliverables, such as;
 - .1 Lessons learned.

5.2.41 PROJECT TEAM

- .1 Typically includes entities, such as:
 - .1 Departmental Representative,
 - .2 Design Builder Team;
 - .3 Independent third parties also in contract with PWGSC, and;
 - .4 User Department and Operational personnel.

5.2.42 PWGSC COMMISSIONING MANAGER (PWGSC DESIGN BUILDER)

- .1 Government commissioning liaison amongst all project stakeholders and reports to the Departmental Representative.
- .2 Undertakes Quality Assurance Reviews of Cx submissions.

5.2.43 QUALITY

- .1 The degree to which the Work meets or exceeds the Project requirements and expectations.

5.2.44 QUALITY ASSURANCE (QA) REVIEWS

- .1 PWGSC QA Reviews are an advisory service to the Project Team and stakeholders where respective submission/deliverable accountabilities remain in effect as per contractual conditions or other forms of commitment.
 - .1 The Design Builder remains professionally accountable for the design validation and verification required of the Project Milestone submissions during the project life cycle.



- .2 QA Reviews, supported by commentary, conclude with a risk assessment associated with Quality of design and documentation deliverables, and include:
 - .1 Parameters to confirm at the onset of a review whether deliverables are appropriately scoped and detailed with respect to current Project Milestones or phase/progressive submissions.
- .3 QA Reviews focus on Quality Indicators (QI) parameters associated with Design Quality Indicators (DQI) and Quality Deliverable Indicators (QDI).
- .4 Design Quality Indicators (DQI):
 - .1 3 Aspects of DQI:
 - .1 Functionality – design utility;
 - .2 Build Quality – design performance, and;
 - .3 Impact – project contextual interactivity (such as cultural, market, environmental conditions/factors):
 - .1 Project impact on context, and vice versa;
 - .2 Context impact on project.
 - .2 Each DQI Aspect is considered against Good Design Protocols, such as;
 - .1 Creativity and Technical Competence;
 - .2 Functional Suitability;
 - .3 Whole-of-Life Performance;
 - .4 Health, Safety and Security;
 - .5 Inspiring and Attractive;
 - .6 Appropriate Innovation, and;
 - .7 Sustainable and Enduring.
 - .3 As each DQI Aspect is considered against Good Design Protocols, each Aspect is also assessed against the same Characteristics such as:
 - .1 Conceptual Integrity;
 - .2 Functionality;
 - .3 Operability;
 - .4 Constructability, and;
 - .5 Claims Prevention.
- .5 Quality Deliverable Indicators (QDI):
 - .1 Focus on documentation delivery.
 - .1 Submitted documentation is assessed against 6 characteristics:
 - .1 Clarity;
 - .2 Completeness;
 - .3 Compliance;
 - .4 Consistency;
 - .5 Correctness, and;
 - .6 Decision Traceability.

5.2.45 QUALITY MANAGEMENT PLAN



- .1 Quality Management goal is to assure:
 - .1 Design Quality;
 - .1 Confirmation design satisfies the Project Requirements,
 - .2 Complementary design principles,
 - .3 Planning/layout efficiency,
 - .4 Accuracy, adequacy, conformance to standards of practice, compliance with codes and standards, cost effectiveness, quality, and fitness for purpose and function as per the TOR.
 - .2 Construction Quality;
 - .1 Construction preparation – review schedule and check points,
 - .2 Follow-up of inspection and testing to confirm on-going performance compliance,
 - .3 Final acceptance.
 - .3 Management Quality;
 - .1 Management assignments,
 - .1 Managers associated with design, project and construction,
 - .2 Quality process reporting and resolution forums,
 - .3 Decision making protocols.
 - .2 Document control,
 - .3 Risk management program.

5.2.46 RECOMMISSIONING MANUAL

- .1 Deliverable by Design Builder's Cx Process Manager/Cx Authority.
- .2 Refer to CSA Z320 Article 4.9.4, Recommissioning manual.

5.2.47 RISK MANAGEMENT PLAN

- .1 Departmental Representative (DR) initiates and maintains a PWGSC RM Program.
- .2 The objective of the Plan is to develop a methodology to improve risk management by:
 - .1 Establishing risk policies to confirm acceptable levels of non-compliance as per DR Risk Management Plan;
 - .2 Focusing on external and internal risk parameters, and;
 - .3 Articulating an approach/framework to identifying risk and its impact in advance and managing the risk with the goal of reducing, transferring or avoiding risk where appropriate.
- .3 Program and Plans are collaboratively monitored and amendments are proposed to the DR by the Project Team as required for an effective project delivery.

5.2.48 STANDARD OPERATING PROCEDURES

- .1 Systems Operations Manual component.
- .2 Procedures are to meet the Canada Labour Code requirement of "every employer" (User Department) by way of "a qualified person to set out, in writing, instructions for operations, inspections, testing, clearing and maintenance" of various components, systems and integrated systems.



- .1 Updated throughout the building lifecycle for continued safety and consistent Work practices.
- .2 Capable of being the basis for the development of Departmental policies.
- .3 Includes site specific:
 - .1 Equipment, chemicals and other concerns such as life safety compliance, emergency provisions/procedures, security, access, sustainability and the environment.
 - .2 Series of flow charts designed to model the actions, activities and network of interconnected activities associated with systems and related operations and maintenance.

5.2.49 STATIC VERIFICATION

- .1 Refer to CSA Z320 Article 4.4.4, Static Verification.
 - .1 Add to Article 4.4.4 the following review requirements:
 - .1 Review select equipment certificated of authenticity (such as, circuit breakers).

5.2.50 SUB-PROJECT

- .1 User Department/Departmental Representative project Work completed by a Departmental Service Provider requiring a coordinated delivery in a main capital Works project, for example:
 - .1 IT Works, Furniture delivery and installation;
- .2 If Work takes place in the same space and time as capital Works then capital Work's health and safety plan governs Sub-Project Work.

5.2.51 SYSTEMS

- .1 Refer to CSA Z320 Article 5, Specific systems.
 - .1 Require confirmation of other systems, such as those that may relate to, for example:
 - .1 Civil Engineering;
 - .1 CSA Z320 currently considers related systems outside the building foot print and therefore not included in the Standard;
 - .2 Sound Masking;
 - .1 As part of CSA Article, 5.1.3.4, Interior Space, Functional Performance Testing;
 - .3 Duct Pressure Tests and Indoor Air Quality (IAQ) Tests;
 - .1 As part of CSA Article, 5.4.3.4, Mechanical Systems, Functional Performance Testing.

5.2.52 SYSTEMS OPERATIONS MANUAL (SYSTEMS DESCRIPTIONS/SYSTEMS MANUAL)

- .1 Developed throughout the project lifecycle.
- .2 Refer to CSA Z320 Article 3, Definitions.
- .3 Extend the CSA Definition to include in emergency conditions as a mode of operation.



- .4 Normally produced by the Construction Manager/Contractor and as part of the Collaborative Project Delivery integrated process with Support by the Consultant and Departmental Representative.
 - .1 Requires Cx Process Manager sign-off at contract Substantial Performance.
- .5 Standard Operating Procedures document is a component of the Systems Operations Manual – see Definition.

5.2.53 UNIFORMAT™

- .1 A uniform, hierarchical classification structure of construction systems and assemblies.
 - .1 Current version – CSI/CSC Uniformat™, 2010 edition.
- .2 UniFormat™ organizational structure also guides the development and delivery of:
 - .1 Cost estimates – refer to Definition for further detail and;
 - .2 PPDFormat™, Preliminary Project Descriptions during the design phase – refer to Definition for further detail.

5.2.54 VALUE ENGINEERING (VE)

- .1 Value Engineering (Assessment) methodology, as related to competing options assessment, emphasizes the return-on-investment aspect of decision making in terms of LCC to maintain or improve the desired levels of capability and performance during planning, design, construction and procurement.
 - .1 When the options satisfy the required function, then the best value option is to be identified by comparing the first costs and life-cycle costs of each alternative.
- .2 Refer to industry standard practices for value methodologies associated with buildings and building systems such as, SAVE and ASTM Standards.
- .3 Also refer to Life-Cycle Costs definition.

5.2.55 WORK

- .1 Refer to Contract Documents: General Conditions (GCs).

5.2.56 WORK BREAKDOWN STRUCTURE (WBS)

- .1 Integral to schedules and project execution plans.

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