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TERMINOLOGY AND ACRONYMS

The following terminology and acronyms are used in this document:

Athena Institute's Environmental Impact Estimator - The Athena Sustainable Materials Institute's EIE/EC tools are used to conduct a life-cycle assessment to determine the environmental impact of major construction and renovation projects. These tools enable informed decisions, at different levels of detail and precision, estimate the environmental impact of construction materials and their use in building projects, focusing principally on concrete, steel and wood.

Building The former CBC Headquarters (also known as the former Edward Drake Building) located at 1500 Bronson, including the guardhouse (but excluding Annex F)

Building Components and Connectivity (BCC)

Components Furniture fixtures and equipment including, built-in furniture and equipment.

Connectivity Information technology (IT), multi-media (MM), Integrated Security Systems (ISS).

Building Automation System (BAS) Also referred to as Energy Management Control System (EMCS)

CHP Confederation Heights Central Plan

Conservation All actions or processes that are aimed at safeguarding the tangible character-defining elements of a heritage place to retain its heritage value and extend its physical life. This may involve preservation, rehabilitation, restoration, or a combination of these actions and processes.

General Contractor (GC) - A general contractor (GC) is the main contractor on a construction project utilizing a fixed price (stipulated sum). His/her responsibility is to ensure that the project is completed according to the client's specifications, as well as in compliance with the law. The GC will hire subcontractors in order to get the work done based on the Construction Documents.

Crime Prevention Through Environmental Design (CPTED) - CPTED is a proactive design philosophy built around a core set of principles that is based on the belief that the proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime as well as an improvement in the quality of life.

Drawings The 2-Dimensional drawings generated from the Building Information Model. All drawings designated as deliverables must follow the requirements of the PWGSC National CADD Standard.

DR Departmental Representative

EMCS Energy Monitoring and Control System, also referred to as Building Automation System (BAS)

Environmental Consultant (EC) - The firm, contracted by PWGSC, to provide analysis, design, and construction documents for removal of hazardous materials.

Federal Heritage Buildings Review Office (FHBRO) - The primary objective of Parks Canada's FHBRO is to assist federal government departments in the protection of their heritage Buildings, in accordance with the Treasury Board Policy on Management of Real Property.

Federal Sustainable Development Strategy (FSDS) - The document that sets out the sustainable development strategy objectives for the Federal Government of Canada on a three-year cycle. Departments that must respond to the FSDS, including PWGSC, state their own objectives in response to the FSDS in the annual Report on Plans and Priorities (**RPP**) and their actual performance in the annual Departmental Performance Report (**DPR**). These minimum sustainability commitments established by PWGSC for all Real Property Projects are further detailed in the *Real Property Sustainability Framework v2015 (RPSF)* (addressing the government wide commitments set forth in the Federal Sustainable Development Strategy (FSDS) 2013-2016). Updated PWGSC strategic goals and priority focus areas have been further advanced in the recently approved *Real Property Sustainable Development and Environmental Strategy (2018)* that align with the GoC's latest sustainability policies including *Federal Development Sustainability Strategy 2016-2019* and the *Treasury Board Greening Government Strategy*.

Full Capital Replacement Plan - A capital replacement plan lists all the major building components, such as windows, doors, siding, roofs, heating systems, and flooring, and provides an estimate for the remaining useful life of the components, and their replacement cost. With this information, an organization can calculate how much to set aside in annual reserves to meet future repair and replacement needs. A capital replacement plan is not a maintenance plan. A maintenance plan is also a useful tool, but it focuses on yearly maintenance items, such as painting, cleaning, minor building repairs and upkeep, rather than on the replacement or repair of major building components."

Geotechnical Services Consultant - The firm separately contracted by PWGSC to provide geotechnical services.

Green GlobesGreen Globes (formerly BREEAM/Green Leaf) is a points-based rating system used to assess the environmental performance of buildings. It can be used for both new construction (including major renovations) and for interior space fit-ups of existing spaces. Buildings are awarded one to five 'Green Globes' based on their score. **GHG Guidelines** – PWGSC Greenhouse Gas Guidelines (2018) were developed to analyse planning and design options. This methodology relies on Building energy modelling and simulation to quantify the energy savings, energy cost savings and GHG emission reductions of energy conservation measures with the use of lifecycle cost assessments

Heritage AssetsThe broad encompassing term used to describe tangible character defining elements and the integrated arts in a Building. They include a range of cultural property managed and cared for by various custodians. They are divided into the following three categories.

MovableFurnishings and other portable assets, e.g. movable furniture, wall-hung fine art, historical material culture and portable sculpture.

Fixed-removableHeritage elements that are fastened to the base Building fabric using screws or other fastening devices which can be easily unfixed, e.g. light fixtures, grilles, radiators, doors, hollow-metal partitions demountable wood panels and wall mounted handrails.

FixedHeritage elements which are fixed or embedded into the Building fabric which, if possible to remove, would require extensive effort and careful disassembly, e.g. woodwork, stainless steel, marble and stone finishes.

Heritage Conservation Services (HCS) - PWGSC's Centre of Expertise for Heritage Conservation, that provides expert advice and quality assurance for key architectural, conservation, engineering and landscape architecture professional disciplines. For work on federal heritage Buildings, HCS takes a lead design advisory role (also known as design management) and assembles a team of professionals from within PWGSC Technical Services sector, to provide expert advice throughout the project. Members of the design management team come from PWGSC Technical Services Architecture and Environmental Services.

Leadership in Energy and Environmental Design (LEED) – Is a voluntary, third party certified, green Building rating system that evaluates the environmental performance of whole Buildings during the design, construction and operational phases of the Building's life cycle.

Life Cycle Assessment (LCA) - A scientific method for measuring the environmental footprint of materials, products and services over their entire lifetime (Ref: Athena Sustainable Materials Institute, <http://www.athenasmi.org/>) and is requested for 25 and 40 years. Under the RPSF v.2015, all new building construction and major renovation projects of over \$5 million will undergo a life-cycle assessment of the major building elements (structure and envelope) using the Athena Sustainable Materials Institute's *Environmental Impact Estimator*. The LCA must be completed at Schematic Design in order to be utilized as a design-assist tool.

Life Cycle Cost (LCC) – Life Cycle Cost (LCC) considers the cost of purchasing/installing, operating & maintaining, repairing and then disposing of the product, system or Building component being analyzed compared to other products or systems. LCCA ensures that the lowest overall cost is selected.

Living Building Challenge - The Living Building Challenge is intended as a philosophy, advocacy tool and certification program that promotes the most advanced measurement of sustainability in the built environment. It can be applied to development at all scales, from buildings – both new construction and renovation – to infrastructure, landscapes, neighborhoods and communities and is more rigorous than green certification schemes such as LEED or BREEAM. Living Building Challenge comprises seven performance areas: site, water, energy, health, materials, equity and beauty, each of which are further subdivided into a total of twenty Imperatives.

Model Building Information Model (BIM) - A Model is the product of the modelling process and is an object-based digital representation of the physical and functional characteristics of a facility. The (*Building Information*) Model serves as a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its lifecycle from inception, design, construction and onward, as well as defined use cases such as heritage asset management or Building automation.

National Capital Commission's Sustainable Development Strategy (2018–2023) – the NCC's Sustainable Development Strategy provides a focused and innovative agenda for environmental leadership in Canada's Capital Region, and serves as an overarching element to be included in all of the NCC's plans, strategies, policies and operations. The strategy aligns with the Federal Sustainable Development Strategy, the Greening Government Strategy and the United Nations Sustainable Development Goals. The strategy is founded on six principles, leadership, transparency and accountability, collaboration, public participation, natural capital in decision making & social equity; supported by thirty-six actions which have been identified to be completed by 2023.

National Energy Code of Canada for Buildings (NECB) - The National Energy Code of Canada for Buildings (NECB) provides minimum requirements for the design and construction of energy-efficient buildings and covers the building envelope, systems and equipment for heating, ventilating and air-conditioning, service water heating, lighting, and the provision of electrical power systems and motors

One Planet Community - One Planet Communities are assessed based on ten One Planet Living principles, developed with recognition of the natural ecological limits of the planet, and the intended creation of supports, both designed and programmatic, for people to live happy, healthy lives, while also leaving space for wildlife and wilderness. One Planet Community status, represents not just endorsement of green building standards, but an ongoing commitment to all aspects of sustainable development through the lifetime of a project, with a publicly-available 'One Planet Action Plan', annual progress reports and publically available results.

Project All services and work required to fulfill the work described in this Project Brief.

Project Delivery Close-Out - Completion of the project management activities relative to the Delivery Phase of a project and to provide an assessment of the project performance against its objectives and requirements.

Project Management Support Services (PMSS) - The Project Management entity in contract with PWGSC for project management support services for this project.

Project Management Team - (PM Team) The combined PWGSC Project Management and PMSS Team, including the Cost Consultant and Schedule Consultant responsible for project and program management.

Project TeamThe combined private sector and government sector team responsible for delivering the project including the PM Team, Consultant, GC, representatives from PWGSC, the Users and other government organizations.

PWGSC Real Property Sustainable Development and Environmental Strategy (RP SDES, 2018) - Identifies four long-term strategic goals that addressing all three “pillars” of sustainability: the environment, the economy, and society. The goals Mission Zero, Community Integration, Thriving Culture, and Client Service Excellence, are supported by short, medium and long term initiatives that integrate all aspects of sustainability.

Real Property Sustainability Framework (RPSF) v.2015 – integrates and summarizes PWGSC’s diverse green building commitments, including targets, implementations strategies, and best practices referenced in this document. The framework addresses the government wide commitments set forth in the 2013-2016 version of the Federal Sustainable Development Strategy (FSDS), and includes requirements pertaining to GHG emissions reductions, property environmental performance, and water management, among others.

SITES ProgramSITES is used by landscape architects, designers, engineers, architects, developers, policy-makers and others to align land development and management with innovative sustainable design. SITES offers a comprehensive rating system designed to distinguish sustainable landscapes, measure their performance and elevate their value. SITES certification is for development projects located on sites with or without buildings—ranging from national parks to corporate campuses, streetscapes to homes, and more, and is often used in partnership with LEED or other building-specific assessment tools.

Substantial Performance

1. The construction work shall be considered to have reached Substantial Performance when a) the Owner or a substantial part thereof has passed inspection and testing and is, in the opinion of the Owner, ready for use by the Owner or is being used for the intended purposes; and b) the construction work is, in the opinion of the Owner, capable of completion or correction at a cost of not more than:

- i. 3 percent of the first \$500,000;
- ii. 2 percent of the next \$500,000; and
- iii. 1 percent of the balance of the Contract Amount at the time this cost is calculated

Treasury Board’s Greening Government Strategy (TB GGS) - The Treasury Board of Canada Secretariat states that through its Greening Government Strategy, the Government of Canada will transition to low-carbon and climate-resilient operations, while also reducing environmental impacts beyond carbon. The Strategy seeks to ensure that Canada is a global leader in Greening government operations with commitments that address real property, greenhouse gas emissions (scope 1, 2, 3), and adaptation to climate change through climate-resilient design and delivery. Real property goals addresses low carbon, water, material (including lifecycle analysis) waste, and operations, while expressing commitment toward implementing green

building principles, and ensuring the sustainability and resiliency of its real property portfolio.

Useable Floor Area.....Useable space to accommodate fit-up requirements does not include Building loss factor or circulation.

UsersThe occupants of the Building after the rehabilitation and fit-up construction is completed.

Value Engineering (VE) - A creative, organized effort, which analyzes the requirements of a project for the purpose of achieving the essential functions at the lowest total costs (capital, staffing, energy, maintenance) over the life of the project or system. Through a group investigation, using experienced, multi-disciplinary teams, value and economy are improved through the study of alternate design concepts, materials, and methods without compromising the functional and value objectives of PWGSC.

Viable Schematic Design Option - All Schematic Design Options must respect the objectives of the Project of cost, schedule, design and heritage quality and sustainability while satisfying the requirements of the swing space and the long-term Functional Programs in order to be “viable”.

WELL Building Standard - Focusing exclusively on the health and wellness of the people in buildings, WELL is a performance-based system for measuring, certifying and monitoring features of the built environment that impact human health and well-being. Domains examined are air, water, nourishment, light, fitness, comfort and mind. The Standard pairs best practices in design and construction with evidence-based medical and scientific research, seeking to harness the built environment as a vehicle to support human health and wellbeing.



Figure 1: Exterior of 1500 Bronson with indications of some character-defining features. [Source of photograph: PWGSC HCS, 2017]

PD 1 PROJECT INFORMATION

This Project Brief identifies the requirements to deliver the 1500 Bronson Rehabilitation Project and provides overall project information. The Project Brief is divided into two (2) main sections: Project Description (PD) and Description of Services. The Description of Services is further divided into two (2) main sections: Project Administration (PA) and Required Services (RS).

1. Project Information

Public Works and Government Services Canada (PWGSC) intends to retain an architectural firm in the capacity of Prime Consultant, supported by a multidisciplinary team of sub-consultants and specialists, for the design and implementation of the 1500 Bronson Avenue Rehabilitation Project, including all base building systems as well as the fit-up of office and special purpose space.

The Prime Consultant (Consultant) should: review all related documentation further described herein; recommend and perform further examination of the Building as required; prepare a minimum of three (3) distinct viable design options; develop the PWGSC preferred design to construction tender documents; perform construction and contract administration services; and provide design management services including cost, scheduling, project control, and commissioning services required for this Project. The delivery of the Consultant services is anticipated to be a continuous process from contract award to Project delivery closeout.

Construction should be implemented by a General Contractor (GC), hired by PWGSC under a separate contract.

This Project Brief is intended to provide overall project information and identify the project requirements proponents need to submit a proposal to provide Prime Consultant Services. Information concerning PWGSC standards and policies for Consultant Services is provided in “Doing Business with PWGSC”, and should be adhered to in conjunction with requirements of this Project Brief.

1.1 Project Identification

Project Title:	1500 Bronson Rehabilitation Project
Location of the Project:	1500 Bronson Avenue, Ottawa, Ontario, Canada
Project Number:	R.076861
Users:	TBD

PD 2 PROJECT DESCRIPTION

2. Project Description

2.1 Project Overview

The purpose of this Project is to rehabilitate and modernize the base building, services and structure of the Building so it can accommodate an office occupancy for its long-term use, as well as revitalize the site to support PWGSC's master plan vision and sustainability objectives

The Project scope of work includes, but is not limited to:

- Site development and Civil work;
- Urban Design to fit with surrounding urban fabric
- Limited excavation, as required by the final design;
- Architectural rehabilitation;
- Heritage conservation;
- Accessibility;
- Selective demolition and abatement of designated substances, as required by the final design;
- Demolition of existing mechanical, electrical, fire protection, and control systems
- Sustainable building and site revitalization, certifying to LEED V4 Platinum, 5 Green Globes or equivalent industry standard, integrating health and wellness design solutions based on recognized industry standard such as WELL v2 Core or Fit Well ;
- Structural, seismic and building envelope upgrades;
- Mechanical and electrical systems including fire protection, energy monitoring and control system (EMCS) and provision of two emergency generators with fuel supply system
- Refurbishment of vertical circulation and loading dock;
- New building Components and Connectivity (BCC) including all furniture fixtures and equipment (FF&E) and information technology (IT), multimedia (MM), and security requirements; and
- Interior office fit-up

2.2 Building Users

There is no building user identified for the project yet and the project scope will incorporate generic fit-up.

2.3 Classified Heritage Building

The Building was designated a "Classified" Federal Heritage Building in 2003. The heritage value is described in the Heritage Character Statement, including "The Edward Drake Building is one of the

best examples of Canadian modern architecture, particularly in its representation of the expressionist strain of modernism.”

2.4 Cost

The Consultant's design is expected to ensure the construction cost stay within the construction preliminary budget (Class D Estimate) as outlined below. It is the Consultant's responsibility to manage the Project's scope within the construction budget. The current indicative estimate (not including HST, risk allowance or professional fees) is as follows:

	Base- Building	FIT-UP
A - SUBSTRUCTURE		538,134
A10 - FOUNDATIONS	494,870	
A20 - BASEMENT CONSTRUCTION	43,264	
B - SHELL		10,362,336
B10 - SUPERSTRUCTURE	3,146,506	
B20 - EXTERIOR ENCLOSURE	6,063,680	
B30 - ROOFING	1,152,150	
C - INTERIORS		4,729,681
C10 - INTERIOR CONSTRUCTION	405,645	1,053,496
C20 - STAIRS	400,000	0
C30 - INTERIOR FINISHES	2,535,216	335,324
D - SERVICES		20,807,580
D10 - CONVEYING	252,000	0
D20 - PLUMBING	963,822	39,748
D30 - HVAC	10,725,694	383,290
D40 - FIRE PROTECTION	391,299	134,846
D50 - ELECTRICAL	4,672,028	3,244,853
E - EQUIPMENT & FURNISHINGS		4,680,300
E10 - EQUIPMENT		
E20 - FURNISHINGS		4,680,300
F-SPECIAL CONSTRUCTION & DEMOLITION		1,162,040
F10 - SPECIAL CONSTRUCTION		
F20 - SELECTIVE BLDG DEMOLITION	1,162,040	
G - SITE WORK		1,078,000
G10 - SITE PREPARATION	0	
G20 - SITE IMPROVEMENTS	1,078,000	

G30 - SITE MECHANICAL UTILITIES	0	
G40 - SITE ELECTRICAL UTILITIES	0	
G50 - OTHER SITE CONSTRUCTION	0	
Sub-Totals	33,486,214	9,871,857

DIRECT COSTS FOR BUILDING AND FIT-UP (Excl. Design Cont. and Soft Costs)	43,358,071
Z10 - Design Contingency	20% 8,671,614
DIRECT COSTS FOR BUILDING AND FIT-UP (Excl. Soft Costs)	52,029,685
Z20 - GENERAL REQUIREMENTS, ADMINISTRATION & PROFIT	
Z2010 General Requirements	10% 5,202,969
Z2020 Administration and Profit	4% 2,081,187
DIRECT COSTS FOR BUILDING AND FIT-UP (Excl. Construction Contingency)	59,313,841
Z30 WORKING CONDITIONS	
Z3030 - Construction Contingency	15% 8,897,076
TOTAL COSTS FOR BUILDING AND FIT-UP (before taxes)	68,210,917
Z70 - TOTAL TAXES	
Z7020 - HST	13% 8,867,419
TOTAL COSTS FOR BUILDING AND FIT-UP	77,078,337

2.5 Schedule

2.5.1 Key Project Activities

Activity durations are preliminary and the Consultant is responsible for verifying and confirming the feasibility of the Prime Consultant Timeline, below, as part of their scheduling mandate.

Activity	% Complete	Dur	Start	Finish
PHASE 1 - BASE BLDG DESIGN WORK	0%	695d	Thu 20-02-13	Fri 22-12-09
DESIGN (PHASE 1 - BASE BLDG)	0%	60d	Thu 20-02-13	Mon 20-05-11
CONCEPT (SCHEMATIC) DESIGN	0%	130d	Tue 20-05-12	Wed 20-11-18
DESIGN DEVELOPMENT (CONSTRUCTION DOCS - 33% SUBMISSION)	0%	615d	Wed 20-06-10	Fri 22-12-09
CONSTRUCTION DOCS (BASE BLDG & FIT-UP)	0%	615d	Wed 20-06-10	Fri 22-12-09
CONSTRUCTION DOCS - 66% SUBMISSION	0%	615d	Wed 20-06-10	Fri 22-12-09
ADDITIONAL FHBRO REVIEWS	0%	615d	Wed 20-06-10	Fri 22-12-09
INCORPORATE PHASE 2 FIT-UP DESIGN	0%	0d	Wed 21-04-21	Wed 21-04-21

CONSTRUCTION DOCS - 99% SUBMISSION	0%	95d	Wed 21-09-08	Fri 22-01-28
CONSTRUCTION DOCS - 100% TENDER-READY SUBMISSION	0%	30d	Mon 22-01-31	Mon 22-03-14
PHASE 2 - CLIENT FIT-UP DESIGN WORK	0%	175d	Tue 20-08-04	Wed 21-04-21
SPECIFIC SERVICE AGREEMENT (SSA) - CLIENT/PSPC	0%	40d	Wed 20-10-14	Thu 20-12-10
DESIGN (PHASE 2 - CLIENT FIT-UP)	0%	85d	Fri 20-12-11	Wed 21-04-21
CONCEPT (SCHEMATIC) DESIGN	0%	45d	Fri 20-12-11	Mon 21-02-22
DESIGN DEVELOPMENT (CONSTRUCTION DOCS - 33% SUBMISSION)	0%	40d	Tue 21-02-23	Wed 21-04-21
EXPENDITURE AUTHORITY 2 (EA2)	0%	231d	Wed 21-05-19	Thu 22-04-28
IMPLEMENTATION PHASE	0%	887d	Mon 21-02-22	Wed 24-10-02
TENDER CALL, BID EVALUATION & CONSTRUCTION CONTRACT AWARD	0%	251d	Tue 21-08-17	Wed 22-08-24
COMPILE TENDER-READY DOCS (AS PER RPCD)	0%	140d	Tue 21-08-17	Mon 22-03-14
TENDER & AWARD	0%	44d	Mon 22-06-06	Wed 22-08-10
FURNITURE PROCUREMENT	0%	607d	Mon 21-02-22	Mon 23-08-14
CONSTRUCTION ADMINISTRATION	0%	517d	Wed 22-08-24	Wed 24-10-02
CONSTRUCTION	0%	0d	Wed 22-08-24	Wed 22-08-24
BASE BUILDING CONSTRUCTION	0%	235d	Thu 22-08-25	Thu 23-08-10
FIT-UP CONSTRUCTION	0%	261d	Tue 22-11-15	Wed 23-12-06
ISSUE CERTIFICATE OF SUBSTANTIAL PERFORMANCE	0%	0d	Wed 23-12-06	Wed 23-12-06
BCC INSTALLS (PSPC, SSC, CLIENT) / DEFICIENCIES CORRECTIONS / OFF-GASSING PERIOD	0%	201d	Thu 23-12-07	Wed 24-10-02
ISSUANCE OF OCCUPANCY PERMIT - SPACE AVAILABLE FOR CLIENT MOVE-IN	0%	0d	Wed 24-10-02	Wed 24-10-02
DELIVERY CLOSE-OUT PHASE	0%	12mons	Thu 24-12-19	Thu 25-12-11

The Consultant should work closely with the Departmental Representative (DR) to maintain or reduce the durations set out in this schedule. Warranty services should be considered over and above these estimated completion dates.

2.6 Implementation Strategy

The Project implementation strategy should optimize critical decision making in order to prioritize the design and interim approvals, allowing construction to start early and in a streamlined sequence.

2.6.1 Phased Design Method

There should be two design phases: Phase 1 Base Building Design and Phase 2 Office Fit-Up Design. The fit-up design is to be generic. A User may be identified prior to the start of the Phase 2 Office Fit-Up Design. Otherwise, PWGSC will provide the role of the User.

The construction is to be tendered in one package for both the design phases.

2.6.2 Integrated Design Process

In collaboration with the DR, the Consultant should adopt and lead a holistic and integrated approach to the design of this Project. In so doing, the Consultant Team will provide an efficient, cost effective and environmentally responsible approach, recognizing strategies that can facilitate future changes in use and occupancy, while meeting current user needs and project requirements.

It is a methodology for the delivery of a collaborative strategy that should:

- Consider the design, construction, operation and occupancy of the Building and Site over its complete life-cycle, including its integration within the Confederation Heights master plan vision
- Engage the Users and other stakeholders, early in the Project, to develop and realize a common way forward, performance priorities and clearly defined functional, sustainable and economic goals and objectives;
- Build a multi-disciplinary Consultant Team that includes or acquires the skills required to address all design issues;
- Proceed from whole building system strategies working through increasing levels of specificity to realize more optimally integrated solutions, including the following:
 - Establish performance targets for a broad range of parameters, and develop preliminary strategies to achieve these targets.
 - Minimize heating and cooling loads and maximize daylighting potential through orientation, an efficient building envelope and careful consideration of the amount, type and location of fenestration.
 - Meet heating and cooling loads through the maximum use of renewable technologies and the use of efficient HVAC systems, while maintaining performance targets for indoor air quality, thermal comfort, illumination levels and quality, and noise control.
 - Iterate the process to produce design concept alternatives, using energy simulations as a test of progress, and then select the most promising of these for further development
- Use team workshops/partnering sessions as key decision making tools to initiate and stimulate discussions, evaluate options and build consensus.

2.7 Other Stakeholders

In addition to the PWGSC, Consultant, and User, the following should also be considered stakeholders:

2.7.1 General Contractor (GC)

A General Contractor (GC) will be retained by PWGSC for construction.

2.7.2 PWGSC Consultants

The following Consultants will be retained by PWGSC and will report directly to the DR. They will provide additional information, as required, as well as provide third party advice and reviews.

2.7.2.4 Environmental Consultant (EC)

The Environmental Consultant will be responsible for all abatement work and will provide related consultant services. The Consultant and the EC will work closely to establish the Abatement and Demolition Program, for design requirements that have not already been previously addressed. It is expected that the scope of the abatement and demolition package will be required only for work that is directly related to the Consultants final design of the Project.

The Consultant should coordinate with the EC to ensure a seamless delivery of the abatement and demolition scope of work. The EC will provide all field review services during tender and construction for their field of expertise.

2.7.2.5 Geotechnical Services Consultant (GSC)

The Geotechnical Services Consultant (GSC) will provide geotechnical investigations and analysis for the Consultant to incorporate into the design, construction documents, and the Model.

The Consultant should coordinate with PWGSC's GSC, to review the geotechnical reports, to identify areas where additional geotechnical information may be necessary for design purposes, and to work in collaboration with the GSC during construction phase inspections and site monitoring activities.

The Consultant is to include a geotechnical engineer on their team as an advisor only.

2.7.2.6 Cost Consultant (CC)

PWGSC will engage a Cost Consultant to provide Project support. They will operate as an extension of PWGSC's Project Management Team and will provide an independent assessment of the Consultant's cost, risk management and quality assurance services, as well as the GC's construction cost.

2.7.2.7 Schedule Consultant (SC)

PWGSC will engage a Scheduling Consultant to provide Project support. They will operate as an extension of PWGSC's Project Management Team and will provide an independent assessment of the Consultant's scheduling, risk management and quality assurance services, as well as the GC's schedule.

2.7.2.8 Security Consultant (SC)

PWGSC will engage a Security Consultant, if required to provide security-related services. They will provide security support services related to the functional requirements and quality assurance services.

2.8 Building Information Modelling (BIM)

Building Information Modelling (BIM) (referred to as the “Model”) is an object-based digital representation of the physical and functional configuration, characteristics and attributes of a project, and will be used and further developed by the Consultant for the Project.

BIM supports the Integrated Design Process through coordinated and reliable 3D information about a project from design through construction and into operations. PWGSC is transitioning to 3D based portfolio and property management, and as part of the process of transitioning from 2D-based to 3D-based operations, design and construction services are a primary source of professionally validated and coordinated 3D information.

In order to define a scope of work for BIM that meets both immediate Project Objectives and downstream business needs, the following BIM Goals will drive the use of BIM for this Project:

- The improvement of project Design and Construction productivity, collaboration, integration, efficiency and quality through the Integrated Design Process (IDP) and the associated Uses of BIM within the Required Services;
- The improvement of the accuracy and speed of cost estimation and anticipation associated with exercising options or design changes;
- The Conservation of Heritage Value of the Classified Building, and improvement of Heritage Documentation and Asset Management Database associated with the building;
- The reduction of RFIs and Change Orders;
- The effective achievement of Sustainable Development Goals and Targets as outlined (including performance, waste management, reduction of GHG's etc.);
- The successful delivery of base building, office space and grounds fit for a High Security client;
- The improvement of decision-making, phasing and logistics planning, contract administration and oversight processes; and
- The provision of a Record Model at project handover for use in Operations, Maintenance and Portfolio Management.

PWGSC is preparing a BIM for the Project. The BIM for the building will include all visible walls, columns, ceilings, floors, and roofs to a conceptual level. The Consultant should complete the Model as required for construction documents, as well as using the Model for analysis. The BIM for 1500 Bronson will incorporate 3D interior and exterior information and will be constructed primarily using existing as-found 3D terrestrial laser scanning data (captured in 2018) and the original construction drawings to model the wall, column, window and floor compositions. The model will not include any plumbing, electrical and HVAC systems. Exploratory openings would be required to confirm

compositions or details that are not visible, and where the model was constructed using the original construction drawings.

The Consultant should add more detailed information to the model so it can be used as a base for energy modeling, seismic modeling, construction drawings, simulations such as lighting studies and space measurements.

2.9 Related PWGSC Projects

The following are related projects underway which will facilitate the work on the Project. The outcomes of these projects are outlined below.

2.9.3 Confederation Heights Master Plan

A consultant is to be retained in 2019 to develop a master plan for the future densification and improvements to the Confederation Heights campus. This study will proceed separately from the Project for completion and approval. Since the building is designated Classified Federal Heritage Building, rehabilitation and fit-up can proceed before the master plan is finalized. At minimum, the project should align with the Master Plan Vision for Confederation Heights. Close coordination will be required between the Consultant and the Master Plan team as that project evolves. The Master Plan is anticipated to be completed by 2022.

2.9.4 Site Development Options Study

A Site Development Options Study is being undertaken by PWGSC in advance of the Master Plan for 719 Heron (SLTB) and 1500 Bronson sites, in order to provide analysis for prospective clients.

2.9.5 Energy Services Acquisition Project (ESAP)

ESAP is responsible for the modernization of the District Energy System which provides heating and cooling services to over 80 buildings in the NCR. This involves the conversion from steam and high temperature hot water to low temperature hot water (LTHW) as well as providing isolation between the primary distribution system and building systems. The Program has two main focuses; modernizing the Central Heating and Cooling Plants (CHP)/distribution, and user building conversions.

The User Building Conversion Program (UBCP) is responsible for modifying the connected buildings to accept LTHW and allow isolation from the primary distribution system. It should also isolate the CHW from the primary distribution system. This program will follow a typical design-bid-build format with the design being contracted through a Standing Offer Agreement (SOA).

The existing Central Heating and Cooling Plants (CHP)/in Confederation Heights currently provides hot water, chilled water, and electricity. The User Building Conversions Program (UBCP) encompasses the conversion of individual building heating systems from HTHW to LTHW, and cooling system conversion from direct to indirect configurations under Stage 1 of the Energy Savings Acquisition Program (ESAP).

The main objective of UBCP is to have all connected buildings converted and ready to accept the planned LTHW solution in advance of the completion of the CHP and DPS conversions, which will

be undertaken under a separate P3 Energy Service Delivery (ESD) contract. The planned completion dates for the conversions vary by ESD, with the intent being to have all buildings converted in advance of the P3 conversion of the CHP. The Confederation Heights Project is to be completed by 2022. An underground vault is to be installed adjacent to the building on the east side, in the branch tunnel connecting the former CBC/Drake Building to the main tunnel system.

2.9.6 Annex F Fit-Up

Annex F is a 2-storey temporary office building constructed adjacent to the Project building. It is currently being fit-up for occupancy as a swing space for PWGSC, and is excluded from this project.

2.9.7 Functional Programs

General Fit-up Requirements will be available for the use of the Consultant to describe functional requirements for the base building and generic fit-up, which the Consultant should further develop in a Functional Program.

2.10 Related External Projects

Note that project work should consider relevant ongoing City of Ottawa and National Capital Commission (NCC) projects as well, such as transit, cycling, and pedestrian route planning, green infrastructure and park planning (such as Vincent Massey Park), and the Confederation Heights Community Plan (Secondary Policy Plan). In support of PWGSC SDES goals for integration with surrounding community, these should be acknowledged for reference at minimum to best inform site access and design decisions

PD 3 PROJECT BACKGROUND

3. Project Background

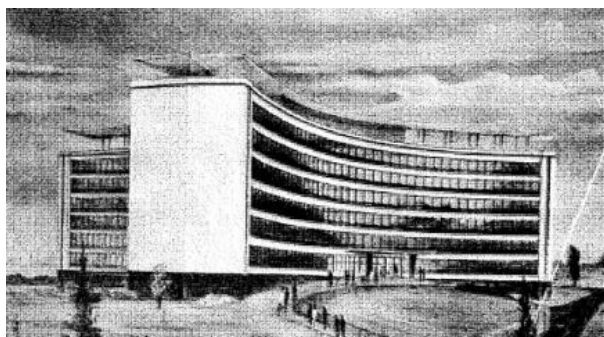


Figure 2: Artistic rendition of CBC, prior to 1961.
[Source: FHBRO Historic Report, pg. 16]



Figure 3: The parabolic curves and wing ends define the building. [Source: PWGSC HCS, 2017]

3.1 Existing Building Information

The building at 1500 Bronson opened in 1964 as the head office of the Canadian Broadcasting Corporation (CBC). The building was purchased in 1997 by PWGSC and immediately refurbished as an office building for Canadian Security Establishment (CSE). The building is a Crown owned office building located within the Confederation Heights Campus, Ottawa. Rehabilitation is required to bring the building back into service, meet obligations to conserve the heritage character defining elements of the building, and Sustainable development to LEED V4 Platinum or equivalent.

The asset has been vacant since 2015 and was decommissioned in 2016. The asset is in poor condition and has reached the point in its lifecycle where major capital reinvestment is required to maintain asset integrity, rehabilitate exterior masonry and to prepare it for modern federal office occupancy as soon as it is practicable, to protect the asset from further damage and return it to service.

The following provides a summary profile of the building:

Building Profile	
Location	1500 Bronson Avenue, Ottawa, Ontario, Canada.
Number of Stories	Seven (7) above-grade stories including the basement level (ground level); plus roof-top mechanical penthouse with flared canopy above the main roof. One (1) storey guardhouse. Branch tunnel leading to the building from the main tunnel that connects 719 and 875 Heron Road
Building Footprint	1,790 m ²
Inside Gross Area	11,580 m ²
Useable Floor Area	8,529 m ²

Building Profile	
Planned Use	The building is to be fit-up to accommodate Federal Government administration space.
Current Occupancy	Unoccupied.
Built	1961-1964 by Canadian Broadcasting Corporation.
Architects	David Gordon McKinstry (CBC Chief Architect at the time)
Additions	No additions to date.
Acquired by Crown	1997
Heritage Designated	Designated as “Classified” by FHBRO, 2003.
Pedestrian Access	Access via Bronson Avenue, through the Guardhouse
Loading Dock	Access via Bronson Avenue, through the Guardhouse
Parking	Access via Bronson Avenue to surface parking
Vertical Transportation	Three (3) passenger elevators
Construction	<ul style="list-style-type: none">• Raft foundation• Structural system is a concrete frame consisting of concrete and steel beams and columns• Reinforced concrete slabs for floor and roof slabs, as well as roof canopies• Sandstone spandrel panels and wing end walls• Ribbon window and spandrel system
Façade	Original stone cladding, with window replacement in 1998 with extruded aluminum profiles and sealed double glazed units.

NOTE: The following elements on the site at 1500 Bronson are excluded from the scope of work:

- Annex F
- Main underground service tunnels travelling from 719 Heron to 875 Heron Road.

3.2 Site

1500 Bronson forms part of the Confederation Heights campus, located south of Ottawa’s downtown core. Its separate/private drive leads to Bronson Avenue and Riverside Drive. The building sits on top of a low hill within a 6 hectare site acquired in 1956 by the CBC. It is bisected by a number of roadways and borders three arterial roadways: Heron Road to the south, Bronson to the east and Riverside to the north. The siting of the building in an elevated landscape, the quality of the architecture, and surrounding openness creates a visual distinction between it and the rest of the campus. As well, the views from within the building and on the roof are magnificent and available in all directions.

While driving along Bronson Avenue, 1500 Bronson is stately and noticeable due to its spatial independence from other structures. Bronson Avenue has been identified as a Capital Arrival Route by National Capital Commission. The building sits at the west side of the major north-south route of Bronson Avenue (noted in Figure 1 below) that links the International Airport and Ottawa’s downtown

core. As such, 1500 Bronson is a noted landmark for the city. The City of Ottawa has identified views from Bronson Avenue and Heron Road toward the building needing protection.

The parking lot to the north of the building is well concealed from Riverside Drive to the north and Bronson to the east with the use of mature deciduous and coniferous trees. The receiving area is located on the west façade of the building at the south end of the parking area. The same area was also chosen for the location of the new 1200m² building in 2005, which necessitated the removal of some of the original surface parking. Nominal pedestrian paths within the fenced area are nominal and provide access from the guardhouse to the main entrance to the north of the building. Other pedestrian paths are located adjacent to the perimeter fence, but there are currently no connections from within the fenced area. There is also a paved area east of the south wing that might be used for volleyball.

Vincent Massey and Hogsback Parks are located west of the Confederation Heights campus, while the RA Centre is northeast of the Project site. There are existing sidewalks along Bronson Avenue and Heron Road that provide access to the parks, but the pedestrian experience is poor due to the high volume of vehicular traffic along these roads.

The following provides a brief overview of building components. Refer to existing supporting documentation for additional information.

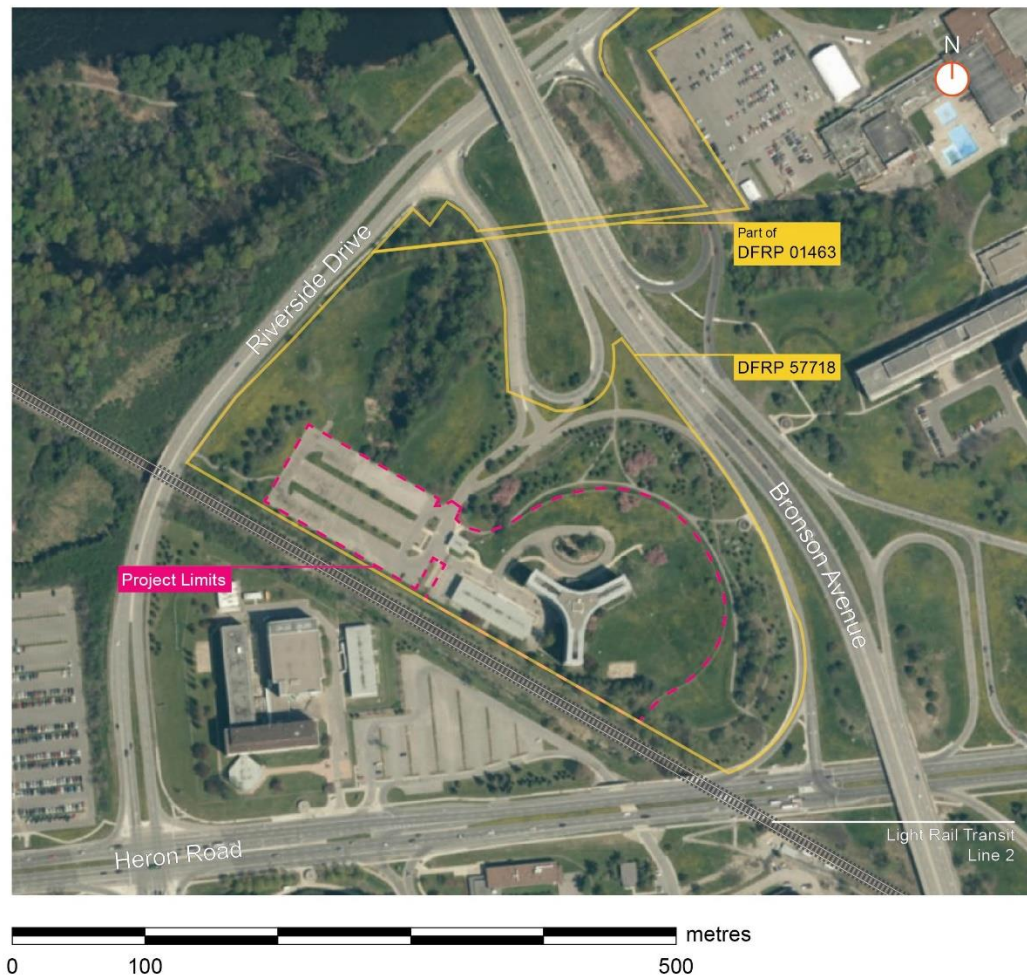


Figure 4: 1500 Bronson; located North of Heron Road and West of Bronson Avenue. (Source: Google Maps)

3.2.1 Building Envelope

1. The footprint of the building is laid out in a 'Y'-form with three similar parabolic elevations. The use of two types of columns; square concrete columns within the floor area of the Building, and circular concrete-encased steel columns at the perimeter are spaced in rows to maximize transparency. Minimizing the size of the structure at the perimeter contributes to the continuous appearance of the ribbon windows (both from inside and outside). The building footprint is conducive to the use of natural cross-ventilation. Many of the windows on the office floors are manually operable.
2. The exterior elevations of the ends of each wing are clad with "Kingston Hue" Canadian sandstone panels, in "sand-honed" finish. The parabolic elevations consist of a horizontal pattern of glazed windows and sandstone panels. The fenestrations span the entire length of

the parabolic elevations between sandstone stone panels and floor to ceiling with an aluminum spandrel panel on the lower portion below a glazed unit. The base of the parabolic elevations utilizes dark grey granite panels, continuing the horizontal banding established by the glazing units and grey sandstone.

3. The sandstone panels utilized at both the wing-end and parabolic elevations are face bedded. This means that the natural bedding planes of the sandstone have been positioned vertically making them prone to accelerated deterioration. This deterioration is evident at a number of sandstone units exhibiting delamination, spalling, unit cracking, and surface cracking.
4. The stone cladding in the wing ends is a “face-sealed” system. Sealant is evident at the joints and is in a deteriorated state. Mortar is used for the joints of the low level granite stones of the south-east parabolic elevation, which is also deteriorated.
5. Fine materials, such as decorative marble around the entrance doors and Stanstead granite as the front steps and landings, have been incorporated into the design of the front entrance. (Conservation Guidelines, by PWGSC Heritage Conservation Services, 2018)
6. The sandstone clad exterior wall composition in the curved walls consists of stone panels anchored back to the reinforced concrete structure with a 1 ¼” cavity between them. A 2” thick polystyrene insulation is placed on the inside face of the building structure. The monolithic concrete structure is neither insulated on the exterior face, nor thermally broken, and consequently leads to significant thermal bridging at all floor levels. The exterior wall composition has an approximate R-value of 14 and does not meet the minimum requirements of the NECB. In order to achieve the energy targets established in the Real Property Sustainability Framework, major modifications of the exterior wall composition should be considered.

3.2.2 Building Interior

The formal entrance to 1500 Bronson is located centrally at the north façade, and includes a single storey entrance, comprised of a pavilion and stand-alone flared canopy. The material treatment at this pavilion is of high quality material and exhibits elements of decorative detailing. This is executed with the marble wall treatment extending from interior through to exterior of the pavilion; separated only by a glazed partition. Teak is used at the ceiling level to provide a relationship between the underside of the exterior overhang and the interior ceiling perimeter. The use of materials such as marble and teak support the expressionist thread of modernism inherent in 1500 Bronson and contribute to the mood of glamour of the early 1960's. The rest of the building interior did not include the use of these materials, ultimately identifying a hierarchical special quality.

After the Communications Security Establishment (CSE) vacated the building in 2016, the building was decommissioned. The majority of interior finishes and partitions were removed, except for those in the entrance lobby, elevator core, exit stairs, and washrooms.

3.2.3 Accessibility

The barrier-free concrete ramp situated at the entrance of the building is in poor condition. The ramp's guardrails are non-compliant. Several other door entrance points and foyer areas do not comply with barrier-free requirements.

3.3 Heritage

3.3.1 Building History

The building was built in 1961-64 for the Canadian Broadcasting Corporation (CBC). Taking the place of seven CBC buildings across the city, it was to consolidate the ever-expanding national offices into one large Head Office. Its presence, size and location exemplifies the control and importance CBC had over Canadian broadcasting and its growth as centrally controlled public and private broadcasting.

It was used for the Head Office of CBC for over 30 years, vacating the building in 1997. It was then occupied by the Communications Security Establishment (CSE); a department of DND. The building's use as a multipurpose office building remained, however its function changed from that of broadcasting information to that of gathering intelligence information. (Conservation Guidelines, by PWGSC Heritage Conservation Services, 2018)

3.3.2 Heritage Character Statement

The architectural character defining elements that contribute to the building designation are described on the following website:

<http://www.historicplaces.ca/en/rep-reg/place-lieu.aspx?id=1865&pid=0>

3.3.3 Heritage Reports

The following studies have been completed in order to provide a better understanding of the building's Heritage elements and value:

3.3.3.1 Conservation Guidelines

The purpose of this document is to outline the heritage significance of this Crown property, as well as to provide *Conservation Guidelines* that will assist in the development of future interventions to both the building (also known as Edward Drake Building) and its site at 1500 Bronson. If applied early in the planning process, these *Conservation Guidelines* should guide design decisions to protect and/or enhances the heritage character of the asset in the long term. This approach is based on the objectives of the *Treasury Board Policy on Management of Real Property* <https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12042>

3.3.3.2 Building Envelope Screening Level 1

A Level 1 screening is a full visual survey of exterior building components, along with a partial tactile survey of areas of concern, as per Health & Safety, Protection of Heritage Values, and Stewardship Recommendations. The report includes recommendations for repair and investigation for short term work to ensure the protection of the heritage fabric and health and safety of the site until the commencement of the major rehabilitation of the building. It also contains the recommendations for emergency work, which have been communicated to the site custodian staff at the time the concern was identified. Cost estimates for short term work and recommendations for frequency of future screening work are also provided. The short term repairs identified for 2018 have been completed.

3.3.3.3 Heritage Recording

The Heritage Recording includes the following:

1. Graphic line drawings of exterior building elevations and floor plans for the building and Guardhouse, based on photographic documentation of the buildings and site
2. Orthographic and topographic site plan

3.3.3.4 Heritage Elements Inventory

The Heritage Elements Inventory includes the following:

1. Heritage Inventory Report including (interior, exterior and site elements in a table format indicating element description, location, and associated heritage value
2. All heritage element data sheets
3. Heritage record photographs

3.3.3.5 Historical Site Assessment

Site History and Site Evolution reports have been prepared by PWGSC for Confederation Heights. A site assessment describing the cultural landscapes will also be available, and will include analysis of the 1500 Bronson site.

3.3.3.6 Pre-Design Investigations and Deliverables

This upcoming work by PWGSC to be completed prior to the engagement of the Consultant includes:

1. Preliminary Building Research incl. Thermographic Analysis, Investigation to determine source of parabolic anchor corrosion, flooring core sampling.
2. Confederation Heights Site Heritage Assessment Report incl. Site Evolution
3. Building Information Model (BIM)
4. Building Documents Timeline

3.4 Structural

1. A Seismic Assessment of the building was conducted by Halsall Associates in 2012 and the conclusion was that the building will need to be upgraded in order to minimally resist 60% of the 2010 NBCC seismic loading. With regards to the 2015 NBCC, the 2017 Feasibility Study outlined that the seismic performance level related to the 2015 NBCC appears to be 60% of that specified in the 2010 NBCC. The revision of the Code in 2015 is unlikely to be sufficient to change the overall conclusion of the previous assessment, although it is possible that the level of effort required to upgrade the building structure may be reduced from that noted in 2012.
2. The 2017-2018 Level 1 screening report from Heritage Conservation Services states that the masonry anchors of the sandstone veneer are corroded. The document also outlines a concern with the method of anchoring the stones and the fact that the anchors likely do not meet current NBCC requirements for seismic and wind loads. The masonry anchors are rigid and will require replacement. These anchors should be inspected in greater detail by the Consultant.

3. The building was built on a raft foundation after issues were discovered on site during construction.
4. There is a crawlspace between the raft foundation and ground floor which contains mechanical services.
5. Beams supporting the ground floor consist of a cast-in-place concrete framed structure.
6. Concrete shear walls provide lateral resistance for the building and are located around the building's staircases at the wing-ends and within the central core of the building. The concrete roof and floor slabs of the building range in thickness, from 100mm and 300mm, the thickest portions being in the penthouse.
7. The floor slabs are supported on interior columns and concrete-clad circular steel columns around the perimeter of the building. Square reinforced concrete interior columns grids are aligned with corridor walls and stairs and washrooms located in the ends of each the wings.
8. The flared white concrete canopy (roof) appears to float over the building. The thickness of the roof canopy ranges from 150mm to 400mm and is supported on concrete column and walls. Steel rods around the perimeter resist wind uplift on the canopy. The perimeter of this area is surrounded by low parapet walls and safety railings. Paving stones have been laid to create a walking path above an inverted roof complete with membrane, insulation and ballast. Lightning protection has been installed above the canopy.
9. A similar flared canopy (roof), held up by pilotis, is positioned above a one storey entrance pavilion and sits at the intersection of two wings on the south side. There is a flat roof over the entrance vestibule.

3.5 Mechanical

1. The majority of the mechanical systems are original to the building (1964) and have long surpassed their normal acceptable life. New sprinklers, humidifiers and washrooms were installed as part of the 1999 renovations but are approaching the end of their life cycles. Some of the systems are already inactive or decommissioned;
2. High Temperature Heating Water (HTHW) and Chilled Water are supplied from the Confederation Heights Central Plant (CHP) to the main mechanical room located in the basement of the building (Room AG09); the heating water piping is from the original construction (1964); chilled water is supplied from the CHP to the main mechanical room located in the basement of the building (room AG09) and operates from April to October. For the balance of the year, chilled water for supplementary cooling load is supplied from the Sir Leonard Tilley Building (C-Wing) at 719 Heron Road;
3. Shell and tube heat exchangers heated with HTHW supply heating water to the building and are from the original construction (1964); Base mounted heating pumps from the original construction (1964) are installed and have been re-fitted with new mechanical seals; Heat exchangers and pumps supply secondary water to the three (3) perimeter induction unit zones: North, East and West; The induction systems operate in heating mode with heating water during the winter and in cooling mode with chilled water from 719 Heron during the summer (Note that this should be rerouted due to security issues).

4. Domestic hot water is provided by one hot water storage tank with integral heat exchanger installed in the main mechanical room in the basement of the building (AG09). The domestic heating system is from the original construction (1964). A recirculation pump recirculates hot water from the fixture units. The age of the pump is unknown.
5. There is a single main air handling unit in the penthouse mechanical room. The unit is from the original construction (1964). The system supplies primary air to the perimeter induction units. The return air fan to the air handling unit is a vane axial fan. Humidification is provided in the main air handling unit. The non-steam humidifier system uses compressed air and pure water to add water mist in the air stream of the unit. The system was installed in 1999 renovations;
6. There are two (2) ventilation shafts in the building that supply air from the air handling unit to the perimeter induction units. One shaft supplies induction units on the East side of the building and one shaft supplies induction units on the West and North sides. These shafts and the distribution duct system are high pressure / high velocity. The majority of the ducting was installed as part of the original construction (1964);
7. Domestic water piping is from the original construction (1964) and has not been renovated. Water piping is copper with soldered joints
8. The drainage system consists of separate sanitary piping, rainwater, and storm drainage systems from the original construction. The drain piping exits the building through a pipe at the West face of the building to the sanitary drainage manhole.
9. The control system throughout the building consists of pneumatic or electronic end devices coupled to a DDC control system provided by Johnson Controls.
10. Two fire pumps pressurize the sprinkler and fire standpipe systems. Fire pumps were installed in 1999. A water pipe from the municipal system enters the main building by the end of the west wing. There is no backflow prevention device installed at the existing fire protection water inlet. Standpipe system is from the original construction (1964). Fire hose cabinets containing fire department valve, with hose and portable fire extinguisher are located throughout the building.
11. There are three (3) original washrooms per floor at the end of each wing in front of the stairs and two (2) newer accessible washrooms per floor in the central core that were renovated in 1999;
12. The water was tested in 2018 and found to be potable;
13. As the building is supplied with heating and cooling water from the CHP and the air handling unit only supplies primary air, space for mechanical rooms and shafts is minimum. Also, the slab to slab height is very limited (3200 mm, 10'-6") and therefore, the space between the slab and the future ceiling will be very restrictive; and
14. There are no existing mechanical "as-found drawings" available for the building systems.
15. Existing mechanical spaces are over-crowded with equipment and may not be adequate for upgrades that include provision of two emergency generators with a fuel supply system and fuel storage tanks.
16. There is no cooling tower in the building.

3.6 Site Services (Civil/Municipal Engineering)

1. The building is provided water from the PWGSC owned water distribution system of Confederation Heights. The PWGSC Confederation Heights water distribution system is connected fed from the City of Ottawa's distribution at three (3) locations and are sized to maximize the available water supply to this campus. Two of these connections to the City's distribution are spaced along Brookfield Road, and the third is located at north of Heron Road and just west of the Sawmill Creek.
2. There are two (2) 203mm diameter water services to the building from the PWGSC 305mm water main on the north side of the building. There is appropriate valving to ensure full redundancy of supply to the building. The water main and building water services were recently upgraded in 2008. The storm water collection system servicing 1500 Bronson, remains original to the original development of the site, except for realignment of the building storm sewer as part of the construction of Annex F.
3. The majority of storm sewers in this area collect surface water and building storm water and direct it northwards where it discharges to a ravine/ditch and into the City of Ottawa storm sewer network before discharging to the Rideau River. The one exception is a couple of catch basins on the south side of the building which discharge west wards and into the cut for the O-Train. This drainage system presents a liability to both the Crown and the city and should be directed out of the O-Train cut as part of any efforts to rehabilitate this site, but this work is not included in the Project.
4. The building sanitary service connects to PWGSC sanitary distribution system at the north end of the site. The sewer and service remain original to the initial site development/building construction in the early 1960's. The PWGSC sanitary collection system ultimately discharges to the city of Ottawa sanitary sewage system to the east, north of Heron near Junction Avenue, where it eventually enters the city's Rideau River Collector sewer. There is an existing sanitary line than runs approximately 25' under the parking lot, but alterations to this line is excluded from the Project.

3.7 Fire Protection

1. The existing fire alarm system is past its life expectancy and needs to be replaced;
2. An addressable 2-stage fire alarm system was installed in 1999. It is complete with a full integrated voice communication system includes monitoring of the Annex F Building and is connected to four (4) slave fire alarm panels controlling the pre-action system located on the 1st level, 2nd level and 3rd level of the building.

3.8 Electrical

1. The majority of the electrical systems were replaced in 1999, but are approaching the end of their life expectancy and require replacement. Some of the systems are already inactive or decommissioned.
2. The main electrical switchgear is fed by two incoming feeders that come from the CHP via the Clark Memorial R.A. Centre; The switchgear is original to the building;
3. The transformation is done by a 1.88 MVA transformer that was installed in 1999. The secondary switchboard is fed by an enclosed bus extension from the main transformer. It is

- located in the same electrical room as the main electrical switchgear. It was manufactured by Eaton/Cutler Hammer and installed in 1999.
4. Secondary Transformers were also installed in 1999. They are in electrical rooms on each floor and in penthouse service rooms. In addition, secondary transformers on the ground floor are rated at various size dependent on load, and are in the main electrical room, sub electrical room and cafeteria area;
 5. Medium voltage feeders come from Confederation Heights Central Plant (CHP) via an underground tunnel system, are connected in the main electrical switchgear and were retrofit in 1999;
 6. Each typical floor electrical room houses one normally powered 120/208V distribution panel supplying the lighting on the floor and each typical floor 600/120-208V transformer, as well as power to the sub branch panels; Emergency panels are located on each floor as well as in the penthouse; 120/208V UPS panel are located on each floor, typically in the electrical rooms. There are ventilation issues inside multiple electrical rooms/closets inside the building. Proper clearances have not been provided between certain electrical equipment and as a result, too much heat is being generated and there is insufficient cooling to dissipate the heat.
 7. Two MCC units were installed in 1999 and are supplied from the base building's emergency generator. MCC #1 is located on the ground floor and MCC #2 is located on the penthouse level.
 8. There are two generators for the building, G-1 and G-2. They are installed prior to the 1999 renovation, are perhaps original and are in the penthouse generator room.
 9. New compact fluorescent fixtures (both surface mounted and recessed types) were installed in 1999, replacing the original incandescent fixtures in the main hall, vestibule and entrance canopy. Due to the modifications and the lack of original documentation, it is not possible to have a clear understanding of the original lighting design. Emergency lighting illuminating the path of egress is provided with general lighting fixtures connected to emergency power supplied from the generator. "EXIT-SORTIE" L.E.D bilingual exit lights in the office areas of the building are installed at exit doors, corridors and public areas forming the path of egress to exit the building.
 10. Existing exterior light fixtures are controlled by a time clock controlled via contactors. Lighting at the roof level, under the entrance canopy and mounted on poles were installed in 1999, but the remaining fixtures on area poles, above exterior doors, and under the main entrance canopy are older and may be original to the building.
 11. The main electrical room is complete with a continuous grounding bus located around the perimeter of the room complete with connections to metal frames and doors
 12. There are no existing electrical "as-found drawings" available for the electrical systems.

3.9 Vertical Transportation

1. The elevator system consists of three (3) gearless, traction passenger elevators. The elevators were modernized in 2014 with new controllers, operating fixtures, door equipment and cab interiors. The original gearless machines were retained.

3.10 Building Components and Connectivity (BCC)

3.10.1 Building Components

1. There are no existing Building Components in the building, other than cafeteria and other equipment that should be removed.

3.10.2 Connectivity

1. The structured cabling data system was tenant owned and was removed.
2. The telephone system was tenant owned and was removed.

3.11 Security

1. The existing guardhouse provides manual control for vehicular and visitor access. However, the existing perimeter system of berms and fencing is not continuous. Otherwise, the building security system was tenant owned and has been removed.
2. Existing security cameras are operational in the tunnels, but otherwise existing cameras on the site are not functional.

3.12 BIM (Model)

1. The Building Information Model (BIM) is currently being developed by PWGSC. The Consultant should develop an As-Is/Record Model of the building conditions of the building in its current state, as well as as-built conditions after construction is completed. The Consultant should verify and update this Model throughout the design and construction document stages.

3.13 Energy Modelling

Partial energy modelling was prepared as part of the Feasibility Study prepared by DFS Architects.

3.14 Environmental Analysis

1. Phase I and II Environmental Site Assessment (ESA) Reports have been prepared for the Site in a separate contract.
2. One monitoring well (MW-12-02) was installed in 2012 during the Phase 2 Environmental Site Assessment to determine if the groundwater is impacted by the underground fuel storage tank on-site. Following the completion of the ESA the monitoring was left on-site. Although no soil and groundwater contamination was found during the Phase 2 investigation it was recommended that the environmental quality of the groundwater be monitored once every two years as long as the underground fuel storage tank is present. This will be undertaken by PWGSC.

PD 4 PROJECT OBJECTIVES

4. Project Objectives

Several objectives have been developed to ensure and the success of the Project.

4.1 Objective One: Cost Management

A key objective is to deliver the Project within the limits of its authorized funding, substantiating the viability and cost benefits of design choices, respecting and enhancing the building and its associated landscape symbolic values while utilizing best practice conservation standards. This should be achieved through the following measures, but not limited to:

1. A rigorous cost management system should be put in place to both monitor and report on cost;
2. Formal costing submissions for each construction tender package and for the overall project, in accordance with all Required Services (RS) sections;
3. Redesign work to be undertaken to maintain the construction cost budget when required;
4. Determination of appropriate contingencies;
5. Iterative and continuous design analysis and adaptation to maintain cost objective in collaboration with the PWGSC's Cost Consultant;
6. Strong and disciplined change control system;
7. Strong communications;
8. Clear approval process; and
9. Management of risk fund.

Since the construction budget is of a fixed value, value engineering (VE) as well as appropriate design choices should be a continuous process throughout the project.

4.2 Objective Two: Design and Heritage Quality

Provide a building that is fully rehabilitated to serve the occupants. The Consultant should maintain a high standard of architectural design, based on recognized contemporary design principles, while respecting the heritage characteristics and value of the building and site. All design elements, planning, sustainability, architectural, engineering and landscaping, should be fully coordinated, and consistent in adherence to good design principles. The level of quality is to meet the following objectives as a minimum:

1. Quality of materials, construction methods and execution should commensurate with the rehabilitation of a Classified Federal Heritage building and the Project budget. Avoid experimental materials. Materials used should have a proven record of good performance and success before being used in a heritage building;
2. A building which continues to display its intended expressionist modernism architectural style within the context of good conservation practices. The design of new construction layers should be compatible with and enhance existing character defining layers;

3. Operating costs should be kept to a minimum and reflect the projected operating costs in the cost plan. This is to be achieved by compliance with the Energy Budget, selection of equipment, requiring the minimum of operating personnel, and finishes for easy maintenance, etc.;
4. Any proposed changes to the exterior of the building must respect the building's current environment, including important views to and from the building;
5. Design for maximum flexibility in interim and long-term use of space;
6. Deliver the Project with an integrated solution for architectural design encompassing conservation of the resources to a high standard of design. Provide balanced solutions to design challenges for elements including planning, programming, security, architectural, conservation, engineering, energy savings and landscape architectural elements, as well as the work product of other specialties; and
7. Building fabric and systems should be of a high quality for a productive, efficient and safe federal occupancy for a further 25+ years; designed in response to sound building science, life cycle cost effectiveness, general ease of maintenance and easily repaired and/or replaced and constructed with the best workmanship possible.

4.3 Objective Three: Project Delivery

Deliver the Project utilizing best practices in support of functional requirements, respecting the approved cost, schedule, scope, quality requirements, and sustainability objectives. Integrated project delivery includes, but is not limited to:

1. A partnership and open communications between all members of the Project Team and stakeholders throughout all phases of the Project life;
2. Rigorous quality assurance reviews during the design and construction phases and commissioning of facilities;
3. A rigorous quality management plan in order to respond and correct, in a timely and effective manner, all issues as they occur, which addresses the technical aspects of the Project such that the performance of all components and systems should be tested against the intended design performance and the design life-cycle analyses;
4. A Consultant, experienced in major capital renovation projects with a significant heritage component, who should be responsible for the production and delivery of all documents, and should ensure that there is a continuity of key personnel working as an integrated dedicated Consultant, for the full duration of the project;
5. A project delivery approach by a general contractor, requiring well-coordinated and comprehensive construction documents, featuring significant heritage rehabilitation work;
6. Professional conduct in all phases of the project, employing best practices for budget, schedule, quality, and scope management;
7. A continuous risk identification and management program employing effective methodologies to ensure construction safety as well as claims avoidance; and
8. Continuous and comprehensive documentation of the Project at all phases of the project implementation.

4.4 Objective Four: Sustainable Development for the Site and Building

Sustainability is defined in broad terms as the capacity to endure, to sustain now and in the future. It's about the building and site meeting and enhancing social, economic prosperity and protecting and enhancing the environment.

The Government of Canada is committed to becoming a leader on climate change and overall sustainability, and PWGSC is a critical enabling department of that goal. In response to priorities set out in the Federal Development Sustainability Strategy 2016-2019 and the Treasury Board Greening Government Strategy, PWGSC has recently released its Real Property Sustainable Development and Environmental Strategy. The Strategy identifies long-term strategic goals that explicitly address all three "pillars" of sustainability and demonstrates the long-term sustainable future Real Property is determined to achieve by year 2050. Within the FSDS, the Government of Canada also committed to reducing GHG emissions by 17% by 2020, and 40% by 2030. In response, the Real Property Services Branch of PWGSC has committed to initiating measures to achieve a carbon neutral portfolio by 2030.

1. As a prominent heritage building within Confederation Heights, the building presents an opportunity to demonstrate leadership for adoption of resilient, healthy and sustainable design strategies that should enable applicable Departmental and Government-wide FSDS commitments to be met or exceeded and set a higher benchmark for a designated Classified Federal Heritage Building. Sustainability includes, but is not limited to Delivery using integrated design principles; the Project should meet, and exceed where possible, applicable PWGSC standards and Green Building commitments (as outlined in the *Real Property Sustainability Framework [RPSF] 2016-2019*). Accordingly, the Project should certify to a minimum of LEED V4 Platinum or equivalent industry recognized standard, but should not be limited to the design strategies within the rating system itself or performance level. Demonstrate a realistic, timely and life-cycle approach, integrating best practices that support the Government of Canada's priority for innovative sustainable and low carbon solutions for smarter, healthier and more productive workplaces;
2. Reduce GHG emissions by at least 88% compared to 2005-2006 emissions, 708 tonnes CO₂ (2005) to 85 tonnes CO₂/yr. (2018); actual reduction potential needs to be validated by the Consultant in line with design strategies and may possibly exceed these values
3. Provides for clean on-site geothermal energy generation to partially offset the GHG emissions from the energy consumed by the building
4. Exceed the National Energy Code for Buildings, 2015 (NECB) baseline building performance by at least 51%
5. Use industry recognized health and wellness standard to frame strategies and pursue WELL v2 Core (Silver) certification
6. Sustainability objectives and innovative strategies should be integrated throughout the evolution of the Project, balancing environmental, social (including heritage) and economical values and impacts with every Project decision.
7. Deliver an enhanced, healthy, liveable work and urban environment; and, provide an appropriate facility with high performance and efficient, flexible, adaptable systems,

components and technologies that support the occupants in the conduct of their business, as well as accommodating the present and evolving operational and functional requirements of Confederation Heights and in support of the surrounding urban fabric.

8. Consideration to include use of renewable energy, such as natural ventilation, motorized windows, geothermal systems, solar water heating and solar photovoltaic systems

4.5 Objective Five: Security

Incorporate physical security requirements within the building and Site. Ensure the security requirements are fully integrated in to the design in a balanced, layered approach providing complete accessibility for its occupants without visual distraction from the heritage character defining elements of the building and its surroundings.

PD 5 PROGRAM OF WORKS

5. Program of Works

5.1 Intent

The building and site is to be rehabilitated and fit up for federal occupancy. A major challenge will be to balance heritage conservation, sustainability measures, and functional requirements.

The building has been unoccupied since 2015. After the last occupant moved out, it was decommissioned. Most finishes and partitions were removed to the concrete walls, floors, and ceilings. The building continues to be heated and cooled, but many of the distribution systems have been removed.

The majority of the mechanical, electrical, and controls systems require replacement. Building systems are to be designed and replaced to suit functional requirements.

5.2 Design Services

5.2.1 Scan-to-BIM

The Consultant should verify the BIM provided by PWGSC and complete to suit design process, using laser SCAN-to-BIM technology. In addition, Consultant is to complete the BIM for use for analysis as well as to update the BIM with as-built information after construction is completed.

5.2.2 Functional Requirements

The design stages should be phased: Phase 1 Base Building Design and Phase 2 Fit-Up Design.

The office design is to conform to GC Workplace Standards and the General Fit-up Requirements will be provided to describe the functional requirements. PWGSC is considering a “soft security” occupant whereby general office occupancy would be provided for a security client and access to the site would be controlled through the guardhouse. Building security hardening measures are not required.

The Consultant should review, validate, update and incorporate all functional requirements in the General Fit-up Requirements into a Functional Program, as well as to maintain a log of any subsequent revisions to the Functional Program.

5.2.3 Site Development

The road configurations and perimeter fence will be updated in the future, based on an approved master plan. Similarly, the existing guardhouse and site perimeter (consisting of fencing, berm, and landscaping) will remain in place until the master plan is approved. The Consultant should provide the landscape architecture and urban design services listed below as a minimum:

- a) Site development including activity areas for the occupant for health and wellness, and sustainability features (such as storm water retention, reduction of surface parking, providing shade for parking areas, bike parking, and native, drought tolerant plant species);

- b) New improvements to the landscape, including amenities such as shaded areas, wind protection and activity areas for the occupant for health and wellness;
- c) Assess the condition and recommend repairs for the small retaining wall;
- d) Crime prevention through environmental design (CPTED) incorporation in site development;
- e) Re-design the circulation system as to meeting operational, functional requirements, security and sustainability following the findings and guidelines as per the site development feasibility study. For example but not necessarily limited to is to:
 - 1. Reduce the number of parking area spaces;
 - 2. Provide pedestrian connectivity to transit (light rail and buses), and federal buildings within the context of Confederation Heights;
 - 3. Provide bicycle connectivity;
 - 4. Provide vehicular access and egress as to drop-off and pick-up zones, material handling, service delivery, security, fire and emergency;
 - 5. Provide a site that is barrier free and accessible to all persons;
- f) Assure protection and enhancement of the environment. Expected minimum is to:
 - 1. Limit hardscape areas to assure no heat sinks occur and permeability to assist addressing storm water percolation issues;
 - 2. Address all storm water on-site through sustainable methods
 - 3. Assure long term resiliency of the site and building in severe climatic events
 - 4. Create useable spaces that create micro-climates and protection from the wind;
 - 5. Strengthen the urban forest, bio-diversity and ecology of the area particularly in relation to the Rideau River on the northwest edge area.

5.2.3.1 Architectural and Site Lighting

Exterior lighting of building facades and canopies, entrance ways, service dock areas, connecting pathways, drop-off and pick-up points, and security should be integrated with the building and site to improve and enhance the function and operation of the building and its environs. The lighting design should be suitable to the Long-Term Vision and Plan, Lighting Master Plan as well as the Capital Illumination Plan, under development by the National Capital Commission (NCC).

Refurbish heritage site lighting and replace security camera system to be monitored from the Guardhouse.

5.2.3.2 Underground utilities

The rehabilitation of the main service tunnel connecting the C Wing at 719 Heron Road to the building to 875 Heron is not included in this project. However, the branch tunnel connecting the main tunnel to northeast wing of the building is included in this Project. Consultant is to

assess the condition of the storm and sanitary lines servicing the building, as well as the chilled water and hot water lines leading to the building in this branch tunnel.

5.2.4 Architecture

5.2.4.1 General Architecture

The architectural requirements include a complete rehabilitation, modernization and fit-up of the building to preserve heritage value and accommodate new functional and technical requirements and as a minimum:

1. Upgrades to exterior building envelope, including materials conservation
2. Upgrades to the building for life safety and Building Code compliancy;
3. Refurbishment of the loading dock facilities;
4. Restoration of vertical circulation throughout;
5. Refurbishment and modernization of interior finishes and spaces;
6. Integration of new structural, mechanical, electrical, Information Technology (IT), Multimedia (MM) and Integrated Security Systems (ISS) into the heritage fabric;
7. Comprehensive planning and fit-up, that includes at a minimum:
 - Special purpose spaces such as; meeting rooms and storage areas;
 - General office space for Federal occupancy conforming to GC Workplace Fit-up Standards for capacity and building services. Interior layouts, mechanical and electrical distribution systems, should be designed with flexibility.
8. Design of BCC Components and Connectivity;
9. Emergency and evacuation gathering areas that are clearly identified when required but do not impact the overall building statement.

5.2.4.2 Building Envelope

1. Rehabilitation and upgrade of the building envelope including materials conservation (masonry, concrete, wood), thermal performance (roof, walls, windows), mitigation of thermal bridges, integration of seismic requirements, sustainability guidelines, and accordance with approved security design requirements; and
2. Replacement and / or refurbishment of roofs on Building, Main Roof Canopy, Entrance Vestibule, and Entrance Canopy.

5.2.4.3 Building Interiors

1. Materials selected are respective of the buildings architectural design and their application respects the established material hierarchy. Selection should generally support sustainability and should focus on durable, long lasting materials that are easy to maintain; and
2. Repair and or restoration of character defining elements and heritage finishes such as exterior masonry, entrance spaces;

5.2.4.4 Accessibility

PWGSC is committed to making its facilities accessible to all persons. Accessibility scope includes the building and the site, utilizing an integrated approach. The principals governing federal regulations, policies and standards are:

1. PWGSC Technical Reference for Office Building Design;
2. Treasury Board's Policy on the Management of Real Property;
3. Treasury Board's Accessibility Standard for Real Property;
4. Canada Occupational Health and Safety Regulations (COHS); and
5. Accessible Design for the Built Environment (Canadian Standards Association [CAN/CSA B651-12 and its supplements] and the NBCC).
6. New accessibility legislation when it is signed into law

These documents establish minimum requirements for accessibility within Crown-owned property.

Additional and specialized programmatic requirements of the Users should be incorporated on an as-required basis. Requirements for universal accessibility should be coordinated with the proposed landscape.

5.2.5 Heritage Conservation

As part of the stewardship role of PWGSC, architectural components being salvaged or disposed should be carefully considered to ensure that the heritage value is respected. The Government of Canada has established a legal and policy framework for the protection of heritage buildings, sites and moveable heritage assets in its care. In addition to the Treasury Board Policy on Management of Real Property the following documents affect how salvaged items are to be assessed and managed:

Treasury Board Policy on the Management of Materiel

<http://www.tbssct.gc.ca/pol/doc-eng.aspx?section=text&id=12062>

Guide to the Management of Movable Heritage Assets

<http://www.tbs-sct.gc.ca/pol/doceng.aspx?id=13872§ion=text>

5.2.5.1 Conservation Approach

The Consultant should present their conservation approach for the project, taking into consideration the building's Heritage Character Statement, and the Conservation Guidelines. The overall objective of the Conservation Approach for the major rehabilitation is to present a solid framework for decision-making for the Project with respect to heritage elements. The approach is meant to be updated at all phases of the project, as necessary. It should be based on an understanding of the building's core heritage value and should focus on protecting key aspects of the building's heritage value and character-defining elements, throughout the rehabilitation exercise.

5.2.5.2 Heritage Materials Database (HMD)

The Consultant should prepare the Heritage Material Database, based on the Heritage Elements Inventory and Conservation Guidelines for this Classified Federal Heritage Building, developing the spreadsheets for each heritage. This database identifies: the item description, location and quantity; assessment of heritage value; material value; and links to photographs from the PWGSC heritage recording.

The Consultant should recommend the salvage/disposal/protect/reinstate requirements for each heritage component based on the project, architectural design, and the conservation approach. Further detail should be provided if the item is selected for salvage including; who will remove it, storage requirements for long term or short term, outdoor or indoor storage.

The recommendation provided by the Consultant will be reviewed by PWGSC. This database should be continually updated and maintained during the design and construction phases of the Project by the Consultant, with monthly update reports to PWGSC. The completed Heritage Materials Database is to be used by the GC, to track conservation treatments, crating, relocation and removals of building elements.

5.2.5.3 Heritage Materials Management Protocols (HMMP)

The Consultant should prepare Heritage Material Management Protocols for any heritage components identified in the HMD and describe the protocols associated with handling heritage materials on the project. It is to be read in conjunction with the contract documents to be prepared for the project.

The HMMP is a document containing the heritage protective measures. This document details the protocol for the GC and should detail as a minimum:

1. The initial material actions;
2. The various steps and types of cataloguing: the purpose of this is to provide guidance to the GC for the appropriate cataloguing of heritage materials that are disassembled from their current location, including those that should be reinstalled or permanently stored;
3. Material handling during removal: the purpose is to provide guidance for the appropriate handling of all heritage material during the removal from their location;
4. The protection, including protection in-situ, protection removal to undertake work, crating protection;
5. Transportation procedures;
6. Temporary storage;
7. Permanent storage;
8. Unanticipated heritage element discovery protocols;
9. Unanticipated damage to heritage elements during construction protocols;
10. Sample heritage material condition report; and
11. Sample crating tag and heritage material I.D. tag.

The Project should involve in-situ and off-site conservation of Heritage Assets as well as any new work that impacts heritage values and character defining elements associated with the building and the surrounding site:

1. In-situ conservation includes all work associated with the interior and exterior base-building and landscape heritage assets and character defining elements; and
2. Off-site conservation includes all work associated with the Heritage Assets requiring removal from the building during construction and rehabilitated and managed off-site.

The DR will provide direction as to where these works and objects are to be stored, and the requirements for their placement in the building prior to occupancy.

5.2.6 Abatement and Selective Demolition (AD)

Much of the original hazardous substances were removed during the Decommissioning project. There are two Designated Substance Reports available: the one prepared for the interior Decommissioning project and a second prepared to located hazardous substances in the exterior envelope as well as remaining materials in the building interior.

5.2.6.1 Abatement

If additional investigations, abatement or demolition are required, the Consultant should provide comprehensive details of the work to be done, to the DR, so they can engage the Environmental Consultant (EC) to plan, design and develop specifications in connection with the abatement. The role of the EC will include the development of a program to remove hazardous substances during demolition as well as the field review related to abatement required.

Any areas being excavated as part of this project should be tested prior to excavation work, to confirm soil quality and have a soil management plan outlining how best the soil should be handled. The same can be said of groundwater. If there is to be excavation, groundwater quality should be assessed to understand how best to dispose of it.

5.2.6.2 Demolition

The Consultant should be responsible for the demolition scope and to fully coordinate directly with the EC to develop their design and construction documents and to ensure the delivery of coordinated AD construction tender documents for all remaining demolition requirements. A high level of cooperation, coordination and integration is therefore required between the EC and the Consultant.

Demolition should follow a construction, renovation, and demolition (CRD) waste management plan. The Consultant should ensure that all activities are monitored and coordinated under the supervision of their Structural Engineer to ensure that the building integrity is not compromised and that the building remains safe.

The Consultant should be responsible for building and heritage protection. Careful protection and on-going monitoring of the building elements that should remain and guidelines shall be required regarding the protection of character-defining elements for any AD that happens. The FHBRO will need to be consulted on any demolition or removal of character-defining

elements. Demolition activities which may affect character-defining elements (materials, assemblies, spaces) requires planning and documentation. Salvaging guidelines shall be required.

All work should be compliant with the City of Ottawa and NCC requirements for demolition.

5.2.7 Sustainability and Environmental Requirements

5.2.7.1 Sustainability Goals

This project should lead by example and incorporate innovative solutions that effectuate real change and reduce carbon dependencies. Sustainability is to be integrated as an overarching driver to connect and advance innovative strategies at both the building and site scale. The strategies should enable applicable Departmental and Government-wide FSDS commitments to be met or exceeded and should result in a Project design supportive of the following high level objectives:

1. The Project should meet, and exceed where indicated, applicable PWGSC standards and green building commitments. The Project should certify to the LEED Platinum, 5 Green Globes or equivalent industry recognized standard, but should not be limited to the design strategies within the rating system itself or performance level. Demonstrate a realistic, timely and life-cycle approach.
2. Minimize the carbon footprint (moving towards Carbon Neutrality) and exceed the National Energy Code for Buildings (NECB) baseline building performance by a minimum of 24%.
3. The specific performance targets stemming from the PWGSC 2017 Feasibility Study:
 1. Reduce GHG emissions by a minimum of 65-88% compared to 2005/06 levels
 2. Reduce overall energy consumption by a minimum of 51% compared to NECB 2011
4. Resilient and flexible design of spaces in support of stronger more adaptive communities, reducing our vulnerability to outside forces/events and future-proofing for localized climate change impacts and anticipated community growth
5. Maximize waste prevention and diversion opportunities, diverting at least 75% of CRD materials from landfill through reduction, re-use and recycling (priority focus for innovative solutions on packaging and plastics) ;
6. Careful integration of new technologies and design strategies that respect, preserve and/or enhance designated heritage characteristics;
7. Strategies that recognize and capitalize on the synergies and benefits of advancing measures that are connected at building, site and where possible, community scale, supporting sustainable and active living patterns;
8. Use life cycle assessments and environmental product declarations (EPDs), to inform and reduce the life-cycle environmental impacts from design/material choices, functional and operational uses;
9. Integrate health and wellness design strategies to enhance social livability and create highly productive, healthful and comfortable environments within indoor and outdoor

spaces that encourage social interaction, active living and nurture the human/nature connection. This includes:

1. spaces for active and passive recreation, as well as quiet contemplation/relaxation
 2. walkable, accessible and pedestrian focussed, promoting active, human powered mobility and alternative modes of transportation
 3. multi-functional spaces for facilitating social connections
 4. healthy indoor environment (i.e. integrated bio philia, daylight and space, natural shapes, forms and materials, fresh air, access to water, healthy food/food production)
 5. Use industry recognized health and wellness standard to frame strategies and pursue WELL v2 Core (Silver) certification
10. Adaptive, restorative, and regenerative design solutions that should improve and enhance ecological integrity and that support mutually beneficial relationships between human and natural systems. Strategies focus not only on preserving but also improving ecosystem health and function through protecting and restoring biodiversity, water use, flow and quality, nutrient needs and creating new natural habitats through good land use and integration into the built environment.
11. Maximize water reduction and use efficiency strategies;
12. Long term savings through improved efficiencies; and
13. Improve comfort and user experience of occupants in a responsive, intelligent, and flexible environment through SMART Building, user-centric technologies that drives connectivity and productivity, enhancing space utilization and occupant engagement in addition to operational efficiency

PWGSC has defined specific sustainability commitments and priorities in its Real Property Sustainability Framework (2015); Real Property Sustainable Development and Environmental Strategy (2018); and the Technical Reference for Office Building Design. These policy and guideline documents present a starting point, confirming minimum Departmental green Building commitments as they relate to environmental performance, waste reduction, life cycle assessment, intelligent building s, water management and energy reduction etc. While the Project shall be designed to at least meet the existing sustainability commitments, all efforts should be made by the Consultant to exceed these where feasible and practical (and where specifically indicated) for healthier more productive modern workplaces. Sustainable design, construction and systems options should be based on good science and sound life-cycle analysis (impact assessment and costing), connecting both Project and building performance in the long term.

5.2.7.2 Sustainability Strategies Development

The Consultant should produce a Sustainable Development Strategy report from RS2 Pre-Design onwards throughout the project stages, as detailed in the RS sections. It is to be re-evaluated and updated at every project stage. It should identify and clearly detail, through narrative (as well as supporting scorecards, matrix's), the Project's specific sustainability

design strategies, anticipated performance and should track and confirm the design decisions, recommendations, limitations and any follow-up required to meet PWGSC sustainable development commitments and the project's high level sustainability objectives and performance targets described herein. The strategy should also coordinate for consistency across the multiple phases to ensure a whole-building and site strategy that enables these objectives and certification requirements.

- The Consultant should provide guidance to PWGSC as to which environmental performance rating system(s) would be most appropriate and realistically achievable for the project, that can best support the project's sustainability objectives. For recommendation and approval by the DR, the consultant should perform an initial assessment at the Pre-Design Phase to inform PWGSC which rating system(s), and which level of rating(s) the Project should most likely be able to achieve; and
- The sustainability strategy to be developed should not be limited by or to credits/measures identified in the chosen rating tool(s). These performance assessment and rating tools are guides to verify an industry recognized level of performance, but it should not define the sustainable design or delivery of the project. There may be innovative opportunities beyond those defined in the tool that are worth exploring, as well as credits where compliance proves too challenging but whose intent can be met anyway. The consultant should balance the requirements of said rating systems with other Project requirements to ensure pragmatic recommendations supportive of a sustainable strategy best suited for this Project and site. Although not required, the Living Building Challenge, SITES, WELL/Fit Well or similar industry-recognized performance assessment standards should be referenced and may be used to frame the consideration and consistent integration of these design concepts across project deliverables if this is seen as benefiting the development of the project specific sustainability strategy.
- The energy model and life cycle assessment shall be used to inform and evaluate the design options and sustainability strategy as it evolves

The Consultant should apply for and obtain, on behalf of PWGSC, certification(s) for the Project under an industry recognized sustainable performance rating system prior to the expiration of the warranty period. The Consultant should be responsible for all tasks, including preparation of documentation and all submissions required for verification and final certification, and should balance the requirements of the rating systems' prerequisites and credits with other Project requirements.

5.2.7.3 Sustainability Performance Targets and Design Options

PWGSC conducted a feasibility study in order to identify the sustainability performance target as well as to provide the basis for planning the project. Two overall scenarios are described in the Feasibility Study: Retention (Options 2a and 2b) and Demolition/Redevelopment (Options 1a and 1b). After it was determined that the building was to be retained, the two initial options were further developed as follows:

- Option A Minimum Standards (Option 2a.1 in Feasibility Study)
- Option B Sustainable Heritage Rehabilitation (Option 2a in Feasibility Study)
- Option C High Performance Sustainable Heritage Rehabilitation (Option 2b in Feasibility Study), modified to remove passive ventilation shafts and regenerative elevators from the scope.
- Option D Maximized Renewable Investment(Investment (Option 2b in Feasibility Study, plus additional photovoltaic panels and other sustainability features)
- Option E Status Quo – Minimal Reinvestment

In this Project, Option C High Performance Sustainable Heritage Rehabilitation is to be further developed. The minimum sustainability performance targets for this Project that are to be validated by the consultant are as follows:

1. Energy reduction of 52% compared to the NECB 2011;
2. Minimum GHG emissions reduction between 65% and 88% compared to 2005-2006 existing building baseline;
3. Meet/certify to LEED Platinum or 5 Green Globes or equivalent industry recognized standard.
4. Pursue WELLv2 Core certification (Silver)

The Consultant should initially prepare a minimum of three (3) complete, distinct and viable Schematic Design (SD) options to be presented separately for review and assessment. Each of the three (3) design options, and final preferred design option with adjustment/changes made during the SD phase, should support the Sustainability Goals detailed above and should meet the Minimum Sustainability Performance Targets as described above.

The feasibility for inclusion of resilient, restorative and/or regenerative solutions (with a positive impact on social liveability and ecological health) should be considered across all options.

The targeted energy performance of each option should prioritize strategies that:

1. Optimize the building envelope;
2. Reduce internal loads;
3. Design high-efficiency systems;
4. Investigate potential for on-site renewable energy generation (where applicable).

For each SD Option, the following sustainability analysis is to be included:

1. Full life cycle costing breakdown;
2. Risks and impacts to the building;
3. Operations and Maintenance (O&M);
4. Improvements to energy, water, material life cycle impacts, waste, air quality and other environmental performance metrics;
5. Improvements to health and wellness;

6. Improvements impacting ecological integrity of the site;
7. Results from the energy model and life cycles assessment, which be used as a design-assist tool to better inform and evaluate these design options.

5.2.7.4 Energy Model

The Consultant should develop a whole building, design assist energy model of the existing building, to be used to identify existing performance and set a baseline for the rehabilitation analysis. The energy model should be used to evaluate design options through multiple simulations that lead to a combination of measures that best enables the Project to optimize energy performance and maximize GHG reduction, while maintaining the best value for the Project.

The Consultant should be guided by the energy performance options included herein when investigating design options for evaluation.

The energy models should be developed, revised and resubmitted for use in discussions at the milestone of, the Pre-Design, Schematic Design; Design Development, and Construction Documentation phases as well as one (1) year after completion of the Project as part of enhanced commissioning.

Modelling is required to confirm the mode of operations, energy balance and energy use of the proposed designs, and to explore and evaluate the best combination of measures accounting for life cycle costs and GHG impacts towards an optimal design solution.

Additional requirements to be accounted for are:

1. Possible energy strategies may include the use and generation of renewal energy on site such as solar, geothermal, heat recovery, etc., where pragmatic;
2. Consider the requirements for resilient design or future proofing for climate change impacts (i.e., increase in energy costs, increased power outages, increased passive requirements);
3. Maximize thermal performance of the envelope assemblies, identifying any limitations including impact on heritage characteristics, durability of materials, environmental life cycle impact, structural limitations, etc.;
4. The energy model produced should use pre-approved energy modeling software;
5. The energy model should have the ability to perform hourly simulations and meet the ASHRAE 140 Standard;
6. The energy model should be of a level of sophistication but be clearly described with assumptions and validation data described;
7. The energy model should be calibrated to the utility bills for the facility, (to be supplied by PWGSC); the building has been vacant since 2015. When using utility bills to calibrate the energy model, the operation schedule, system condition, occupation number, and functions of rooms shall be simulated as near as possible to those of the year of utility bill to be used;
8. Design decision support may include special modelling runs and detailed energy models of building equipment (in addition to “whole building” model);

9. The modelling software chosen should have the capability for modelling natural ventilation, solar photovoltaic systems, solar water heating and other forms of renewable energy.

The GHG emission factors to be used to assist with the evaluation should be confirmed and supplied by PWGSC (based on accepted values published by Environment Canada in the National Inventory Report).

5.2.7.5 Life Cycle Assessment (LCA)

The Consultant should account for the life-cycle environmental impacts of the design options. In accordance with PWGSC's sustainable development commitment detailed in its RPSF (2016-2019), the Consultant should complete a whole building life-cycle assessment (LCA) using the Athena Impact Estimator for Buildings to measure and compare the life-cycle environmental impacts (and operational performance) associated with the design, construction and material choices when weighing various design options.

The LCA will contribute to an optimal and balanced strategy that can best support the various Project sustainability objectives, performance goals and user requirements of the Project. The Consultant should conduct the LCA as follows:

1. Evaluate opportunities for reducing associated environmental impacts, including embodied energy (alongside operating energy), embodied carbon and air and water pollution (etc.), which will inform the selection of architectural materials and systems. Design options should investigate a minimum 10% reduction in embodied GHG over a baseline, as well as demonstrate reduction in two (2) other environmental impact categories by 5% (no other categories should increase by more than 5%);
2. Identify hotspots i.e. the biggest contributors to the environmental footprint of the building s (in its life cycle), in order to enable design modifications with the most meaningful and efficient improvement to overall building environmental footprint;
3. The LCA should be completed and used as a design assist-tool and revised and resubmitted for use in discussions at the Schematic Design; Design Development, and Construction Document phases;
4. Operational energy data resulting from the Energy Models should feed into the LCA when possible for the most holistic and accurate assessment.

5.2.7.6 Life Cycle Cost (LCC)

The life cycle costing should include:

1. Capital costs including all hard and soft costs;
2. Operation/Maintenance costs;
 - Energy & utilities costs (electricity, gas, water etc.)(\$/total/yr., \$/m2/yr.);
 - Materials (\$total/yr., \$/m2/yr.);
 - Equipment (\$total/yr., \$/m2/yr.);
 - Periodic replacement (\$ Total, \$/m2);

- Residual value, including demolition, recycling, disposal (\$ Total, \$/m2).
- 3. Resulting carbon price* based on anticipated GHG emissions (CO2e);
 - *Carbon price to be used is \$50/metric tonne of GHG (CO2e), fixed rate over life cycle (25 and/or 40 year);
 - The life cycle costing outputs.
- 4. 25 and 40-year lifecycle costing (with and without carbon pricing); and
- 5. Simple payback period (Return on Investment).

Assumptions regarding life cycle duration, discount rates, fuel cost escalations, inflation, facility alteration improvement and demolition, recycling and disposal should be described.

5.2.7.7 Non-Hazardous Solid Waste Management

Pursuant to PWGSC's Real Property Sustainability Framework (v2015), the Real Property Sustainable Development and Environmental Strategy and in response to the FSDS 2016-2019 and the Treasury Board's Greening Government strategy (2017), all projects greater than \$1 million should implement Construction, Renovation and Demolition (CRD) waste management practices through reuse and recycling to achieve a minimum non-hazardous waste diversion rate of 75%.

The PWGSC Construction, Renovation, and Demolition (CRD) Non-hazardous Solid Waste Management Protocol provides directions on the undertaking of non-hazardous solid waste management actions for CRD projects*. It shall be referenced for the minimum waste management planning requirements expected to be carried out for this project, as outlined below

*CRD waste should not include any hazardous materials (i.e. waste generated from asbestos, mould, lead abatements, PCB ballasts, fuels, other chemicals). Therefore, a clear distinction should be established between CRD waste and hazardous waste.

5.2.7.8 Non-Hazardous CRD Waste Management Program

The Consultant should develop a Non-Hazardous CRD Waste Management Program for the Project which should include the following key deliverables:

1. Prior to construction:
 - Waste Audit – Determines the types and volumes of construction materials that should be produced as surplus to the Project, as well as the preliminary options and diversion potentials for waste reduction, reuse and recycling. Although PWGSC has committed to a minimum diversion target of 75%, all efforts should be made to maximize waste prevention, reduction and diversion, setting a revised target based on the results of the waste audit. The PWGSC Environmental Consultant (EC) will prepare a Consolidated Waste Inventory that shall also inform the Waste Audit in full consultation and coordination with the Consultant based on the demolition and construction scope; and
 - Waste Reduction Work Plan – Identifies the overall waste diversion goal and material specific targets. It describes project specific procedures to maximize the

recovery of those materials identified in the Waste Audit. This also includes the Material Source Separation Program that details on-site sorting and labelling practices, tracking and reporting procedures and destinations for the materials recovered to be implemented during the construction phases of the project.

2. During and post-construction:

- Training – Includes presentation of a mandatory training session to be given prior to the commencement of the work on site and attendance at a midpoint update meeting, convened by the DR, to discuss progress and challenges of the Waste Reduction Work plan; and
- Waste Diversion Report – Documents the recovered construction materials to ensure that the results anticipated in the Waste Audit and Waste Reduction Work plan are realized to the highest degree possible. It records the results at the end of the project, using hauling and tracking records to confirm the quantities (percent and tonnage) and final destinations of the materials diverted/landfilled.

5.2.7.9 Regulatory Requirements:

PWGSC should ensure that every project it undertakes complies with Federal and, where applicable, Provincial Environmental Laws and Regulatory requirements. Under the Federal Government, most of these laws and regulations are governed by Environment and Climate Change Canada, Department of Fisheries and Oceans, and Transport Canada. Provincial regulations as well as municipal by-laws include requirements concerning soil, water and air quality as they relate to varying land uses and receptors.

The Project should be implemented in compliance with all applicable environmental regulations, guidelines, and by-laws. This should include consideration and conformance with City of Ottawa by-laws, and specific NCC requirements. Any potential compliance risks associated with the work should be identified and mitigation measures developed to limit or prevent the severity of any identified adverse environmental outcomes.

5.2.8 Structural

The structural requirements include providing structural support to accommodate new functional and technical requirements and base building repair, upgrade and/or modifications and as a minimum the Consultant should:

1. Perform a site assessment to document characteristics including: member and frame geometry; material type; visually evident deterioration, deformation, damage; surface conditions; and critical connection details;
2. Evaluate actual floor and roof load capacities with respect to the occupancies and uses from original construction and intended occupancies and uses;
3. Confirm the existing structure is adequate to support all imposed loads. Identifying the structural systems that do not meet current Building Code loading requirements, this includes any change of use or load increases to meet the functional program requirements. Deficient structural systems identified should be reinforced or the use is to be relocated to an area that is structurally adequate;

4. For seismic, the new (March 2018) PWGSC Seismic Standard should be used to determine the required performance level based on different factors such as inspection quality, redundancy and consequence of failure. The difference in terms of costs to upgrade to 100% of the 2015 NBCC seismic loading should also be looked at.
5. Design for structural modifications to satisfy the technical and functional program requirements such as the reinforcement or repair of the original building fabric; including new additions and modifications to existing structural systems (including temporary and permanent openings);
6. Detail engineered repairs to structural members and assemblies to restore/upgrade structural material integrity, this includes items listed in the Feasibility Study and most current Building Condition Report, including, but not limited to; the existing structure, floor slabs, roof slabs, exterior walls, handrails and railings, and ramps;
7. Detail seismic upgrade of structure and non-structural elements (including exterior cladding, operational and functional components [OFC's]) including conservation of the masonry and other heritage materials, containing repair, replacement, resetting, consolidation and repointing;
8. Upon request by PWGSC, submit all structural calculations for review;
9. Provide design loads that can be applied into the building or any other structure that is above or below grade imposed by construction activities, such as, the temporary scaffolding systems, shoring, material and equipment loads, to enable continuous construction work;
10. Specify all structural temporary work required as part of construction, including the specific requirements and sequencing of temporary structural bracing;
11. Assess structural components to determine if there has been any movement or indication that the structure should be monitored during construction.
12. Prepare construction documents and provide contract administration for exploratory openings, including removal of sandstone panels
13. Structural as-builts after construction is completed.

5.2.9 Seismic Retrofit

Currently the building does not meet the performance objective of the current PWGSC Seismic Standard. Seismic retrofit to meet PWGSC Seismic Standard is a requirement of the comprehensive rehabilitation.

The Consultant should propose the seismic upgrade reinforcement of the building as part of the holistic rehabilitation. It is expected that the retrofit strategy considers the options identified in the 2012 Halsall report as well as all other proposed works to building in developing the options, including any new service or circulation shafts and structural strengthening of gravity systems. This should require upgrading its seismic resistance, while minimizing the impact on heritage fabric and supporting an overall conservation strategy. This includes a cost/benefit analysis of the seismic upgrade to 60 % and 100 % of NBCC. The consultant is to identify the sensitivity of each option to the interior fit-up options. Where the seismic upgrade option is found to be sensitive to the fit-up layout option, the Consultant should analyze that seismic option for each of the sensitive fit-up layout options.

5.2.10 Mechanical

During the Schematic Design the Consultant should provide mechanical designs for the three (3) distinct design options presented in the SD phase for the base building HVAC and for the emergency generator systems, including options for location of generators, and fuel storage tanks, complete with life cycle costs analysis, advantages, disadvantages, risks and recommendations. For each option, energy simulations should be completed to demonstrate energy use and provide comparisons of the options. HVAC system modelling should include options using natural ventilation and motorized windows operated by the EMCS.

The Consultant's design should consider but is not be limited to:

1. Design of base building mechanical systems to serve the occupied building for at least 30 years;
2. Capping, demolition and removal of all existing mechanical systems;
3. Develop well considered mechanical design to best implement the sustainability targets as part of the Sustainability Strategy
4. Full replacement of the mechanical equipment and systems should be required. Geothermal heating is planned for the design, but the Confederation Heights Central Plan (CHP) should be retained as a backup or for peak load, or even for geothermal system of this building to feedback energy for other buildings. The new mechanical systems should be closely coordinated with all other building systems, closely integrated with the heritage character defining elements of the building and the overall heritage conservation strategy and form an integral part of the sustainable strategy;
5. Coordinate the building envelope design upgrade with the mechanical design in order to provide the lowest energy consumption.
6. Provide speech privacy as per the Functional Program
7. Prepare as-found mechanical drawings to be used for demolition construction tender documents
8. Consider space limitations for location of duct work within the existing building structure.

The scope of work should also include, but is not limited to

9. Evaluate the condition and sizing of the water meter to confirm appropriateness for current and future requirements. For any changes required, the Consultant should take the lead in the discussions with the PWGSC; the City has no jurisdiction for individual building water meters; building water meters are PWGSC owned and for PWGSC's own water recording/auditing purposes. Add new meters as required for sustainability strategy. Evaluate condition and appropriateness of the existing backflow preventers, if any.
10. Design new hot water heating system to comply with the ESAP Requirements for Building Heating and Cooling Systems Connected to the PSPC District Energy Systems in the NCR.. Provide calculations to support selected temperatures and equipment types. Coordinate evaluation with architectural discipline in order to evaluate the improvements

in envelope (windows, wall insulation, air tightness) heat transfer that are necessary to achieve the design guideline of the low temperature heating water system;

11. New chilled water system plant complete with primary to secondary heat exchangers, pumps and chilled water distribution to all air handling units and terminal equipment. Design of chilled water temperatures will be according to CHP design requirements; new supply and return chilled water piping basement mechanical room and new chilled water heat exchangers.
12. Remove and replace existing air handling units and exhaust fans; Provide new energy efficient HVAC systems for the building. The base building HVAC systems need to be flexible and adaptable for the use of building occupants and comply with ASHRAE ventilation requirements as well as the National Building Code.
13. Consider use of demand controlled ventilation to improve energy efficiency.
14. Design mechanical system to work with geothermal energy source
15. New ductwork distribution mains from air handling units' and new floor distribution mains; review existing vertical shafts and determine how best to incorporate vertical systems while maximizing useable floor area
16. Remove existing perimeter heating units and replace;
17. New domestic water piping and sanitary drains to washrooms, kitchenettes, water fountains, and other plumbing fixtures throughout the building;
18. Evaluate and replace existing sanitary, rainwater, and storm drainage systems and piping;
19. Remove existing control devices and system; provide new Building Automation System (BAS)/EMCS and intelligent devices controlling all equipment and devices. All sequences of control to be coordinated to provide the most intelligent control system; BAS should use Open Protocols such as Bacnet.
20. New water-saving plumbing fixtures in all washroom areas, with the exception of the reinstalled heritage lavatories; Clean and reuse original porcelain sinks in washrooms;
21. Provide full mechanical support systems such as ventilation, heating, cooling, plumbing, and drainage for new washrooms and kitchenettes as required by the Functional Program;
22. New generator exhaust system and fuel oil systems required for two new generators;
23. Provide seismic restraint systems for the mechanical equipment, piping and ductwork according to the NBC (National Building Code);
24. Mechanical as-built drawings after construction is completed
25. As a member of the mechanical engineer's team, the geo-exchange specialist is to:
 1. A pre-design study to determine the feasibility of incorporating a geothermal system into the building design
 2. Provide design for the geothermal system through close collaboration with mechanical engineer

5.2.11 Fire Protection

1. The fire protection systems should be replaced.
2. Site fire protection should be evaluated for verification purposes using FUS guidelines and confirmation of appropriate fire hydrant coverage following City of Ottawa guidelines (including OFS) and NBC.
3. Replace existing fire pump system with new; Sizing of pump should be accordance with the hydraulic design of the new sprinkler system
4. New sprinkler systems throughout the building;
5. New addressable fire alarm system for whole building to suit base building and fit-up layouts;
6. New standpipe systems should be located in stairwells; Hose connections are to be located in the exit stairwells as required by the NBC;
7. Survey the integrity of the fire separations and repair as necessary to provide required separations.
8. Provide complete evaluation of exit facility and repair to what is reasonably practicable according to the requirements of the NBC.
9. As-built drawings after construction is completed

5.2.12 Site Services (Civil/Municipal Engineering)

1. Evaluate capacity of all existing mechanical utility services entering the building: domestic water and fire protection, sanitary, storm, steam and chilled water. Where existing services are of lower capacity, compared with what is required by the building, notify the DR at the early phases of the Project; Even if existing services appear to be adequate, the condition should be assessed and the sizing assessed in order to recommend renew or replace
2. Evaluate the site drainage system and identify sustainability opportunities to address storm water such as storm water retention, bio swales rainwater harvesting for transporting waste; and other systems; Assess opportunities in conjunction with adjacent buildings site in order to develop a centralized approach.
3. Conduct a full load analysis of the entire building to verify if the high voltage distribution is sufficient for the new load requirements and replace if required;
4. Replace medium voltage cables.

5.2.13 Electrical

The Consultant's design should consider but is not be limited to:

1. Full replacement of the electrical equipment and systems should be required, with the possible exception of the existing main and secondary transformers as well as the secondary switchboard; the Confederation Heights Central Plant (CHP) will be retained as the source for electricity;
2. Design of base building electrical systems to serve the occupied building for at least 30 years;

3. Capping, demolition and removal of all existing electrical systems, with the exception of any to remain;
4. Develop well considered electrical design to best implement the sustainability targets as part of the Sustainability Strategy
5. The new electrical systems should be closely coordinated with all other building systems, closely integrated with the heritage character defining elements of the building and the overall heritage conservation strategy, and form an integral part of the sustainable strategy.

The scope of work should also include, but is not limited to

1. Expand & upgrade existing main switchboard as per the Project requirements;
2. Assess the condition and life expectancy of the main and secondary transformers;
3. New emergency power distribution system including two new Diesel generator sets and associated transfer switch(s) and MCC;
4. New electrical switchgear
5. New UPS system;
6. New distribution panels, transformers & feeders;
7. Power connections required to mechanical equipment;
8. New Lighting & Power; Select lighting fixtures to coordinate with the design and heritage conservation strategies;
9. Assess and refurbish exterior heritage light fixtures
10. New lighting control system allowing energy savings through controlled dimming/switching/daylight harvesting in selected areas;
11. New empty conduit & wiring for security equipment and A/V systems as per the Project requirements identified in functional requirements;
12. New communications racks, patch panels, cable tray, trunk conduit & cabling, outlets & cabling in core areas;
13. Lightning protection & grounding;
14. Seismic protection;
15. Coring, x-ray, cutting, patching & fire stop.

5.2.14 Vertical Transportation

The existing vertical transportation systems requires review for Building Code compliance and functionality. The building includes four (4) interior stairwells to meet requirements and three (3) passenger elevators.

Coordination between all the Consultant Team members including Electrical, Mechanical, Structure, Control and Security is essential to meet the functional and operational project objectives.

Loading dock is to be upgraded with new hydraulic lift.

5.2.15 Building Components and Connectivity (BCC)

The provision of Building Components (fixtures, furnishings and equipment) and Connectivity (Information Technology, Multi-Media and Integrated Security Systems [IT/MM/ISS]) (BCC) are essential to meet the functional, operational, and security requirements of the Users. Occupancy will not occur without successful design and sensitive integration of these elements into the heritage fabric of the building as well as other aspects of the Project. The objective of the BCC program is to meet the operational requirements to allow immediate occupancy of the space.

5.2.15.1 Building Components

The Consultant should select and/or design all BCC Components in keeping with the overall design strategy. This includes the preparation and ongoing update of a comprehensive quantity and specification listing (Building Component Matrix) of new and existing elements and corresponding cost estimates for all BCC Components.

PWGSC Workplace Solutions will provide guidance and oversight on all office fit-up layouts and provide furniture procurement strategies.

Substantial coordination effort is required by the Consultant to integrate the functional requirements from the General Fit-up Requirements and their Functional Program into the overall design.

The Consultant services for BCC Components includes, but is not limited to the:

1. Development and continuous update of required Components lists;
2. Design of the furniture and equipment layouts;
3. Selection of commercially available Components or design custom Components that are aesthetically compatible with the architectural vocabulary of each space;
4. Design of custom furniture, including those requiring embedded IT and/or MM equipment, in coordination with the manufacturer specifications;
5. Development of a procurement strategy in liaison with the DR;
6. Prepare Component / furniture statements of work/specifications;
7. Specification, installation and commissioning requirements of Components in all procurement packages;
8. Definition and selection of appropriate suppliers;
9. The coordination, overseeing of the installation, and inspection of all BCC Components in consultation with the DR and the GC including the loading dock availability;
10. Site verification of delivery and installation approval, and preparation of and rectification deficiency lists (in conjunction with the DR);
11. Cost estimating services for all BCC Components; and
12. Coordination and integration of BCC Components into the BIM and all other elements of the Project.

5.2.15.2 Building Signage

The Consultant's responsibility includes the design, drawings and specifications of all temporary and final exterior and interior signage for the Project. Interior way finding, and room signage should be fully coordinated with approved room numbering;

5.2.15.3 BCC Components inclusions and exclusions

BCC Components include, but are not limited to:

1. Commercially Available Furniture;
2. Case Goods;
3. Purpose-Built Furniture and Shelving (custom furniture);
4. Soft Seating;
5. Chairs;
6. Task Lighting;
7. Maintenance Equipment;
8. Security Equipment;
9. Health and Safety Equipment;
10. Material Handling Equipment; and
11. Other Equipment (such as computers, photocopiers, printers, scanners, digital radios, etc.) in support of the delivery of common services (i.e., security posts, printing services, building management).

BCC Components do not include the following:

1. Office equipment related to administrative functions such as: computers, printers, fax machines, television sets, VCRs, converters, phone sets or radios; and
2. Office Accessories such as: garbage cans, supplies, plants, decorative drapes and rugs.

5.2.15.4 Procurement

Each procurement package should include a package specific Statement of Work (SoW), detailed specifications for all elements to be procured, detailed installation drawings, and a cost estimate.

Procurement for furniture to be as per latest valid PWGSC's Acquisitions Branch's rules and regulations. Workplace Solution can provide assistance in the procurement process and strategy. The consultant to provide specific documents and deliverables in order to assist the procurement process.

The DR will determine the procurement method. Typically, any Building Component built-in or physically attached (fixed) to the building, structure, or site including millwork are considered part of the base building requirement. Custom Components and commercially available Components, as identified in manufacturer's catalogues, are routinely procured through PWGSC, as determined by the DR.

5.2.15.5 BCC Connectivity Overview (IT/MM/ISS)

The Consultant should be responsible, for the validation of requirements and definition of specifications for all aspects associated with the BCC Connectivity (Information Technology, Multimedia and Integrated Security System [IT/MM/ISS]) elements related to the Users requirements and other BCC Connectivity items.

The Consultant is required to design and integrate/coordinate the BCC Connectivity program with all base building and fit-up requirements which support a fully coordinated set of construction documents.

The Consultant services for BCC Connectivity includes, but is not limited to the:

1. Preparation of detailed technology and security designs for all information and security monitoring and control systems for the Project;
2. Preparation of a detailed Statement of Work (SoW) for each BCC Connectivity, IT/MM/ISS, construction tender package;
3. Planning, design, coordination and full integration of the infrastructure to accept Connectivity elements as described in this Project Brief, including, but not limited to; conduits, cable trays; junction boxes and terminations points; technical grounding; specialized power configurations; cabling to termination points; termination cabling to outlets; lighting (including television and teleconference, as required) building and site security; harmonic analysis and HVAC to ensure a seamless base building solution, with due regard to how it impacts aspects of lighting, acoustics, power requirements, maintainability, acoustical treatments and commissioning, and integration with building heritage elements;
4. The planning for segregated pathways and minimize interferences with other building services;
5. Instruction for the GC to control dust migration. Due to the sensitive nature of electronic equipment, the construction site should be maintained as clean as possible during and after installation of electronic components;
6. Commissioning of the technology components and systems is the responsibility of the Consultant's qualified sub-consultant (IT Engineering Consultant). The commissioning of interface or connection of base building to the technology components and systems is the responsibility of the Consultant and the GC;
7. There are significant design challenges integrating technology requirements in heritage spaces. The level of effort and coordination among design disciplines and with the GC within the Model cannot be understated and
8. Conducting specific workshops for BCC Connectivity during the implementation of the Project are critical to successful and timely integration of requirements.

5.2.15.6 BCC Connectivity Inclusions and Exclusions

BCC Connectivity includes, but is not limited to:

1. Infrastructure fit-up;
2. Cabling;

3. Integrated Security System;
4. CATV, Network;
5. Public Address System;
6. Wi-Fi;
7. Telephony;
8. Multimedia;
9. Digital Radio;
10. Exterior Cameras;
11. Communications Centre Operational Training;
12. Initial Operation and Maintenance Requirements;
13. Fire Alarm Monitoring System; and
14. Extended Warranties.

BCC Connectivity does not include the following:

1. Operation and maintenance requirements subsequent to transfer of assets; and
2. Base building renovation and construction activities.

5.2.16 Integrated Security Systems (ISS)

The Consultant should provide design requirements, guidelines, security construction documents and related addenda. The Consultant should coordinate the full integration of the security component pathways, physical and other related security features into the base building and fit-up, and achieving required solutions. The Consultant should coordinate and integrate security requirements with the base building and fit-up systems, seamlessly integrating them into the heritage fabric of the building.

In defining the requirements, concepts of operations and detailed design, the Consultant should consider a number of factors, including, but not limited to:

Architecture

1. Crime Prevention Through Environmental Design (CPTED);
2. Site Hardening (secure building perimeter, structural integrity,);
3. Security Lighting;
4. Doors, Door Hardware;
5. Acoustics & Speech Security;
6. Fences;
7. Gates;
8. Barriers (bollards, planters, street furniture);
9. Berms and built landscape forms such as “ha ha’s”
10. Security Posts and Screening Facilities.

Personnel:

1. Administration & Organization;
2. Roles and Responsibilities;
3. Screening, Training;
4. Security Posts and Post Orders;
5. Policies & Procedures.

Technology areas:

1. Integrated Security Systems;
2. Access Control;
3. Photo Identification;
4. CCTV Surveillance;
5. Intrusion Detection;
6. Security Intercom;
7. Other Systems Integration;
8. Contraband Detection (weapons, explosives, biohazards, drugs, audio recording devices, cameras).

5.2.16.4 BCC Connectivity CATV, Voice and Data, Security Cabling, and Multimedia

The Connectivity system designs should be fully integrated into the Consultants' base building and fit-up design, as it progresses and not after such design is completed.

Pathways, conduit run, recessed terminal boxes and junction boxes, etc. should form part of the Consultants' drawings and coordinated with all disciplines.

Contract documents should clearly describe the extent and timing of work such that the GC can properly plan, coordinate and control the work site.

5.2.16.5 Procurement

Construction documents should include a package specific Statement of Work (SoW), detailed specifications for all elements to be procured, detailed installation Drawings, and a cost estimate.

The DR will determine the procurement method. Generally speaking, any BCC Connectivity element built-in, integrated within or physically attached (fixed) to the building, structure, or site and custom Connectivity elements are considered part of the base building for procurement by the GC, thus integration of these elements into coordinated tender packages is critical. Other BCC Connectivity goods or services, security related requirements are routinely procured through PWGSC, but may be procured through the GC if there are Project scheduling or safety constraints or other issues, as determined by the DR.

PD 6 EXISTING DOCUMENTATION

6. Existing Documentation

6.1 Available to all Proponents (Upon Request)

1. Heritage Character Statement, Federal Heritage Buildings Review Office (2003)
[https://www.historicplaces.ca/media/17162/2001-049\(e\)edwarddrakeBuilding.pdf](https://www.historicplaces.ca/media/17162/2001-049(e)edwarddrakeBuilding.pdf)
2. Standards and Guidelines for the Conservation of Historic Places in Canada, Parks Canada (January 2010)
<http://www.historicplaces.ca/media/18072/81468-parks-s+g-eng-web2.pdf>
3. A Guide to Working with the Federal Heritage Buildings Review Office (FHBRO), Parks Canada (January 2009)
http://www.historicplaces.ca/media/7313/fhbro_manual_parks%20canada.pdf
4. Real Property Sustainability Framework (RPSF) 2016-2019 <https://www.ec.gc.ca/dd-sd/default.asp?lang=en&n=B8F4119E-1> and 2019-2022 Draft http://fsds-sfdd.ca/downloads/Draft_FSDS_2019-2022.pdf
5. PWGSC Real Property Sustainable Development and Environmental Strategy 2018
<https://www.tpsgc-pwgsc.gc.ca/rapports-reports/smdd-dsds/index-eng.html>
6. Departmental Sustainable Development Strategy (2017-2020)
<https://www.canada.ca/en/canadian-heritage/corporate/publications/plans-reports/sustainable-development-strategy-2017-2020.html>
7. Technical Reference for Office Building Design (TRFOBD) (2017)
http://publications.gc.ca/collections/collection_2017/spac-pspc/P4-70-2017-eng.pdf
8. Greenhouse Gas Options Analysis Methodology
9. PWGSC Commissioning Manual <https://www.tpsgc-pwgsc.gc.ca/biens-property/sngp-npms/bi-rp/tech/miseenservice-commissioning/manuel-manual-eng.html>
10. Treasury Board Policy on the Management of Real Property, PWGSC (November 2013)
<https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12042>
11. Policy on the Management of Materiel, Government of Canada (June 2006)
<https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12062>
12. A Guide to the Management of Movable Heritage Assets, Government of Canada (July 2008)
<https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=13872>
13. Treasury Board Policy on the Management of Real Property, PWGSC (November 2013)
<https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12042>
14. Treasury Board Accessibility Standard for Real Property, PWGSC (June 2006)
<http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12044#cha3>
15. PWGSC National CADD Standard, PWGSC (December 2016)
<http://www.tpsgc-PWGSC.gc.ca/biens-property/cdao-cadd/index-eng.html>
16. Policy on the Management of Materiel, Government of Canada (June 2006)
<https://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12062>

17. TBS Greening Government Strategy (2017) <https://www.canada.ca/en/treasury-board-secretariat/services/innovation/greening-government/strategy.html>
18. PWGSC National Carbon Neutral Portfolio Plan (2017)
https://buyandsell.gc.ca/cds/public/2018/07/05/0a5d8ab5360ef32e82a6e1f47a8405a4/ABES.PROD.PW_ZQ.B018.E33604.ATTA001.PDF
19. PWGSC MD 15161-2013 Legionella Standard <https://www.tpsgc-pwgsc.gc.ca/biens-property/documents/legionella-eng.pdf>
20. PWGSC MD 15000 Environmental Standard
http://publications.gc.ca/collections/collection_2013/tpsgc-pwgsc/P4-50-2012-eng.pdf

6.2 Available to all Proponents in Phase II of this RFP (Upon Request)

1. Confederation Heights Vision and Mission (2018)
2. Feasibility Study Report 101% Submission, DFS Inc. Architecture & Design (2017)),
3. Conservation Guidelines, PWGSC Heritage Conservation Services (2018, amended 2019)
4. Building Condition Report, PWGSC (2016)
5. General Fit-up Requirements PWGSC (2019)
6. Heritage Elements, PWGSC Heritage Conservation Services (2018)
7. Stage 1 Building Envelope Screening Report, PWGSC Heritage Conservation Services (2018)
8. Building Information Model (BIM), PWGSC (2019)
9. Edward Drake Building Seismic Upgrade Phasing Feasibility by WSP April 2016
10. Original Construction Drawings, CBC Headquarters, D.G. McKinstry, Chief Architect, December 1961
11. PWGSC Seismic Standard (March 2018))
12. ESAP Requirements for Building Heating and Cooling Systems Connected to the PWGSC District Energy Systems in the NCR, PWGSC (December 2016)
13. PWGSC Real Property National Construction, Renovation, and Demolition Non-Hazardous Solid Waste Protocol CADD Building Floor Plans, PWGSC Heritage Conservation Directorate (March 2019)
14. CADD As-Found Exterior Building Elevations, Sections and Reference Plans, PWGSC Heritage Conservation Directorate (March 2019)
15. CADD Site Plan, PWGSC Heritage Conservation Directorate (March 2019)
16. Original Drawings and Specifications for the (former) CBC Headquarters Building, 1959

6.3 Available to the successful Proponent (After Contract Award)

Documents made reference to within this document, in the list below, will be made available to the successful Proponent in the language written:

1. Building Timeline, Heritage Conservation - Repository of all technical documentation available for the Building.
2. Site History, Evolution, and Cultural Landscape for Confederation Heights

3. Phase II Environmental Site Assessment for Edward Drake 57718 by Dessau (2012)
4. Environmental Compliance Management Program (EGMP) Checklist, PWGSC (January 2013)
5. Preliminary Identification of Environmental Services Required (PIESR), PWGSC (May 2017)
6. Geotechnical Report Seismic Assessment, Technical Memorandum - Golder (March 2012)
7. Geotechnical Report Edward Drake, Investigation, Houle Chevrier (February 2015)
8. Proposed Security Fences and Modular Buildings, Drake and Tilley Buildings - Paterson (July 2004)
9. Seismic Assessment Report of CBC Building, Adjeleian Allen Rubeli Limited Consulting Engineers (November 1997)
10. Designated Substances Report for 1500 Bronson Avenue Rehabilitation Project, Building by: DST Consulting Engineers Inc., - decommissioning
11. Designated Substances Report for the 1500 Bronson (DST Consulting Engineers) March 2014 and Designated Substance Report Specifications Section 011425 (DST Consulting Engineers) – 2014
12. Infra-Red Thermography Investigation Volume 1 – Report, Heritage Conservation Directorate (March 2015)
13. Seismic Assessment of the Sir Edward Drake Building, by Halsall Associates, 2012
14. Site Development Options Report, Jensen Hughes (2019)

PD 7 CONSULTANT SERVICES

7. Consultant Services

Members of the Consultant Team may have the necessary qualifications and expertise to provide services in more than one discipline or specialty. The Consultant Team for this Project should be capable of providing the following integrated services:

7.1 Regulatory Analysis Planning and Development Services:

1. Building Code and Life Safety (both National and Provincial Codes);
2. Universal Accessibility;
3. Municipal Zoning;
4. Occupational Health and Safety.

7.2 Architecture, Interior Design and Specialty Services:

1. General Architecture;
2. Building Envelope Science with Expertise in Heritage Building Envelopes;
3. Interior Design;
4. Building Universal Accessibility Specialist;
5. Acoustics;
6. Lighting, with Expertise in Heritage Buildings;
7. Hardware, with Expertise in Heritage Buildings;
8. Building Signage and Way-Finding;
9. Indoor / Outdoor Air Quality Design and Control;
10. Sustainable Design Specialist;
11. Scan-to-BIM;
12. Building Information Modelling and Management;

7.3 Landscape Architecture and Urban Design Services

1. Landscape Architect
2. Urban Design Specialist – Preference is for an Architect
3. Site accessibility and wayfinding specialist
4. Ecology, bio-diversity and urban forest specialist
5. Arborist
6. Site lighting specialist

7.4 Heritage Building Services:

1. Heritage Conservation Architecture;
2. Heritage Conservation Structural Engineering;
3. Masonry Conservation;

4. Heritage Materials Conservation for Plaster, Wood and Metals;
5. Building Science Engineering;
6. Scan-to-BIM
7. Building Information Modelling and Management.

7.5 Engineering and Specialty Services:

1. Civil Engineering;
2. Traffic Engineering
3. Geotechnical Specialist
4. Municipal Services
5. Structural / Seismic Engineering, including Heritage Building Expertise and Base Isolation Expertise
6. Mechanical Engineering; including geothermal systems as well as solar hot water heating
7. Geoechange Specialist
8. Electrical Engineering, including Expertise in IT and Communications, Multimedia and Security Systems
9. Whole Building Energy Modelling and Simulation/Analysis and GHG Options Analysis
10. Power Systems including UPS, Backup Generators and Supplementary Power
11. Building Automation/ Energy Management Control Systems;
12. Fire Protection;
13. Vertical Transportation;
14. Security Infrastructure
15. Environmental Design (Indoor/Outdoor Air Quality Design and Control);
16. Commissioning Services (Specifications, Design Intent, Witnessing and Manual Development)
17. Scan-to-BIM
18. Building Information Modelling and Management;
19. Third-Party Commissioning Agent

7.6 Project Control Services:

1. Cost Planning, Estimating and Control (PQS);
2. Time Planning, Scheduling and Control (recognized specialists).

7.7 Specialty Consultant Services

The following outlines expectations regarding some of the specific specialty consultant expertise required by the Project:

7.7.1 Building Code and Life Safety Specialist

The Consultant Team should have specialized expertise in Building Code analysis and life safety system design requirements (code specialist). In areas where there is a difference between the NBC and the OBC, the most stringent requirement shall apply.

The code specialist should provide detailed assessment of building assemblies and provide written direction to the Consultant and PWGSC with respect to all Building Code, life safety and construction operation requirements, as well as providing direct input to the detailed design and participate in the execution of all life safety testing, at each phase of occupancy. The code specialist should prepare both NBC and OBC code matrices and tables of equivalencies throughout the Project and assist in the negotiation with municipal and federal officials for building and occupancy permits. The code specialist should play a key role in establishing the requirements for temporary fire protection for construction operations and verify, routinely, that such protection is correctly installed and is being properly maintained.

7.7.2 Acoustics Specialist

Expertise is required for broadcasting, speech security and speech intelligibility design with acoustical commissioning. The Consultant's acoustic specialist is also required to prepare for presentations and discussions and computer-based acoustic models to demonstrate the performance of proposals to meet acoustic requirements.

7.7.3 Sustainable Design Specialist(s)

The Consultant Team should include expertise in sustainable design having demonstrated experience in projects involving retrofit and/or rehabilitation for high performance, sustainable buildings and certification for industry recognized high-level environmental project and/or building performance ratings.

Demonstrated experience includes the integration and application of environmental protection and sustainable development policies and strategies, environmental assessment policies, programs and guidelines, environmental management and performance, strategies and tools, and site and/or community scale sustainability solutions beyond the building footprint. The expertise should include certified professional with a valid LEED AP or equivalent industry recognized professional accreditation and be familiar with Green Globes Design for New Buildings and Retrofits. The sustainable design specialist should be prepared to work in a cross disciplinary fashion and participate in the Integrated Delivery approach including all design meetings.

7.7.4 Building Information Modelling and Management (BIM) Specialist

The Consultant Team should include expertise in Building Information Modelling and Management, having experience in the coordination, processes, exchange and interoperability of information relating to Building Information Modelling and the Management of BIM Planning, Delivery and Clash Detection for major projects. The BIM Specialist should have experience working with Point Cloud data, BIM strategies and tools, as well as have experience leading major BIM Project Teams.

7.7.5 Energy Modeller

The Consultant Team should include an energy model specialist having experience completing whole building, design-assist energy model simulations to determine and evaluate the mode of operations, energy balance and energy use of proposed designs, accounting for life cycle costs and resulting GHG impacts towards carbon neutral solutions. The energy model specialist should have demonstrated experience modelling large commercial buildings using pre-approved leading-edge software. The modeller should be prepared to participate in all design meetings and provide design decision support through special modelling runs and detailed models of building components (in addition to “whole Building” model).

7.7.6 Buildings Controls Specialist

The Consultant Team should have a building controls specialist with expertise in Building Automation Systems (BAS) and Energy Monitoring and Control Systems (EMCS). The building controls specialist should co-ordinate the controls interface for mechanical, electrical and possible other building infrastructures such as fire alarms and design the interface and the functional integration of all devices required to meet the building’s proposed targets. The EMCS should be direct digital control (DDC) technology with networked distributed processing and should be user-programmable in the field for all required automated functions of all energy and water consuming systems.

7.7.7 Vertical Transportation Consultant

The Consultant Team should have a vertical transportation consultant whose expertise is in vertical transportation and experience with heritage buildings. The vertical transportation consultant should be retained throughout the Project.

7.7.8 Security Specialist

The Consultant Team should have a physical security specialist, a security system specialist and a security designer who should be retained throughout the Project.

7.7.9 Geoexchange Specialist

Geoexchange Specialist on the mechanical engineer’s team to be accredited by a Canadian Geothermal Association such as the Canadian GeoExchange Coalition (CGC) or the Ontario Geothermal Association (OGA). This specialist should have experience with designing and administering the construction of ground source heat pump systems for existing buildings of comparable size.

7.7.10 Scan-to-BIM

The Consultant Team should have expertise in the collection of point-cloud data using laser scanning technologies for the recording of as-built conditions, as well as experience producing large and coordinated point-clouds for Modelling use.

7.7.11 Cost and Scheduler Specialist(s)

Cost estimates are required as prescribed in “Doing Business with PWGSC”. Delivering this Project on time and within the approved construction budget is a high priority. The purpose of cost planning and cost control is to assist in the accomplishment of the Project cost objectives.

The Time Specialist should play a major role in the development and monitoring of the Project schedule and provide scheduling services from the award of the Consultant contract, through to construction and commissioning completion, including the warranty period.

Both services are a continuous and interactive process involving planning, action, measurement, evaluation and revision.

7.7.12 Third Party Commissioning Agent

The Consultant is to retain an experienced independent third party Consultant Commissioning Agent as a subconsultant. The Consultants Commissioning Authority (CxA) should have documented commissioning authority experience in at least 2 LEED whole building projects. Qualifications of the proposed Commissioning Agent shall be provided to the Departmental Representative for verification of minimum requirements. The Consultant's Commissioning Agent should be directing the commissioning process. The individual(s) serving as the (CxA) should be independent of the project design. The (CxA) is responsible to identify all required Commissioning activities related to various building components. The following elements, Life Safety, HVAC, EMCS Controls, Electrical (normal and emergency), Plumbing, Building Envelope, Elevating Devices and Security systems are to be commissioned. The (CxA) should work closely with the Project Team, PWGSC Commissioning Manager and the Contractor during commissioning activities. The CxA should report results, findings and recommendations directly to the project team. The CxA should develop integrated Performance Verification and Product Information forms, Commissioning reports and manuals at various stages of the project in compliance with the contract documents.

The Commissioning Agent is being engaged to provide commissioning services on the project with the following objectives;

- Review and ensure that the built work, systems and equipment are planned, designed, installed, tested, optimized and capable of being operated and maintained in conformance with the Project Requirements;
- Review and ensure that the built work, systems and equipment meet or exceed the design Consultant's Basis of Design, and any other requirements set forth in the contract documents;
- This Commissioning Agent shall document and witness all test results to ensure conformity to the design and operational requirements;
- The Consultant Commissioning Agent shall take on a key and leading role in driving the commissioning process to successful completion.
- Refer to PWGSC Commissioning Manual CP-1 - 4th Edition – November 2006 and PWGSC Commissioning Guidelines CP.3 to CP.13 available at <http://www.tpsgc->

pwgsc.gc.ca/biens-property/sngp-npms/bi-rp/tech/miseenservice-commissioning/documents/manuel-manual-eng.pdf.

- Refer to CSA Z320-11: *Building Commissioning Standard & Check Sheets*, with variances as listed in Real Property Branch (RPB) *Commissioning Standard*.

7.7.13 Geotechnical Specialist

The Geotechnical Specialist should be a geotechnical engineer who should be a sub-consultant on the Consultant's team. This Specialist should provide advice regarding incorporating geotechnical information and analysis received from the GSC into the designs.

DESCRIPTION OF SERVICES

PA 1 PROJECT ADMINISTRATION

1. Project Administration

The following administrative requirements apply during all phases of project delivery.

1.1 PWGSC Senior Project Management/Departmental Representative

The PWGSC Senior Project Manager assigned to the Project is the Departmental Representative (DR). The DR is responsible for the Project progress and is the liaison between the Consultant, other sectors of PWGSC and the Users. PWGSC administers the Project and exercises continuous control over the Consultant's work during all phases of the project. Unless directed otherwise by the DR, the Consultant must obtain, or cause to be obtained, all approvals from authorities with jurisdiction, municipal and other governmental or regulatory requirements and approvals necessary for the Project.

1.2 Lines of Communication

All correspondence from the Consultant must be distributed as directed by the DR. There must be no correspondence or communication between Users and the Consultant unless directed by the DR. The Consultant must develop a Communication Management Plan, to be approved by the DR and incorporated into the Project Design Management Plan and executed.

All communications must carry the contract name/number, PWGSC Project title and PWGSC Consultant contract Project number and a date in a non-ambiguous format (i.e. 01/09/02 is ambiguous and is not acceptable). Automatic date fields must not be used except when preceded by the text "printed on."

1.3 Media

The Consultant must not respond to any requests for Project related information or questions from the media. Such inquiries must be directed to the DR.

The Consultant must ensure that no staff of the Consultant (including sub-consultants or specialists) grant interviews with the media unless requested to do so by the DR. All contact by reporters or others, requesting information about the building rehabilitation Project, must be referred to the DR immediately, without response to those requesting the information.

1.4 Security of Information

The Consultant and any person contracted or employed by the Consultant must not discuss issues relating to the Building Rehabilitation Project specifically including, but not limited to; building layout, design and security provisions, except as they relate to the direct provision of services related to this contract or if written permission is obtained from the DR.

1.5 General Project Deliverables

Where deliverables and submissions include summaries, reports, drawings, plans, specifications and schedules, five (5) hard copies must be provided along with a copy in native electronic format and PDF format, unless otherwise specified. Where deliverables and submissions include models or the results from any given modelling process, five (5) copies of the native electronic format and IFC or COBie format (as directed by this RFP and Annex B – Building Information Modeling [BIM]), unless otherwise specified.

Electronic format shall mean:

Deliverable	Acceptable PWGSC Format
Written reports and studies:	MS Word or MS Publisher
Spreadsheets and budgets:	MS Excel
Presentations:	MS PowerPoint and/or MS Visio
Schedules:	Microsoft Project/ Primavera
Change management, daily logs, etc.:	MS Word
Drawings:	AutoCAD and PDF
Models:	Native Electronic Format and IFC or COBie
Specifications:	NMS, in MS Word format
Web (Internet):	Adobe PDF, HTML, Macromedia Flash, etc.

Specifics around interim, milestone and coordination Model-based deliverables between Project Team members, and including all information exchange requirements, will be captured in the BIM Project Execution Plan (PxP)

1.6 Writing Style

The writing style must be presented in a logical, objective, clear and concise manner. Reports must be written so that the reviewer can easily locate references and respond to related information contained in the report. Typically, reports will include the following sections:

1. A cover page indicating the Project title, nature of the report, consultant contract number and author name, PWGSC contract name and reference number, and date in a non-ambiguous format, i.e. January 1, 2019;
2. A table of contents;
3. An executive summary;
4. An introduction;
5. A methodology section explaining the methods and tools used, such as weightings, comparative analysis;
6. A conclusion or synopsis; and
7. Appendices containing supporting material referenced in the report, supplementary and supporting information.

1.7 Report Content

Report contents must:

1. Ensure that the executive summary is an accurate and complete summary of the report following an identical structure, including only key points, results and recommendations requiring review and acceptance;
2. Use an organizing system, such as MS Word Document Map, for ease of reference and cross-referencing;
3. Use correct grammar including complete sentences to avoid ambiguity and facilitate translation when required. The use of technical terms, industry jargon and cryptic phrasing must be avoided. Acronyms should be spelled out where they first appear in a document
4. Be efficiently written with only essential information included in the body of the report and supporting information in an appendix, if required; and
5. Ensure all correspondence has been critically analyzed against accepted goals and objectives, PWGSC standards and the requirements identified in this Project Brief.

1.8 Acceptance of Consultant Deliverables

Acceptances indicate that, based on a general review of material for specific issues, the material is considered to comply with governmental and departmental objectives and practices, and that overall Project objectives must be satisfied. The DR, PWGSC Technical Services Team and other Quality Assurance members, the Users and other Authorities Having Jurisdiction (AHJ's) will review the Consultant's work product and will provide review comments. The Consultant must respond formally in writing to all comments and adjust documentation until all comments are resolved to the satisfaction of and acceptance by all authorities. In the case of conflicting comments, the Consultant must identify these to the DR, who will make the final decision on the differing perspectives.

PWGSC reserves the right to reject incomplete, undesirable or unsatisfactory work and any such rejected work must be redone and resubmitted for acceptance at the Consultant's sole expense. PWGSC acceptances do not prohibit rejection of the work that is determined to be unsatisfactory at later phases of review. If progressive Project design or technical investigation reveals that earlier acceptances should be withdrawn, the Consultant is responsible for redoing the work and resubmitting it for acceptance at the Consultant's sole expense.

The Consultant must obtain the DR's authorization in writing, before proceeding to the next phase.

No acceptance or approval by PWGSC, whether expressed or implied shall be deemed to relieve the Consultant of professional or technical responsibility. Neither does acceptance of an estimate by PWGSC in any way abrogate the Consultant's responsibility to not exceed the approved construction budget throughout the life of the Project, or the requirement to redesign, should the lowest acceptable bid differ significantly from the approved construction budget.

1.9 Co-ordination by the Consultants

The Consultant must:

1. Ensure submissions are fully coordinated and complete. That they are reflective of an approved quality management/assurance process for this Project including those from the sub-consultants. The importance of this cannot be understated, PWGSC will reject submissions which fail to be fully coordinated;

2. Coordinate with the work products of stakeholders;
3. Ensure clear, accurate and ongoing communication of design, construction, estimates and scheduling issues (including changes) as they relate to the responsibilities of the Consultant from initial base building reviews to post construction reports;
4. Provide how the Consultant will monitor and ensure quality of Consultant deliverables in the Design Management Plan;
5. Co-ordinate input for the DR's risk management plan;
6. Maintain a decision log documenting parameters of all design decisions taken, including: record of options considered, parties involved in the decision, and rationale for the decision;
7. Co-ordinate quality assurance process ensuring submissions are complete and signed-off by the designated senior reviewer; and
8. Ensure to provide adequate site inspection services and attend all required meetings.

1.10 Meetings and Workshops

Regular bi-weekly meetings face to face with the design and construction teams throughout the Project are required. An Integrated Design Process (IDP) is to be incorporated throughout the project, including the following: Core Team Meetings

Project Core Team meetings will be chaired by the DR and will direct the activities of the Project Team. These meetings will be held for the duration of the Project at the PWGSC offices located in the National Capital Area, or on the Project site.

The Consultant must prepare and deliver the agenda, notice to invitees, and minutes. The Consultant must issue final meeting minutes within two (2) working days of meeting. The format of the meeting minutes must be approved by the DR prior to the issuance.

The Consultant must create and maintain a current, searchable database containing meeting action items and issues that are directly linked to the risk management services of the Consultant. The top 10 risks from this database must accompany the meeting minutes.

Membership of the Project Core Team will vary in accordance with the schedule and milestones and usually includes the DR (and other Project Management and Technical Services Team members), representatives from the Users, the GC (during construction only), and the Consultant Team members who must participate as required and according to the work/issues in question.

The purpose of these meetings is to:

1. Monitor the Project progress against Project objectives;
2. Monitor the Project progress against the approved, construction cost estimates, cash flow, prioritized construction schedule and scope;
3. Assess design and construction productivity against agreed upon performance requirements;
4. Ensure clear communication between all participants; and
5. Identify opportunities or issues, assigning responsible individuals and dates for resolution.

1.10.1 Design Meetings

The Consultant will co-chair the Project Design meetings with the DR to coordinate and review the activities of the Project Team. These meetings will occur at the PWGSC offices located in the National Capital Area, or on the Project site.

The Consultant must prepare and deliver the agenda, notice to invites, and minutes. The Consultant must issue final meeting minutes within two (2) working days of meeting. The format of the meeting minutes must be approved by the DR prior to the issuance.

The Consultant must create and maintain a current, searchable database containing meeting action items and issues that is directly linked to the risk management services of the Consultant. The top 10 risks from this database must accompany the final meeting minutes.

At minimum, meetings must be organized under two (2) main categories:

1. Overall design requirements; and
2. BCC and their design integration.

Attendance at these meetings will vary in accordance with the phase of Project design and will include: the DR (and other Project Management Team members), the Consultant Team, site services personnel, sub-consultants (as identified by the Consultant and according to the work in question), the GC and User representatives.

The purpose of these meetings is to:

1. Monitor design progress against the approved, construction cost estimates, construction schedule and scope;
2. Ensure clear and efficient communication between all participants;
3. Ensure effective BCC design and tender package coordination;
4. Identify opportunities or issues, assigning responsible individuals and dates for resolution; and
5. Ensure effective quality management, including integration of approval body requirements.

1.10.2 Construction Meetings

The Consultant must attend weekly construction meetings during the Project Construction Phase, to be held either at the PWGSC offices located in the National Capital Area, or on the Project site.

The Consultant will prepare and deliver the agenda, notice to invites and minutes. The Consultant will issue the final meeting minutes within two (2) working days of meeting.

The Consultant will create and maintain a searchable database of action items and issues that is directly linked to the risk management plan. The top 10 risks from this database will accompany the final minutes of the meeting.

The attendance of the Consultant Team's site services personnel and sub-consultants are required at each meeting (as identified by the Consultant and according to the work in question).

The purpose of these meetings is to:

1. Monitor the progress and administration of the prioritized construction against the approved scope and construction cost estimate, and the construction schedule;
2. Ensure efficient communication between all participants;
3. Ensure effective construction coordination with site and building operations;
4. Ensure effective and efficient site coordination of all disciplines and sub-contractors;
5. Early identification opportunities or problem issues, assigning responsible individuals and dates for resolution; and
6. Ensure effective quality management.

1.10.3 Technical and Submission Meetings

The Consultant must co-chair additional meetings associated with technical subjects and submission reviews with the DR. Meetings will occur either at the PWGSC offices located in the National Capital Area, or on the Project site.

The Consultant must prepare and deliver the agenda, notice to invitees, and minutes. The Consultant must issue final minutes to all attendees within two (2) working days of meeting. The format of the meeting minutes must be approved by the DR prior to the issuance.

Meetings will include, but are not limited to:

1.10.3.1 Conservation meetings

Requiring the presence of the Consultant, key specialists and disciplines relevant to the topic, the GC (during construction only) and appropriate Project Management Team members. The conservation meetings will occur monthly or as required by the Consultant or DR. Presentations must be supported by graphic accompaniment.

1.10.3.2 Technical meetings

Requiring the presence of the Consultant, key specialists and disciplines relevant to the topic and appropriate Project Management Team members. The technical meetings will occur on an as-required basis, as determined by the Consultant or DR. Presentations must be supported by graphic accompaniment.

1. Sustainability strategy/targets and options development;
2. Sustainability design matrix and credits;
3. Landscape architecture;
4. Architectural lighting;
5. Structural systems
6. Mechanical systems; including BAS and Energy Modelling
7. Electrical systems;
8. Physical security and enterprise integrated security systems;
9. Multi Media;
10. Information Technology;

11. General acoustics;
12. Geothermal;
13. Model quality, design, and information exchange coordination;

1.10.3.3 BIM Project Execution Plan Meetings

Requiring the presence of all stakeholders specifying or delivering content within the Model environment. These sessions will develop and update the BIM PxP, a document that captures the logistics and technical details needed to deliver on Model-based requirements. The first BIM PxP meeting must be held 30 days after the contract award, and the PxP must be updated and in place for the remainder of the project, with approval for changes granted by the DR. This meeting is to be led by the Consultant Team's designated BIM Specialist, and supported by the DR's BIM Coordinator.

NOTE: An update to the BIM PxP is required for each major RS final deliverable, at minimum. The elements required to cover the Project BIM Requirement (Annex B) are part of the larger BIM PxP process.

1.10.3.4 BIM Coordination Meetings

Requiring the presence of all stakeholders specifying or delivering content within the Model environment. These sessions will resolve hard- and soft-clashes originating in the Model and requiring DR review and approval. These BIM Coordination Meetings do not detract from the requirement that the Consultant conduct regularly scheduled Coordination meetings amongst their Consultant Team. This meeting is to be led by the Consultant Team's designated BIM Specialist, and supported by the DR's BIM Coordinator.

NOTE: This meeting is expected to support RFI's and DIR's when they pertain to BIM and its implementation against project requirements to meet PWGSC expectations.

1.10.3.5 Submission meetings

Requiring the attendance of the Consultant, key specialists and disciplines relevant to the topic. Submission meetings for all approvals and construction tender packages will generally be synchronized with the schedule of submissions as outlined throughout the Project Brief.

1.10.3.6 Stakeholder Workshops

The Consultant must chair Stakeholder workshops with Users and Authorities with Jurisdiction, unless otherwise specified. The Consultant must prepare and deliver the agenda, notice to invitees, and minutes. The Consultant must issue final meeting minutes within two (2) working days of meeting. The format of the meeting minutes must be approved by the DR prior to the issuance.

The Consultant must create and maintain a current, searchable database containing workshop action items and issues.

Attendance at these workshops will typically include the Project Management Team, GC (during construction only), the Consultant Team, (as required and according to the subject of

the workshop), representatives from the Users (when required), and, in some instances, third party experts invited by PWGSC.

Workshops will include, but are not limited to:

a) Subject Matter Specific

These workshops will be focused working sessions intended to address specific technical topics and design approaches, project implementation strategies, and/or particular Project challenges. These workshops are required at 50% SD, 50% DD, and at other phases of the Project as required by the DR. BIM will be used for visualization, analysis and management of discipline specific. Following a general submission overview workshop by the Consultant at each of the aforementioned submissions, individual subject matter specific workshops include, but are not limited to:

b) Functional Requirements Workshops:

The Consultant must collaborate with and assist the DR in organizing and conducting these workshops. These workshops will be held during the Pre-Design Phase of the Project, to identify and clarify functional requirements in the General Fit-up Requirements with the third-party Consultant, who prepared the General Fit-up Requirements, and the User.

c) BCC Workshops:

The Consultant must collaborate with and assist the DR in organizing and conducting these workshops. These workshops must be held during the SD and DD phases of the Project to identify specific activities, schedules and scope for upcoming phases of the BCC. In addition to the specific subject matter workshops outlined earlier in this section.

d) Risk Management and Lessons Learned Workshops:

The Consultant must actively participate with and assist the DR in organizing and conducting these workshops. These workshops must be held to provide input to and analysis of the Consultant's, GC (during construction only), and PWGSC's risk registers, noting potential opportunities to be leveraged and risks to be mitigated, as they occur throughout the Project. Include lessons learned from the Project implementation and other projects in discussions to leverage opportunities and mitigate risks.

e) Value Engineering Workshops:

The Consultant and GC (during construction only) must actively participate at these workshops chaired by the DR. These workshops will seek to ensure value for money of the proposed design and construction. In addition to the typical list of workshop attendees, the third-party peer review body may attend these workshops.

f) Constructability Workshops:

The Consultant will chair, record all issues and decisions and prepare and distribute minutes within two (2) working days of the workshop. These will typically be full day workshops addressing constructability, work restrictions plan, scheduling and cost implications. The BIM

will be used for the visualization, analysis and solutions identification of contractability issues.
A specific constructability workshop will be held for every tender package submission at 50%, 90%, 95% completion;

1.10.4 Frequency of Meetings, Workshops and Presentations

	RS 1, RS 2	RS 3	RS 4	RS 5	RS 6, 7, 8, 9,10
Meetings:					
Core Team Meetings	Monthly	Monthly	Monthly	Monthly	Monthly
Design Meetings		Weekly	Weekly	Weekly	Weekly
Construction Meetings*					Weekly
Conservation Meetings*	Monthly	Monthly	Monthly	Monthly	Monthly
Technical Meetings	As required	As required	As required	As required	As required
BIM Project Execution Meetings	As required	As required	As required	As required	As required
Submission Meetings	Monthly	Monthly	Monthly	Every deliverables milestone	As required
Workshops:					
Subject Matter Specific Workshops	As required	8	5	As required	As required
Seismic/Blast Design workshops	Monthly	Monthly	Monthly	As required	As required
Functional Requirements Workshops	5		2	0	0
BCC Workshops	5				
Risk Management and Lessons Learned Workshops	Every 6 months	Every 6 months	Every 6 months	Every 6 months	Every 6 months
Value Engineering Workshops		2	2		

	RS 1, RS 2	RS 3	RS 4	RS 5	RS 6, 7, 8, 9,10
Constructability Workshops	Monthly	Monthly	Monthly	Every deliverables milestone	As required

* Commence with investigations planning.

1.11 Partnering and Team Building Sessions

PWGSC intends to "partner" both the design phase and construction phases of this project in an Integrated Design Approach, to optimize design collaboration in a design charrette as well as to assess constructability prior to tendering construction.

Partnering is a collaborative, ongoing team- building process, based on improving communication and understanding amongst Project Team Members to achieve a common goal, putting the Project first. While the contract resulting from this RFP establishes the legal obligations of the parties, the partnering process strives to establish positive working relationships which will maximize the benefits to the Project from the knowledge and experience of all stakeholders, while at the same time allowing all stakeholders to maximize their benefits from the project.

A successful partnering process leads to improved effectiveness, quality, timeliness and team morale. Members of the Consultant Team, including representatives from the senior management of all firms must attend partnering sessions. Representatives from the Project Management Team, the Users, GC (during construction only) and others will also attend partnering sessions.

PWGSC may employ a third party as facilitator for these sessions. The Consultant's cost to attend is to be included as part of the proposed fee for this Project.

A one (1) day design partnering workshop will be arranged during each of the two design phases and another one (1) day session during construction. These workshops will be held in the National Capital Area.

1.12 Project Response Time

It is a requirement of this Project that the key personnel of the Consultant and sub-consultant or specialist firms be personally available to attend meeting or respond to inquiries within four (4) hours' notice.

1.13 Submissions, Reviews and Approvals

This is a high-profile Project of national significance requiring a significant investment of public funds. A facility with extensive interventions to a structure of high architectural, historical and national significance is required. Project reviews will be rigorous at the federal level.

1.13.1 Authorities Having Jurisdiction (AHJ's)

The DR as well as the authorities identified below will review work in progress on a continuing basis. Formal presentations are required for design and project approvals in accordance with the project delivery phases outlined in Required Services (RS). Ad hoc presentations will be required for various committees and senior officials.

Below is a list of federal authorities that will require presentations and/or submissions for approval. The frequency of meetings indicated is an estimate only. It will be affected by the Project phase, issues and requirements for decisions and approvals. The Consultant must attend all other meetings as needed and make presentations to satisfy Authorities as identified.

The following are authorities having federal government jurisdiction over the project:

Authority	Federal Government Jurisdiction
Treasury Board of Canada	Project and contract approvals
Public Works and Government Services	Contracting authority and project delivery Canada (PWGSC)
PWGSC/Users	Functional design and security requirements and standards,
PWGSC Project Review Advisory Committee (PRAC)	Design quality assurance.
National Capital Commission (NCC)	Federal Design and Land Use Approval Canadian Environmental Assessment Act 2012 (CEAA 2012) for site, building design, landscape, hoarding, exterior signage, exterior lighting.
Parks Canada (PC) Federal Heritage Building Review Office (FHBRO)	Design requirements to ensure preservation of site heritage character values.
Environment Canada	Environmental Compliance Management Program (ECMP).

1.13.2 Other Authorities Having Jurisdiction (AHJ's)

Although the federal government does not formally recognize jurisdiction at other levels of government, voluntary compliance with the requirement of these other Authorities is required unless otherwise directed by the DR. In areas of conflict concerning provincial requirements, federal authority prevails. Codes, regulations, by laws and decisions of AHJ's must be observed. In cases of overlap the most stringent will apply.

PWGSC will voluntarily comply with the applicable Ontario Construction Health and Safety Acts and regulations, in addition to the related Canada Occupational Safety and Health Regulations.

Authority	Jurisdiction
Ontario Ministry of Labour	Employment Standards, Construction Safety, Designated Substance Management, Workers Compensation, Ontario Construction Health and Safety Acts and Regulations.
Ontario Ministry of the Environment	Environmental Protection Act: 3R, Regulations Building Discharges into the air, water and ground, Disposal of Designated Substances including Asbestos.

Ontario Ministry of Consumer and Commercial Relations – TSSA	Construction Hoists. Elevators, Escalators and Dumb Waiters, Pressure vessels.
City of Ottawa	Planning and Design Submissions for Information and Consultation, including with the Transit Commission and Transportation departments, Building Demolition and Plumbing Permits and Inspection, Fire Safety, Equipment and access for firefighting equipment, Ottawa Built Heritage Advisory Committee, Planning Committee and City Council, Occupancy Permit.
Electrical Safety Authority (ESA)	Electrical Permits and Inspection.

The Consultant must, with the assistance of the DR, identify any other AHJ's and endeavor to ensure that all design work meets or exceeds all codes, regulations and standards of these other AHJ's.

1.13.3 Municipal Building Permit and Other Permits Building Permit/ Occupancy Permits

On behalf of PWGSC, the Consultant must apply for building permits from the City of Ottawa, by supplying the supporting documentation for permit application. Payment of the permit will be the responsibility of the GC. The Consultant must participate in any negotiations and assist in resolving related issues prior to tender of each package. Submissions will begin at the end of Design Development and will be followed by a final submission at 99% construction tender documents. Additional submissions/presentations may be required if requested by the City of Ottawa.

The GC will apply for interim and final Occupancy Permits and coordinate the resolution of all outstanding issues relating to obtaining the permit. Municipal authorities will have access to the site as required and will provide reporting of their findings. The Consultant must address and respond to all issues raised by Municipal officers.

1.13.4 Presentations and Submissions

Presentations for approval bodies are required in advance for review by the DR and subsequent revision by the Consultant. The Consultant must plan the time to tailor Project information for each formal presentation.

Approvals and presentations must be derived from and facilitated by Models and Model-based data. The importance of the Model for visualization, real-time analysis and coordinated information sharing is paramount. The User will benefit from this data source, where an easier understanding of the Project can lead to an increase in time spent on value-added tasks, inspections, and including precise commentary and recommendations, both in collaborative sessions and individual reviews.

Collaborative sessions must be facilitated by the Consultant in order to present and navigate the Model. The Consultant will provide the necessary technical and support services, where appropriate, to facilitate these sessions in an interactive and audience-responsive manner.

Models must be submitted for reviews of functional and technical Project requirements.

1.13.5 Senior Management - PWGSC

Purpose of Review/Approval Final decision authority for all options;

Submission Format..... Oral presentation including Power Point decks/boards;

Submission Schedule..... Submissions are reviewed at key milestones including review of the schematic design update phase, design development phase, at 100% tender documents and for key mock-ups, when completed work has been forwarded to the DR;

Number of Submissions..... One (1) mandatory per submission as outlined above;

Expected Turnaround Time..... Four (4) weeks.

1.13.6 Project Team (including PWGSC Technical Services Team, Users)

Purpose of Review/Approval Program, Design and Technical Quality Assurance and constructability reviews;

Submission Format..... Reports, drawings and specifications, oral presentations including Power Point decks/boards;

Submission Schedule..... Submissions are reviewed at the Pre-Design, Schematic Design (Interim, 99%, and 100%); Design Development (99 % and 100% completion), construction documents phase (66%, 99 % and 100% completion), Tender Documents one (1) review when completed work has been forwarded to the DR;

Number of Submissions..... Minimum Nine (9) mandatory and supplement Senior Management presentations plus any follow-up;

Expected Turnaround Time..... Pre-Design review three (3) weeks, Schematic Design review four (4) weeks, Design Development four (4) weeks and four (4) weeks for each construction documents submission.

1.13.7 Project Review Advisory Committee (PRAC)

Purpose of Review/Approval Design Quality Assurance;

Submission Format..... Reports, drawings and specifications, sample boards, oral presentations including Power Point decks/boards;

Submission Schedule.....Submissions are reviewed at Schematic Design and Design Development when completed work has been forwarded to the DR;

Number of Submissions.....Minimum two (2) mandatory plus any follow-up;

Expected Turnaround Time.....The committee will provide comment and feedback at the presentation followed by minutes in three (3) weeks.

1.13.8 Federal Heritage Buildings Review Office (FHBRO)

Purpose of Review/ApprovalConformance review of proposed interventions to a federal heritage building, as per the Standards and Guidelines for the Conservation of Historic Places in Canada;

Submission Format.....Report, drawings and specifications, sample boards, Photographs, Model and oral presentations including Power Point decks/boards;

Submission Schedule.....Pre-Design, Schematic Design, Design Development, and construction documents phase. Some reviews will be formal Federal Heritage Buildings Committee (FHBC) reviews and others will be Federal Heritage Buildings Review Office (FHBRO) Review of Intervention Report (ROIR's). Recommendations may include design changes, so it is recommended to liaise periodically throughout the planning and design process with the FHBRO office to obtain consensus in the process. These reviews must be scheduled after FHBRO concerns have been addressed. Refer to the Guide to Working with the FHBRO

www.pc.gc.ca/progs/beefp-fhbro/ManRefnrnce.aspx;

Number of Submissions Four (4) formal plus three (3) follow-up to comments received from FHBC.

Any exploratory work which risks affecting character-defining heritage elements must be planned to minimize damage and must be submitted to FHBRO for review. Assume up to four (4) Reviews of Intervention (ROIR) will be required.

NOTE: Refer to the Guide to Working with the FHBRO for further detail.
www.pc.gc.ca/progs/beefp-fhbro/ManRefnrnce.aspx

Expected Turnaround Time 4-6 weeks after a submission for a formal review, the Consultant will provide a presentation to the Federal Heritage Building Committee (FHBC) and their written response will be received four (4) to six (6) weeks after that. For minor interventions or follow-up reviews, three (3) weeks will be required prior to receiving the Review of Intervention Report (ROIR).

1.13.9 National Capital Commission (NCC)

Purpose of Review/Approval NCC design approval, specifically the “Federal Land Use, Transaction and Design Approval” - Level 3;

Submission Format..... Report, drawings and specifications, Photographs, Model and oral presentations including Power Point decks/boards;

Submission Schedule Schematic Design (SD) and Design Development (DD) Submissions will be reviewed for “Federal Land Use, Transaction and Design Approval” - Level 3 at a stage decided by the DR and NCC staff. Supplemental submissions during the construction documents phase are more than likely required;

Number of Submissions Four (4) mandatory plus any follow-up reviews;

For a Level 3 review process, timing of submissions is critical as the Advisory Committee on Planning, Design and Reality (ACPDR) meets only five (5) times per year: March, May, August, October and December. As recommendations from ACPDR may necessitate design changes, through the DR, liaise with NCC periodically throughout the planning and design process to obtain consensus. ACPDR presentations must be scheduled only after Federal Heritage Buildings Committee (FHBC) review letters & FHBRO Review of Interventions Reports (ROIR) have been obtained and issues raised in these letters and reports have been addressed by the Consultant;

Expected Turnaround Time ACPDR will provide comments and feedback at the presentation followed by meeting minutes in one (1) to two (2) weeks and final ACPDR notes in two (2) to three (3) months, depending on the schedule for the Board meeting.. ACPDR formal approval usually follows by the NCC Board of Directors approval approximately four (4) weeks thereafter.

1.13.10 City of Ottawa

Purpose of Review/Approval To obtain Municipal building permit;

Submission Format..... Drawings, specifications, oral presentations including Power Point decks/boards;

Submission Schedule Submissions are reviewed when completed work has been forwarded to the DR for site plan and building permit approvals, interim consultations are required for Design Development and construction document phases which involve a building permit;

Number of Submissions As required until permit/approval has been received;

Expected Turnaround Time Dependent on type of submission, usually four (4) weeks to three (3) months.

1.13.11 Project Approvals

1.13.11.1 Cost

Throughout the Project the cost must be closely monitored by the Consultant to ensure that the project does not exceed the approved construction budget.

1.13.11.2 Stakeholders Consultation and Approvals

The building was attributed significant values in all three (3) evaluation categories of historic associations, architecture and environment. It was designated a Classified Federal Heritage Building. The implications of this designation are defined in the Treasury Board Policy on the Management of Real Property (<http://www.tbs-sct.gc.ca/rpm-gbi/doc/gmrp-ggbi/gmrp-ggbi06-eng.asp#a6.6.5>). Generally, interventions to a Classified Federal Heritage Building must be submitted to the FHBRO for review in the planning phase. Large rehabilitation activities, such as those taking place as part of this Project, will be reviewed through a formal review process by the Federal Heritage Buildings Committee (FHBC). The Consultant must develop and follow a clear conservation approach in accordance with the Standards and Guidelines for Conservation of Historic Places in Canada, which will help guide the design process. FHBC bases its conformance reviews of proposed interventions on the conservation approach set out in this document.

The National Capital Act makes the National Capital Commission (NCC) responsible for coordinating and approving projects related to federal lands and buildings in Canada's Capital Region. The NCC role includes reviewing all proposals for work or alterations to federal heritage buildings and sites through the federal land use, transaction and design approvals process (FLUTDA). This Project will be a Level 3 (a major project having a high symbolic value for the Capital). Level 3 projects require a detailed internal review by a team of NCC professional staff and are presented to the Advisory Committee on Planning, Design and Realty (ACPDR) prior to being submitted to the NCC Board of Directors for approval. Abatement, demolition and fit-up construction will not proceed until the FLUTDA is obtained.

The building Rehabilitation Project will include a large number of stakeholders including the above mentioned FHBRO/FHBC (Parks Canada), NCC, PWGSC, City of Ottawa, and the public.

PA 2 PROJECT TEAM ORGANIZATION

2. Project Administration

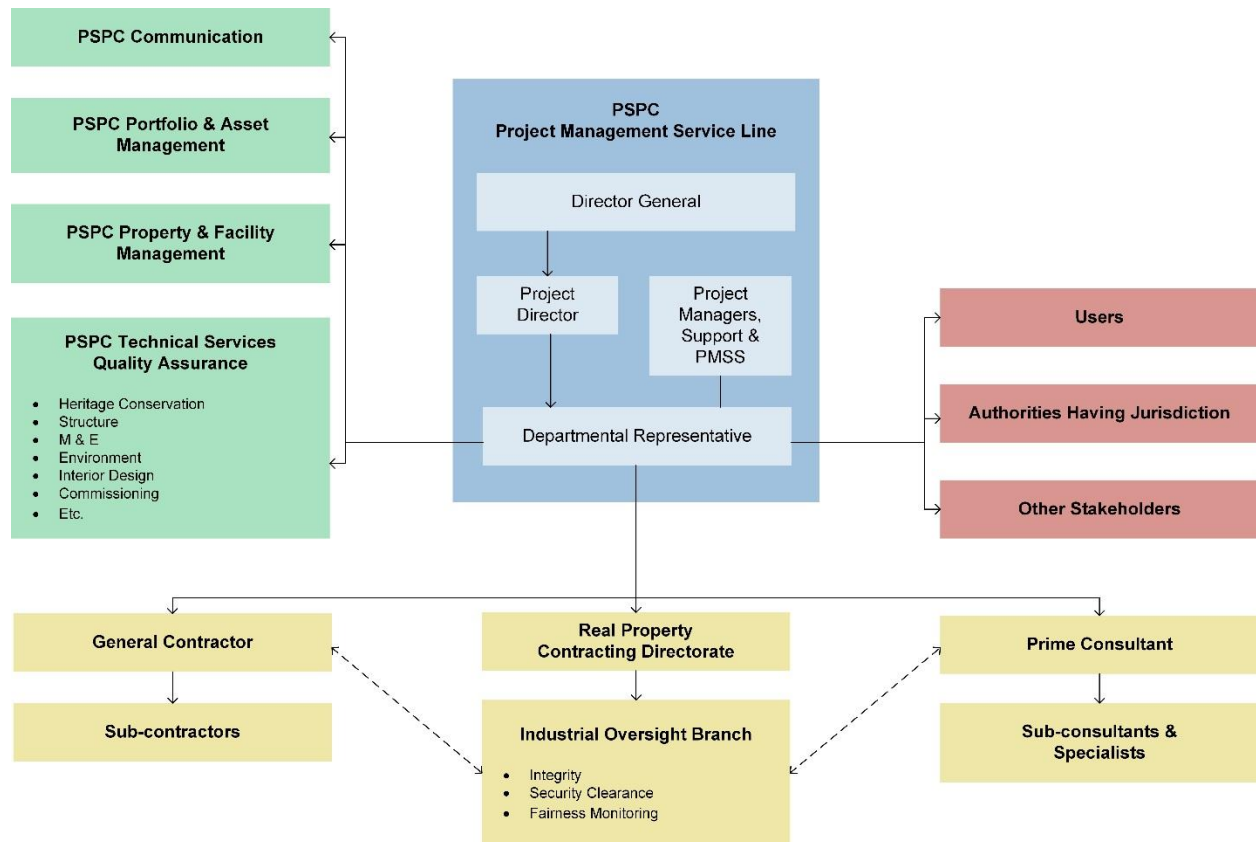
This Project is to be managed and implemented in a collaborative manner. All members of the Project Team are required to work cooperatively at every phase of the design and construction process in order to assure the creation of a successful and meaningful end result. Under the leadership of the DR, all Project Team members are responsible for establishing and maintaining a professional and cordial relationship.

The Project Team refers to the key representatives, involved in coordinating and delivering this Project. The PWGSC Departmental Representative leads the Project Team, with membership representing those responsible for project implementation. The following chart identifies the PWGSC organizational relationships:

AHJ's are not indicated.

Solid lines indicate functional reporting relationships.

Dotted lines indicate Project communication relationships.



2.1 Roles of the PWGSC Project Team and the User

2.1.1 Director General

The Director General holds overall accountability for the Project and reports to executive management within PWGSC.

2.1.2 Directors

The Project Director is accountable for the expenditure of public funds and the delivery of the Project in accordance with terms accepted by the Treasury Board;

The Project Director reports to senior PWGSC executive management and is the formal point of contact with the Users;

The other Directors are responsible for the technical aspect related to the design and construction of the Project.

2.1.3 User Representatives

Once identified, the User will play an important role on the Project Team as a stakeholder. User representative will participate throughout all phases of the Project as it relates to the fit-up components and functional operations. Their representative will be responsible for the provision information pertaining to: functional requirements, design, fit-up, occupancy planning, and move management.

There is a single point of contact for the Users who is responsible for all internal management and communications.

Until a User is identified, PWGSC will represent the User.

2.1.4 PWGSC Departmental Representative (DR)

The Senior Project Manager is the Departmental Representative (DR) for this project. The Senior Project Manager is accountable to the Project Director for management of the project implementation. The DR can delegate to the Project Manager. The Consultant reports to the DR.

2.1.5 PWGSC Project Management Team

Numerous Project Managers (PM's) will be responsible for various roles affecting design and implementation of elements such as systems, architecture, engineering, heritage, etc. The Project Management Team will also include PMSS and will work to support the role of the DR.

2.1.6 Project Management Support Services (PMSS)

PWGSC has engaged external Project Management Support Services (PMSS) to provide project management, construction advice and project management administration support for the PWGSC Project Manager. PMSS reports to the DR and will assist in the day-to-day management of the project. PMSS will operate on this Project as an extension of and part of the PWGSC Project Manager's responsibilities. These services will include independent third party review of information produced by the Consultant and their sub-consultants and the GC.

2.1.7 PWGSC Senior Communications Advisor

The Senior Communications Advisor is the PWGSC representative responsible for all communications requirements and activities including contact with the media and the public.

2.1.8 PWGSC Property & Facilities Manager (PFM)

The PWGSC PFM is the building operator and manager. The PFM is present on the Project Team to ensure the PWGSC facility management requirements are identified and incorporated into the project. The PFM will play an active project role during project commissioning and turn over.

2.1.9 PWGSC Technical Services (TS) Team

The PWGSC Technical Services Team provides technical advice and quality assurance to the Project Management Team for key architectural and engineering professional disciplines and other specialists including BIM. The purpose of the TS Team is to offer strategic and technical advice, to advise of risks, to review Consultant deliverables, to track and confirm compliance with Project requirements. Members of the PWGSC TS Team will participate regularly in all phases of the project. During construction, some of the PWGSC TS Team may attend construction meetings and field reviews on an ad hoc basis to advise the DR.

The Technical Services Lead (i.e. Design Manager) will assemble and coordinate the services of the Technical Services Team.

2.1.10 PWGSC Commissioning Manager

The PWGSC Commissioning Manager represents the Users, Project and PFM's interests and maintains overall responsibility for representing PWGSC in the commissioning process. The PWGSC Commissioning Manager is responsible for overseeing all commissioning activities during the design, development, implementation, and post construction phases of the project, assuring that all program issues are addressed. Responsibilities include the review and input into the Commissioning Plan and Systems Operations Manual (SOM), Systems Operating Procedures Manual (SOP), approval of commissioning schedule, approval of commissioning report, and certification of final completion and input to the evaluation report. The Commissioning Manager will review O&M reports and commissioning specifications, training and performance verifications procedures at all phases of the Project and will ensure all O&M aspects are addressed.

The Consultant must work closely with the PWGSC Commissioning Manager, throughout the project. Reporting to the DR, the Commissioning Manager will review and approve all documentation at all phases of the project delivery and will monitor all commissioning activities, including the accuracy of reported results and manuals produced by the Consultant and the GC.

REQUIRED SERVICES

GENERAL REQUIREMENTS

The Consultant must provide the Required Services (RS) described in this Project Brief, unless they have been indicated to be optional. Detailed reporting requirements are noted within each Required Service section. Reporting must meet the format and style outlined in the Project Administration (PA) section, with the technical content (text, drawings, photographs, etc.) described within the listed tasks (intent, design services and deliverables.) and summarized in the reporting sections within each Required Service section.

The Consultant, as an expert in matters of design, planning and implementation, must:

- Provide comprehensive and continuous design planning, analysis, management and implementation services throughout the Contract until the completion of the Project and the DR has approved/signed the Certificate of Completion. The Consultant's services include consultation and review of any warranty related call-back and repair required after the issuance of the Certificate of Completion; and
- Actively participate with the DR and all stakeholders, as required, in a collaborative manner.

RS 1 DESIGN MANAGEMENT

1. Design Management Plan (DMP)

1.1 Intent

The Consultant must prepare, submit, maintain and implement a Design Management Plan (DMP) governing the Consultant's activities, as well as the effective management of the Consultant's team. The DMP will describe how the project will be managed until it is completed.

The Consultant will submit draft and final DMP until the DR indicates acceptance, and thereafter provide quarterly DMP Status Reports.

1.2 Design Services

The Consultant's DMP must be comprised of seven (7) distinct plans as listed below and described herein:

1. Cost management plan;
2. Time management plan;
3. Scope management plan;
4. Quality management plan;
5. Communications management plan;
6. Risk management plan;
7. Human resource management plan;

1.2.1 Cost Management Plan

The Consultant must develop and maintain a design cost management plan and cost control system specific to this Project including the Consultant's fees, ensuring they are in accordance with the projected expenditures and that contingency and risk budgets are being correctly identified, authorized for use, and allocated per expense category.

The Consultant's plan must include, but is not limited to:

1. Approach and methodology for the identification and management of all costs, including Consultant fees;
2. Approach and methodology to contingency identification and quantification, conditions and authorization for usage, and documentation and notification processes;
3. Approach and methodology to assessing, determining, and reassessing escalation rates;
4. Approach, methodology and frequency for assessing and validating the GC's tender price and Change Order pricing;
5. Approach and methodology to assessing sub-contractor, supplier or conservation specialist's bids, conditional bids, and alternative or equivalent proposals.

The Consultant must continuously implement the plan and, in conjunction with the DR and Cost Consultant (CC), ensure the DR and CC are engaged in the reassessment process and any modifications to the cost management plan.

1.2.2 Time Management Plan

The Consultant must develop and maintain a time management plan and time control system specific to this Project to ensure that each of the Consultant's tasks/activities are identified, monitored and controlled. The Consultant's plan must include, but is not limited to:

1. Approach and methodology for the planning, scheduling and control of all Consultant services, include the role of the Consultant, DR and Schedule Consultant (SC);
2. Approach and methodology for establishing durations per work task/activity;
3. Approach and management of float quantification per work task/activity, including how, when and who will authorize the reallocation of float within the Consultant's overall design and site services schedule;
4. Approach and methodology of analyzing the Consultant's design production; and
5. Approach and methodology of documenting (laser scanning, modelling, etc.) and administering the GC's construction and conservation work;

The Consultant must continuously implement the plan and, in conjunction with the DR and SC. Ensure the DR and SC are engaged in the reassessment process and any modifications to the cost management plan.

1.2.3 Scope Management Plan

The Consultant must develop and maintain a scope management plan specific to this Project which documents how the project scope will be defined, developed, monitored, validated and controlled. Through the Scope Management plan, Consultant will ensure that all aspects of the design is properly scrutinized, prioritized, integrated and thoroughly understood by the Consultant's team members.

The Consultant must ensure that the design is composed of all the work required to complete the Project successfully. The Consultant's plan is the blueprint for how the scope of work will be defined, developed, verified and controlled.

The Consultant must immediately notify the DR, in writing of any potential increases or decreases in the scope of work that could affect the ability to meet the Project objectives.

The Consultant's scope management plan must include, but is not limited to:

1. Approach and methodology of how the functional requirements provided will be validated, amended and approved as the fit-up scope baseline by the DR, and then distributed to the Consultant team for coordination.
2. Approach and methodology of analyzing the Consultant's design information and coordination with the Model(s), including the assessment of design completeness and the ability to construct the proposed design;

3. Approach, methodology and frequency of analyzing the coordination of the Consultant's individual design elements and the overall design;
4. Approach and methodology for meeting sustainability and GHG reduction targets and preparing and evaluating compliant alternatives.
5. Approach and methodology of how alternative building materials, or construction methods will be considered and how life-cycling analysis will factor into the analysis of the design;
6. Approach and methodology for protecting and conserving the tangible and intangible heritage fabric of the building. Indicate the roles and responsibilities of the Consultant and the interaction with the GC's conservation specialists and the DR's PWGSC Technical Services Team; and
7. Approach and methodology for identifying, analysing and managing, scope changes and their impact on cost and schedule after the construction budget for Design Development is established.

1.2.4 Quality Management Plan

The Consultant must develop, revise when required, and implement a design quality management plan specific to this Project to the approval of the DR.

The Consultant must continuously adhere to the specific quality management plan and processes for the duration of the Project:

1. The plan will identify quality requirements and/or standards for the project and its deliverables, and document how the project will demonstrate compliance with quality requirements and/or standards.
2. Ensure the quality processes used to manage, create and coordinate the consultant deliverables are followed;
3. Validate that the Project deliverables are completed with an acceptable level of quality
4. Ensure that quality problems with the construction are eliminated and to respond and recommend corrective action in a timely and effective manner to all issues as they occur;

All Consultant deliverables and processes are subject to quality review. The Consultant's quality management plan must include, but is not limited to:

1. Approach and methodology for the day-to-day execution of the quality management plan, describing who, how many resources, the scope of their mandate and responsibilities, and where these services will occur;
2. Approach and methodology for developing and maintaining documentation standards, benchmarks and timeframes (both submission and review by the Consultant) for analyzing, validating, commenting on, approving or rejecting submittals (any type), notices, or any other document from the DR;
3. Approach and methodology for developing, managing, and maintaining a searchable database for all quality management matters, and if or how this database might/will be

linked to the functional requirements or documentation of action items in meeting/workshop minutes;

4. Approach, methodology and frequency of integrated analysis and coordination of the Consultant's individual design elements and the overall design;
5. Approach and methodology for preparing and issuing quality management documentation and reports;
6. Approach and methodology for quality management awareness training of the Consultant's personnel; and
7. Approach and methodology for providing, documenting and following-up on quality management matters related to the construction.

The Consultant must continuously implement the plan and, in conjunction with the DR, ensure the DR is engaged in the reassessment process and any modifications to the quality management plan.

1.2.5 Communications Management Plan

The Consultant must develop a communication management plan specific to this Project. The Consultant is to work closely with the DR to ensure the Consultant's communication plan is consistent with and complimentary to all other communication plans.

The Consultant's communication management plan describes how project communications will be planned, structured, implemented and monitored for effectiveness. The Consultant's plan must define the structure and methods of information collection, screening, formatting, and distribution and outline understanding among the Consultant's Team regarding the actions and processes necessary to facilitate the critical links among people, ideas, and information that are necessary for Project success.

The Consultant's communication management plan must include, but is not be limited to:

1. Approach and methodology for internal Consultant Team and Project Team communications including a flowchart of the information flow in the project, workflows with sequence of authorization. matrix mapping communication interactions;
2. Communication requirements and standards during meetings and workshops and reporting or follow-up afterwards;
3. Description as to how correspondence, reports and performance records are distributed, and managed complete with version control procedures, timeframe and frequency for the distribution of required information and receipt of acknowledgment or response.
4. Include stakeholder communication requirements and a description of information to be communicated, including language, format, content and level of detail.
5. Actions and processes necessary to facilitate the critical links among people, ideas, and information for Project success;
6. A directory of the Consultant Team is to be included to provide contact information for all involved in the Project including their areas of responsibility.

1.2.6 Risk Management Plan

The Consultant must develop and implement a risk management plan for services and work that is specific to this Project. The purpose of the plan is to identify the processes and methodologies for opportunity and risk identification, qualification and management within the Consultant's risk registry.

The Consultant's risk management plan must include, but is not limited to:

1. Approach and methodology to creating a risk registry including when, and how data will be integrated into the registry;
2. Approach and methodology to the quantification of opportunities and risks;
3. Approach and methodology for determining, applying and reassessing the probability of occurrence per risk registry element;
4. Approach and methodology for determining how, when and by whom, relevant opportunities and risks are, included, tracked and archived in the risk registry;
5. Approach and methodology for establishing, implementing and managing a services and work claims avoidance program related to the Consultant's sub-consultants and suppliers; and
6. Approach and methodology for how, when and to whom lessons learned are disseminated, including the timing and frequency of follow-ups to validate the lessons learned are being applied in the application of the services and work and the Consultant's services.

The Consultant must continuously implement the plan in conjunction with the DR. Ensure the DR is engaged in the reassessment process and any modifications to the Consultant's risk management plan.

1.2.7 Human Resource Management Plan

The Consultant must develop and implement a human resource management plan specific to this Project. The purpose of the plan is to achieve Project success by ensuring the appropriate human resources are deployed with the necessary skills, resources are trained if any gaps in skills are identified, team building strategies are clearly defined, and team activities are effectively managed for Project success.

The Consultant's human resource management plan must include, but is not limited to:

1. Roles and responsibilities of the Consultant's Team throughout the Contract;
2. Consultant Team organization charts and how positions interact/relate to other members of the Project Team;
3. Staffing plan to include:
 - How and when resources/skills will be deployed;
 - Timeline for resources/skill sets;
 - Training required to develop skills and frequency of retraining;
 - Transition period required for succession of all positions;

- A forward-looking work plan reflective of all Consultant services required over the duration of the Project that considers succession; and
- Any other relevant information regarding the provision of the Consultant's services for the Contract.

The Consultant must continuously implement the plan and, in conjunction with the DR, Ensure the DR is engaged in the reassessment process and any modifications to the human resource management plan.

1.3 Deliverables

1.3.1 Design Management Plan (DMP)

The Consultant must submit for each of the plans:

1. An initial proposed layout, format, template, samples including Table of Content for review by the DR within 30 working days of Contract Award;
2. A draft DMP addressing all issues and in compliance with the agreed layout and format for review by the DR within 20 working days of the acceptance of the plan layout and format; and
3. A final DMP for acceptance by the DR within 20 working days after receiving DR's review comments are received.

The Consultant's plans are to clearly detail how the Consultant's services will be managed, monitored, reported on and controlled during all phases of the Consultant's services.

1.3.2 DMP Status Reports

Once the final DMP is accepted by the DR, the Consultant must implement each plan and submit quarterly DMP Status Reports consisting of at least three pages and assessing the implementation of each of the seven management plans. The Consultant must be available to discuss the contents and implementation of each of the management plans and its quarterly DMP Status Reports and take the necessary actions as may be required to address any concerns of the Project Team as directed by the DR.

The DMP Status Reports must accompany the Consultant's invoice for services rendered. The invoice will not be accepted unless the applicable DMP Status Reports are attached, reviewed and accepted by the DR.

1.3.3 Updates to DMP

Submit updated DMP as required in the Required Services. Ensure any modifications to the Design Management Plan are submitted in writing to the DR for review, respond to DR comments, and finalised in a revised DMP for acceptance by the DR.

RS 2 PRE-DESIGN

2. Analysis of Project Requirements and Existing Information

2.1 Intent

The intent of the Pre-Design Phase of the Project is to; review and integrate the Project requirements, identify and evaluate conflicts or problems, identify gaps in the available information for Project advancement and to develop and receive approval for the Project cost, schedule, scope, quality assurance, and integrated delivery process.

The Pre-Design Phase will be a continuous process feeding the Project as it evolves. The design process will occur in two phases:

- Phase 1: Base Building
- Phase 2: Office Fit-Up

The Consultant must actively manage and prioritize work in coordination with the DR.

2.2 Design Services

2.2.1 Review of Existing Documentation and Site Conditions

There is a significant amount of existing documentation detailing findings from previous investigation work, reports and studies, as well as federally authored information on approval processes, standards, policies, etc. These documents provide the information necessary to understand the general condition of the property and the extent of existing damage or deterioration as well as the federal contextual framework in which the project must be managed, designed and implemented.

The Consultant must:

1. Review all relevant background reports including related projects to understand the general condition of the property and the extent of existing damage or deterioration;
2. Interview property management and operational personnel to confirm existing conditions, as required;
3. Conduct site reviews, surveys, measurements, investigations and analysis required to validate and acquire all pertinent information.

2.2.2 Regulatory Analysis

The intent of the regulatory work is to identify health and safety deficiencies. The Consultant must prepare:

1. A summary of regulatory and statutory requirements;
2. A description of applicable Authorities Having Jurisdiction (AHJ);
3. The identification of applicable codes, regulations, plans, policies and standards including those for structural assessment;
4. A Building Code analysis identifying constraints and issues; and

5. The identification of opportunities and strategies to protect the heritage components of the building and limit the effects on heritage character defining elements from the regulatory requirements for the Project.

2.2.2.1 Life Safety Regulatory Analysis

The Consultant must conduct a life safety regulatory audit of the building and identify critical deficiencies that would require immediate attention for health and safety reasons.

2.2.3 Exploratory Work and Investigations

Preliminary and detailed exploratory work and investigations are required to collect information required to advance the design and complete the Model. The purpose is to confirm, analyze, test and determine various conditions either known or unknown. The Consultant must undertake, a systematic site verification of the building, site, installations and associated infrastructure and of all existing documentation and prepare a prioritized and detailed exploratory work and investigation program to maximize investigation work.

Any exploratory work which risks affecting character-defining heritage elements must be planned to minimize damage and must be submitted to FHBRO for review.

The Consultant must prepare a preliminary investigation plan for approval by the DR, with a description and rationale of proposed investigation, locations and methodologies, including observations and measurements, non-destructive testing, destructive testing, digging, and laboratory testing to include but is not limited to:

1. Identify individual investigation requirements;
 - Identify information that can be acquired during the investigation;
 - Description of the risk or consequence to the Project if the investigation is not completed;
 - Detailed schedule indicating start and completion times, for both construction documents and construction, including durations for reinstatement;
 - A list of all Consultants, including all sub-trades and conservation specialists, who will be performing the investigations;
 - Identify the type of speciality or access equipment and the locations of the access equipment (scaffold, laser scanner, crane, lift, swing stage, etc.); and
 - Validation of the security clearance requirement for all personnel and vehicle access requirements.
2. For all the investigations recommended by the Consultant and approved by the DR, the Consultant must;
 - Provide detailed Construction Documents as required for public tenders, identifying the location of the openings, testing and the type of access equipment and the temporary locations of the access equipment (building and vehicle access requests, scaffold, crane, lift, swing stage, etc.);
 - Assist PWGSC in selecting the contractor for the investigation work;

- Continuously supervise the implementation of each investigation during the day, at night or weekends;
- Ensure sequencing of the investigation is conducted as planned and approved;
- Provide an inspection report documenting each inspection;
- Provide the DR a detailed report of all investigation findings and resulting analysis and recommendations within two (2) weeks of each investigation, or as agreed by the DR;
- Incorporate into the Model all findings resulting from each investigation.

2.2.4 Functional Program

The Consultant must analyse and validate the General Fit-up Requirements in order to prepare the Functional Program.

The Consultant must define and analyse the capacity and code compliance of the building to accommodate GC Workplace Fit-up Standards, for a yet undefined user, for the use of the building.

The Functional Program must include analysis and recommendations for the following:

- Building Capability
- Sustainability
- Proximity
- Vertical Stacking Diagrams
- Horizontal Blocking Plans
- Functional Space Equation
- Zoning Plans
- Mechanical and Electrical Engineering
- Security
- Acoustics
- Communications/Data
- Furniture
- Support Space
- Special Purpose Space
- Procurement Strategy for Furniture

2.2.5 Base Building Requirements Analysis

The Consultant must prepare the base building requirements for the Functional Program based on the fit-up of the building for a GC Workplace Fit-up Standards accommodation and the General Fit-up Requirements to include but not limited to:

1. Define design requirements to ensure the capacity of the building will accommodate the GC Workplace Fit-up Standards functional requirements, and detail the results;

2. Coordinate with the DR to provide early advice on construction challenges arising from the functional requirements;
3. Prepare a gap analysis and a risk assessment within 12 weeks of contract award.

2.2.6 Site Analysis

2.2.6.1 Landscape Architecture Analysis

The Consultant must prepare an analysis and evaluation of the site that includes but is not limited to:

1. Analysis of existing conditions of the site including microclimate zones, all above and below grade landscape features, signage and way-finding (regulatory, directional, information), exterior lighting, landscape furniture, vegetation, grading, soil and soil structure condition, drainage and irrigation, include potential green infrastructure connections with neighboring sites and mechanical, electrical and fire protection infrastructure;
2. Circulation and universal accessibility analysis, including pedestrian, bicycle, vehicular (private vehicles) and transit stations and access; and how active transit routes connect with neighboring sites and broader networks or plans. Include parking areas, delivery material handling and loading areas, gathering places, decision points, events staging areas, etc.;
3. Site security analysis, including existing guardhouse, perimeter fencing and bollards systems, soft security landscaping measures surveillance cameras and sightlines, security lighting, security buffer zones.
4. Visual impact analysis that considers views within the Project boundaries, to and from the building and from key vantage points, including those from neighboring sites;
5. The identification of opportunities and strategies to limit and protect the impact to landscape features of planned interventions including physical security requirements;
6. Identification of landscape design objectives and approach, with consideration of the development of the Confederations Heights Master Plan and the NCC SDS; and
7. Identification of information gaps in the recording of existing landscape features with recommendations to the DR as to further investigations and/or studies relative to the landscape design objectives and approach and other Project requirements;
8. Review the Model of the site and identify any gaps.

2.2.6.2 Architectural Lighting Analysis

The Consultant must prepare an architectural lighting analysis that includes but is not limited to:

1. Consideration of the impact of architectural lighting installations on the building and requirements for new or reuse of existing site lighting.
2. Identification of information gaps in the recording of the architectural lighting with recommendations to the DR as to further investigations and/or studies relative to the objectives and approach and any other Project requirements.

2.2.6.3 Legal and Topographic Survey Analysis

The Consultant must prepare a legal and topographical survey analysis that includes but is not limited to:

1. An audit of current PWGSC survey data;
2. Identification of information gaps in the recording of the legal and topographical survey with recommendations to the DR as to further investigations and/or studies relative to the objectives and approach and any other Project requirements;
3. Perform additional building and surveys as required; and
4. Validate and update the Model with current survey information.

2.2.7 Architectural Analysis

2.2.7.1 Building Envelope Investigation and Analysis

The Consultant must prepare a building envelope investigation and analysis to supplement the existing information, including all required information to complete the Model and inform each of the building design options including, but not limited to:

1. Following Review and analysis of Existing documentation, identify information gaps in the recording of the building envelope with recommendations to the DR as to further investigations and/or studies relative to the project objectives and approach and any other Project requirements.
2. A detailed visual and tactile inspection of the condition of the building, including all exposed exterior and interior masonry stonework and concrete, foundations, windows, doors and louvers, roof systems and structures, metalwork, and openings of all roof elements; to analyse the condition of the different components;
3. Update the Model to include all as-found information needed for energy and hygrothermal modelling;
4. Provide modelling of envelope performance;
5. The roof and overall water management;
6. Exterior and interior inspection openings (both non-destructive and destructive) to verify the condition of the masonry, concrete, connections, bonding, ties, windows attachment details
7. Testing to identify hidden cracks, voids, and presence of steel;
8. Assessment of mechanical, physical, structural, and chemical properties of units, assemblies, systems or in-situ stresses, using tests such as shear test of masonry, flat jack and pull-out test, thermographic imaging, ground penetrating radar, sonic, ultrasonic, etc.;
9. Material sampling for laboratory analysis for concrete, stone, other heritage materials, and paint colours;
10. Assessment and identification of critical components for structural monitoring and recommendation of appropriate scope;

11. Masonry wall assembly, foundation, roof assemblies, windows, all component assemblies between the interior and exterior, etc.;
12. Ensure the following considerations are incorporated in the building envelope investigation and analysis work:
 - The performance and monitoring of the masonry including cracking, staining and spalling of masonry veneer.
 - The performance of the wall assemblies in the context of air and moisture infiltration.
 - The thermal performance of the existing wall assemblies.
 - The presence of physical moisture inside the wall assembly and condition of masonry ties;
 - Water damage to the building envelope and the interior of the building due to water infiltration to the interior;
 - The performance of the flat and the sloped and canopy roofs
 - The performance of the windows and doors
 - Monitoring of displaced exterior masonry units and moisture in the building.
 - Investigate to ascertain the condition of wall assemblies. Conduct laboratory tests and research to ascertain the composition of the existing and new mortar and stone; and
 - Identify Options to improve envelope thermal insulation, minimize heat losses and remedy thermal bridges;
13. An envelope assembly performance assessment and material stabilization strategy;
14. Substructure and foundations, including basement;
15. Masonry conservation requirements;
16. The impact on indoor environment, e.g., temperature, humidity, air pressure and flows and mitigation;
17. Incorporate building envelope layers into the Model in sufficient detail for simulations and analysis of the building envelope assemblies.

2.2.7.2 Accessibility Analysis

The Consultant must prepare an accessibility analysis that includes, but is not limited to:

1. Conduct an accessibility review highlighting the risks and constraints of the building configuration and the limits of the current accessibility measures for the building and adjacent site; and

Identification of information gaps in the recording of the accessibility analysis with recommendations to the DR as to further investigations and/or studies relative to the objectives and approach and any other Project requirements.

2.2.7.3 Acoustic Analysis

The Consultant must prepare an acoustic analysis that includes, but is not limited to:

- Determine baseline acoustic performance in the building;
- Conduct tests as appropriate to provide the Project Team a comprehensive summary of existing acoustical conditions;
- Identification of information gaps in the recording of the acoustics with recommendations to the DR as to further investigations and/or studies relative to the objectives and approach and any other Project requirements.

2.2.8 Heritage Conservation Background Analysis

The Consultant must prepare a heritage conservation background analysis for submission to FHBRO for review that includes, but is not limited to:

1. Review of relevant guidance documents related to conservation, including policies, practices, and guidelines for the Project, regulatory frameworks and jurisdictions, as well as the Standards and Guidelines for the Conservation of Historic Places in Canada;
2. A demonstrated understanding of the heritage character of the building, landscape site and setting, including:
 - Analysis of the initial building planning, spatial organisation and design;
 - Identification of the building's heritage values and character-defining elements;
 - Zones of high, medium and low heritage value (on plans);
 - Design principles, patterns of use;
 - Tangible and intangible heritage values; and
 - Construction methods, materiality and craftsmanship;
3. Identification and summary of strategies to limit and protect the impact to heritage values and character-defining features, and opportunities for higher levels of intervention to building, site, and setting;
4. Develop a preliminary heritage conservation approach, leading to the elaboration of project-specific heritage conservation principles and guidance for the building, the landscape site and setting;
5. Preparation of a cross-analysis that evaluates the proposed conservation objectives and approach against other Project requirements such as sustainability features;
6. Prepare the Heritage Materials Database and provide a description of how this database will be managed. Each heritage component is to be documented in a manner suitable to requirements of the Project;
7. Prepare a preliminary strategy for the sourcing and quantification of:
 - Replacement stones, quarried from the original or similar deposits, suitable for repairs to exterior and interior finishes; and
 - Replacement and new materials required for interior spaces, consistent with the qualities and grade of original heritage finishes;

8. Summarize the requirements for material quality control testing; and.
9. Identification of information gaps in the recording of heritage features with recommendations to the DR as to further investigations and/or studies relative to the objectives and approach and any other Project requirements.

2.2.9 Abatement and Demolition Analysis

The Consultant must prepare an abatement and demolition analysis that includes, but is not limited to:

1. Identification of any materials sampling and testing required to validate and update the existing designated substance surveys;
2. Identification of information gaps in the recording of abatement and demolition with recommendations to the DR as to further investigations and/or studies relative to the objectives and approach and any other Project requirements; and
3. Incorporate existing and new information into the Model.

2.2.10 Urban Design and Site Development Analysis

Consultant must develop an Urban Development Strategy Report that includes but is not limited to:

1. Future fit and connectivity of the building and site development with the other federal buildings that make up the Confederation Heights site, including the Confederation Heights Vision and Mission and the Master Plan underway
2. Support and enhancement of sustainability - social, environment and economic;
3. Verification that the rehabilitation fits with the approved vision and mission statements and high level design principles for Confederation Heights;
4. Fit with the NCC's Plan for the Capital and its principles and objectives;
5. Fit with the City of Ottawa's plan for this area; and
6. Fit with Real Property's portfolio objectives for the NCR and national portfolio strategy

2.2.11 Sustainable Site and Building Design Analysis

The Consultant must develop a Sustainability Strategy Report that includes, but is not limited to:

1. The establishment and description of the approach and potential for the Project to support a high sustainability performance and low carbon solution consistent with the Project, PWGSC and Government of Canada goals and objectives;
2. The preliminary assessment of sustainable design strategies to inform options development, identify opportunities and challenges, risks and limitations requiring further discussion, review and follow-up with the Project Team. Strategies should present a complete picture in the Sustainable Design narrative of the report, however, be further detailed and well integrated across all report sections as applicable; It should be clear and detailed within the report, how the proposed sustainability strategies are tailored to address unique building and Site characteristics, opportunities and challenges

3. Confirm recommended/selected sustainability rating tool for application. Include preliminary assessment scorecards estimating the probability of securing each credit (i.e. high, med, and low) and justification for sustainability decisions. For those credits identified, provide a short description on how they will be achieved;
4. Identify any environmental features that would affect the sustainable design strategy;
5. Review potential for environmental impacts and application of the Canadian Environmental Assessment Act (CEAA); and
6. Complete pre-design energy model to create baseline preliminary energy performance & loads (of building and those attributed to envelope assemblies) and associated GHG emissions. Present preliminary simulations of proposed options

2.2.12 Structural Analysis

The Consultant's work throughout the pre-design phase must promote a solid understanding of the Project scope and objectives, existing structures, informing the analysis and design of all structural interventions. Potential repairs, seismic, functional program support and building code upgrades options must be identified.

The goal of this phase is to assess the current structural condition and performance of the building and understand the required changes and areas that require structural intervention to meet the Project scope and objectives.

The Consultant must prepare a structural analysis that is iterative and use increasing levels of sufficiently detailed static and dynamic methods and assumptions that reflect the evolving level of the Consultant Team's understanding of the structure.

The Consultant must provide an analysis appropriate for the unique building construction characteristics of the building and must include, but is not limited to:

1. Structural investigations to supplement existing information and inform the structural, seismic and blast analysis:
2. A structural condition assessment in accordance with PEO Structural Condition Assessments of Existing Buildings and Designated Structures Guideline;
3. Structural exploratory work and investigations program that assesses:
 - All structural systems;
 - Structural system assemblies, components and materials;
 - Load paths;
 - Evidence of structural damage or distress;
 - Unique structural features and/ or discontinuities;
 - Areas that require structural intervention to meet the project scope and objectives;
 - Gaps in knowledge or understanding of the construction of the structural systems; and
 - Requirements for the detailed assessment of the structural systems;
4. Advise the DR immediately of any critical structural deficiencies related to the safety and serviceability of the structures that require immediate remedial measures;

5. Define and conduct a detailed program to investigate, test and monitor, in an iterative and cumulative fashion using the following prioritized techniques as required to understand the structural assembly and conditions:
 - The least destructive investigative techniques;
 - Visual observations and simple tools (tactile);
 - Thermographic imaging ground penetrating radar, sonic, ultrasonic;
 - In-situ load testing, flat jack, in-place shear test, forced vibration tests;
 - Exploratory openings, core drilling; and
 - Destructive openings and sample removal for laboratory testing of physical properties;

2.2.12.1 Structural Modelling Framework

A framework for the structural analysis and for creating an analytical Model to aid the structural analysis, using both detailed static and dynamic methods. Identify the software proposed. The framework and subsequent Model must:

1. Communicate the relationship between and methodology to be followed for the structural analysis and the Model;
2. Define the various components of the structure, identifying how:
 - Properties will be estimated or measured;
 - Interconnection of the assemblies will be determined; and
 - The above will be modeled;
3. Identify uncertainties such as material properties, gaps in understanding of structural system construction, condition and behaviour and how they will be minimized and modeled, and the implications of these uncertainties on the accuracy of the Model and results;
4. Identify where simplified analysis or modelling of members, assemblies and connections can be used in the analysis;
5. Identify loading, acceleration and deformation conditions and define how they will be modelled including:
 - Gravity load breakdown and distribution on members;
 - Wind load and distribution;
 - Seismic load;
 - Environmental loads;
 - Blast loading (blast from both explosives during rock excavation and acts of terrorism) from various blast scenarios and loading resulting from progressive collapse; and
 - Existing crack and damage patterns;
6. Define boundary conditions, their potential impact on the analysis and results, and how/whether they will be modeled in the analysis;

7. Define a parametric analysis that will be used to calibrate the Model:
 - Identify how anticipated upper and lower bounds of material properties, component behavior, and boundary conditions will be determined;
 - Define upper and lower boundaries for key parameters to bracket actual behavior;
 - Provide the design and Model input assumptions for review and approval of the DR;
8. Define how operational and functional components (OFC) such as roof parapets; masonry veneer and other cladding, and any remaining interior OFCs will be analyzed and modeled;
9. Define the OFC risk analysis to be performed based on CSA S832;
10. Meet the requirements of NBCC 2015;
11. Define a regulatory review that will be completed to establish an appropriate design standard and target reliability level for the seismic evaluation and upgrade of the building.
12. Demonstrate how information from the assessment of the foundation, including geotechnical rock information and Modelling, will be incorporated into the structural Modelling and analysis. Analyze the effects on the building; the effects of options for evaluating the effectiveness of various different seismic isolation and upgrade techniques; and assess the impact of seismic loads on the large amount of heavy, non-load bearing masonry and other OFC's and heritage finishes

2.2.12.2 Structural Modelling Analysis

Upon review and acceptance of the modelling framework by the DR, continue to refine and test the analytical Model using information gathered from the preliminary and detailed exploratory work and investigations by:

1. Considering parametric analysis to calibrate the Model, relating the damage predicted by the Model to the observed condition of the structural system, exterior and interior building finishes:
 - Identify additional testing or investigations that are necessary to address anomalies in behavior or gaps in understanding that become apparent during calibration of the Model;
 - Update and incorporate into the detailed investigations program as required; and
 - Revise the Model as required and re-calibrate;
2. Describe the preliminary seismic upgrade options (e.g. base isolation, new stiff shear walls, and new steel brace frames in combination with new movement gaps between the perimeter frame and infill stone/masonry);
3. Define the extent of work involved and effectiveness of seismic upgrade options;
4. Describe in sufficient detail the inter-relationships between the structural system and:
 - Building envelope;

- Architectural finishes and heritage fabric;
 - Building functions;
 - Proposed modifications;
 - Building systems;
 - Life cycle cost;
 - Design life span; and
 - Maintainability;
5. Identify the technical justification for each preliminary option and analysis with respect to Project objectives;
 6. Describe the past performance of the structural system, including identifying pertinent information gathered from the detailed exploratory work and investigations program;
 7. The Consultant Team must engage a third-party entity to calibrate the structural model with highly sensitive vibration sensors temporarily deployed on structure platforms to measure minute vibrations coming from micro tremors, winds, traffic and human activity. This information is to be analyzed with advanced algorithms to determine modal properties (natural frequencies, damping ratio and mode shapes) of the structure. The intent is to confirm that the analytical model's behaviour corresponds to the measured building behaviour.

2.2.13 Geotechnical Information

The Consultant must review geotechnical information and analysis to identify information gaps in the recording of any existing geotechnical information with recommendations to the DR as to further investigations and/or studies relative to the objectives and approach and other Project requirements to supplement existing information so PWGSC can obtain the required geotechnical information.

2.2.14 Mechanical Analysis

The Consultant must:

1. Conduct an analysis of existing building systems, approach and guidelines to support and service the mechanical requirements for construction including the construction yard and the enclosed scaffold environment (heating, ventilation and fire protection). Take into consideration building heating systems (Existing High pressure steam and the planned conversion to low temperature hot water, chilled water, gas and electricity) restrictions and include analysis and confirmation of available system limitations, tie-in locations, and capacities to support construction requirements; analyze adequacy of existing mechanical spaces
2. Analyze ventilation requirements for maintaining indoor air quality
3. Identify potential designated substances on existing equipment for testing
4. Provide an analysis and approach to quality control monitoring of temperature and relative humidity during masonry rehabilitation, construction and curing period, including building interior, and to protect and preserve features;

5. Analyze the capacities of the existing mechanical building services to the building (water, sanitary, storm, steam, chilled water, hot water) and existing interior HVAC and plumbing and drainage systems and the potential opportunities and limitations considering the project's program, the necessity to relocate, replace and upgrade underground utilities and any required reconstruction of the site;
6. Identify new or temporary mechanical systems necessary to implement the project;
7. Identify assumptions regarding life cycle duration, discount rates, fuel cost escalation and the inflation rate to be employed in analysis;
8. Identify the methodology and criteria for life cycle cost analysis;
9. Incorporate into the Model and analyze the entry points for mechanical services and opportunities or limitations considering the site and adjacent and dependent building s;
10. Incorporate into the Model existing outdoor air supply and exhaust systems and determine a preliminary proposal to meet the project's requirements for outdoor air supply and exhaust;
11. Determine the opportunities for innovation to achieve integrated building systems;
12. Decommissioning:
 - Incorporate into the Model the existing components of infrastructure to be decommissioned as part of the Project; and
 - Propose a strategy, timelines and procedures to decommission, including recommending what equipment and distribution systems should be retained;
13. Prepare as-found drawings or updates to the Model to describe all equipment and distribution systems to be removed;
14. Utilities (buried and in tunnels), HVAC, plumbing and fire protection connection:
 - Provide a narrative description of existing systems connections and capacities;
 - Understand the new system requirements and provide a narrative description;
 - Review existing information and perform on site audits of existing systems distribution infrastructure layouts and chases. Model systems and provide narrative description of findings as well as constraints; and
 - Survey and incorporate into the Model existing infrastructure horizontal and vertical pipe and duct runs. Use typical floor Drawings and sketches to identify locations and constraints;
15. Safety:
 - Provide options for controlling/containing all air borne contaminants;
16. Prepare a pre-design study to be required to determine the required tonnage for a geothermal system, obtain test wells, and conduct thermal conductivity tests, as follows:
 - Obtain heat loss / heat gain calculations for the building (design heat loss calculation); with this information and with the geotechnical background information available, determine how many deep test wells will be required for

the building. The casings for these test wells will remain in the holes to reuse them later as part of the geothermal system.

- In these test wells, the geoexchange specialist will coordinate the required in-situ thermal conductivity (TC) test performed by a company specialized in geothermal drilling in-situ tests in accordance with CSA Standard (conductivity, temperature, etc.).
- When the tests are done, the geothermal sub-consultant will be able to calculate how many other wells (and their depth) will be required for the entire geothermal system. When this step is done, the profitability of the geothermal system can be assessed for the building.

17. The Model

- Incorporate into the Model:
 - Site drawings with footprint of all buildings showing the common services /utilities how they connect to the building and how these will be dealt with during the project; and
 - All services (utilities, air intakes/exhausts) that are to remain, to be added and/or modified, as required to use the Model for energy analysis

2.2.15 Civil/Municipal Analysis

The Consultant must:

1. Verify and obtain from the City of Ottawa existing boundary conditions (HGL at required domestic flow demands and fire flow requirements) for the municipal water distribution system supporting the building;
2. Analyse capacities of the site storm water drainage collection systems and sanitary collection systems, including any limitations or restrictions imposed on these systems by municipal infra-structure that would affect the building;
3. Analyse ability of surrounding site to be developed to manage storm water on-site;
4. Define and conduct a detailed Closed Circuit Television (CCTV) inspection of building services and supporting sewers, including building services, from their inception point (furthest upstream maintenance hole), to their respective downstream maintenance hole; Include a visual assessment of respective maintenance holes, and include photographic records of findings
5. Review CCTV inspection reports and video and provide the DR a written opinion based on findings of the overall condition of the sewers;
6. Verify the sizing of the existing building water services
7. Summarize analyse and confirm if any upgrades may be required; and
8. Undertake a calculation of required site fire flows using FUS Guidelines (Water Supply for Public Fire Protection, A Guide to Recommended Practice, prepared by Fire Underwriters Survey). In addition, prepare fire flow calculations employing Ontario Building Code, Section 3.2.5 Provisions for Fire Fighting including Annex A. Compare required flows calculated to that available from the municipal distribution system. Report any

deficiencies and provide recommendations as to achieve required fire flow for both calculation methods.

2.2.16 Fire Protection Analysis

1. Report on the following:
 - Existing fire detection and alarm systems for life safety and asset protection. Identify systems, panel locations, evacuation/gathering places away from the building and other features that potentially contribute to an integrated life safety approach.
 - Prepare as-found drawings or updates to the Model to be used for demolition construction documents

2.2.17 Electrical Analysis

The Consultant must:

1. Conduct an analysis of existing electrical systems, approach and guidelines to support and service the electrical requirements for construction. Include analysis and confirmation of available system limitations, tie-in locations, and capacities to support construction requirements; and
2. Report on the following:
 1. Condition, loads, capacities, routing of existing electrical and IT systems;
 2. Risks associated with the relocation, replacement, reuse and upgrade of electrical and IT systems;
 3. Lighting levels and other electrical requirements based on the Project's program requirements, ensuring that the architectural lighting master plan and those of the Canada Occupational Health and Safety Regulations and Illuminating Engineering Society of North America are respected;
 4. Hydro Ottawa's requirements and capacity including requirements for loop systems conductors and Hydro's labour costs;
 5. Identify the existing components of infrastructure to be decommissioned as part of the project;
 6. Propose a strategy, timelines and procedures to decommission;
 7. Identify potential designated substances to be tested;
 8. Normal, Emergency and UPS Electrical Distribution which must consider the future conversion of the building to a GC Workplace Fit-up Standards accommodation:
 - Provide narrative description of existing electrical distribution;
 - Provide tables and projections of future theoretical requirements capacities;
 - Comparison Graph must be used to demonstrate power requirements over the year timeline. (existing and future load results); and
 - Provide narrative description and sketches of findings incorporated into the Model as well as constraints on existing electrical distribution infrastructure layouts and conduits/chases;

9. Public Address System:
 - Provide narrative on existing system type and capacity;
10. Lightning Protection System:
 - Provide narrative on existing system type and capacity.
3. Decommissioning:
 1. Incorporate into drawings or the Model the existing components of infrastructure to be decommissioned as part of the Project; and
 2. Propose a strategy, timelines and procedures to decommission, including recommending what equipment and distribution systems should be retained;
4. Incorporate into the Model:
 1. Site drawings with footprint of all buildings showing the common services /utilities how they connect to the building and how these will be dealt with during the project; and
 2. All services (utilities, electrical distribution) that are to remain, to be added and/or modified, as required to use the Model for energy analysis
 3. Entry points for electrical services and opportunities or limitations considering the site and adjacent and dependent building

2.2.18 Vertical Transportation Analysis

The Consultant must prepare a vertical transportation analysis that includes, but is not limited to:

1. An analysis of existing elevators functionality and capacity. Provide the scope of work required to make operational.
2. An analysis of the staircases, that will support Building Code requirements for vertical transportation and building evacuation; and
3. Include analysis of capacities to support building occupancy and accessibility.

2.2.19 Building Components and Connectivity (BCC) Analysis

The Consultant must prepare a BCC analysis that includes but is not limited to:

1. An analysis of existing Building Components, a review of the requirement and a strategy for acquisition;
2. An analysis of the Building Connectivity requirement to meet the functional requirements; and
3. An analysis of the existing security measures in the building to meet the functional requirements.

2.2.20 Budget and Schedule

Review and validate the Project budget and schedule, including:

1. Updated Class D Cost Estimate to confirm budget
2. Updated schedule to confirm project timing

2.3 Deliverables

2.3.1 Deliverables in advance of the Pre-Design Report

The Consultant must;

1. Summarize documentation received and provide an initial gap analysis report for each discipline within 8 weeks of contract award. Update the gap analysis at least quarterly until the end of RS 4 Design Development; and Include an overall summary in the Pre-Design Report; and
2. Based on the review of the documentation, preliminary inspection and preliminary analysis, the Consultant Team must prepare a Detailed Field Investigation and Testing Program Proposal to be conducted in collaboration with the relevant disciplines.

2.3.1.1 Detailed Field Investigation and Testing Program Proposal

The Consultant must prepare the preliminary investigation plan within six (6) weeks of contract award and detailed exploratory work and investigations program within 12 weeks of contract award. In collaboration with the relevant disciplines, the Consultant must include;

1. Proposed tests, specific locations, cost, and schedule in the basic testing program;
2. Justification for the detailed tests and inspection;
3. Options for testing whenever possible;
4. Strategy to minimize openings to reduce cost and impact on historic fabric;
5. Field Investigation Contractor Scope of Work and construction tender packages, as required for public tender, identifying the location of the openings, testing and the type of access equipment and the temporary locations of the access equipment (building and vehicle access requests, scaffold, crane, lift, swing stage, etc.);
6. Defining and managing the testing program and the interpretation of the results are to be included in the Consultant fees;
7. Detailed investigation reports and investigation specific Model updates within two (2) weeks of each investigation, or as agreed by the DR; and.
8. PWGSC will retain the contractor to perform the testing.

2.3.1.2 In-Situ Testing - Non-Destructive/Minor Destructive Testing

Testing may include, but is not limited to;

1. Exterior and interior inspection openings (intrusive) to verify the condition of the masonry, bonding, ties, and windows attachment details and condition;
2. Non-destructive testing to identify hidden cracks, voids, and presence of steel where openings are not feasible;
3. Assessment of mechanical, physical, and chemical properties of units, assembly, systems or in-situ stresses, using tests such as shear test of masonry, flat jack and pull-out test, etc.;
4. Material sampling for laboratory testing program; and
5. Other testing as recommended by the Consultant and approved by the DR.

2.3.1.3 Laboratory Testing Program

In collaboration with the relevant disciplines, the Consultant must;

1. Confirm and conduct materials analysis/laboratory testing on existing materials as required where existing information from background documents is not sufficient for design;
2. Be responsible for delivering and managing the laboratory testing, and for the interpretation of the test results;
3. Pay costs to the testing laboratory from the testing allowance to be reimbursed by PWGSC; and
4. Define and manage the testing program and the interpretation of the results are to be included in the Consultant fees.

2.3.1.4 Preliminary Conservation Approach

The Consultant must prepare a project specific Conservation Approach and the key points of the heritage background analysis.

2.3.2 Pre-Design Report

The Consultant must submit a comprehensive Pre-Design Report for review by the DR, identifying the project requirements. The Consultant must revise the report as required by the DR. Interim submittals of the Pre-Design Report are required at 99% and 100% complete phases. The final 100% Pre-Design Report will consolidate any completed exploratory work and investigations reports, progress of on-going exploratory work and investigations and discipline specific deliverables gathered from the activities identified above. The Pre-Design Report will illustrate an analysis of the Project requirements and also serve as a benchmark project control document to monitor progress of the project.

The body of the Pre-Design Report is to include as a minimum the following sections:

1. Executive summary;
2. Table of Contents
3. Glossary of terms;
4. Summary of reviewed documentation;
5. Regulatory analysis;
6. Exploratory work and investigations;
7. Functional Program;
8. Urban Design analysis
9. Site analysis;
10. Complete the Model
11. Architectural analysis;
12. Heritage Conservation Background analysis;
13. Abatement and Demolition analysis;

14. Sustainable Design analysis;
15. Structural/Seismic analysis;
16. Mechanical analysis;
17. Geothermal analysis
18. Civil/Municipal analysis;
19. Fire Protection analysis;
20. Electrical analysis;
21. Vertical Transportation analysis; and
22. Building Components and Connectivity (BCC) analysis.
23. Budget and Schedule

Include as a minimum:

1. Conservation approach and heritage background analysis;
2. Identify opportunities to accelerate the Project delivery;
3. Analyze risk implications and preliminary mitigations strategies for managing risk during the subsequent RS phases of the Project; and
4. Prepare PowerPoint presentations on the framework for structural modelling and analysis for discussion at meetings and workshops.

2.3.3 Design Management Plan

The Consultant must provide the approved Design Management Plan with the Pre- Design Report from RS2.

2.3.4 Response to Pre-Design Report

The Consultant must:

1. Review and analyse all the comments provided by the DR;
2. Prepare and submit a written response within 20 working days to all the submission comments; and
3. Integrate comments into the subsequent submissions as directed by the DR.
4. Depending on the completeness of the submissions, the DR may provide written instructions to the Consultant to proceed to the next Stage while they respond to comments received.

RS 3 SCHEMATIC DESIGN

3. Schematic Design (SD)

3.1 Intent

It is expected that the Schematic Design (SD) Phases will overlap with the Design Development Phases. SD will occur in two phases:

- Phase 1 – Base Building
- Phase 2 – Office Fit-Up

The intent of the SD Phase is to investigate, develop and analyze design options, weighing them against the Project requirements and constraints, including (but not limited to) the functional program, cost, time, scope, heritage values, and sustainability requirements, constraints, etc., in order to confirm the scope and direction of design and to provide a sufficiently developed design to permit the preparation of construction tender documents.

Obtain written authorization from the DR before proceeding with SD Phase 1 or 2.

It is anticipated that SD Options for Phase 1 Base Building will vary primarily due to design solutions for seismic upgrades, mechanical systems and sustainability features, in balance with heritage conservation.

3.2 Design Services

3.2.1 General

The Consultant must:

1. Coordinate all services of the Consultant Team;
2. Integrate all ongoing Pre-Design investigation work;
3. Prepare all required documents and deliver the presentations to the FHBRO, NCC, and other Authorities Having Jurisdiction (AHJ's), integrate their recommendations and obtain their support and approval;
4. The Consultant must provide a comparative analysis of all design options; and
5. Identify a preferred option that best integrates all other disciplines and best balances heritage value and functionality with Project, cost, time and scope constraints.

3.2.2 Regulatory Analysis

The Consultant must prepare:

1. A detailed site and building code analysis and requirements;
2. A fire and life safety strategy, exemptions, including smoke control and the means of egress and exit; and
3. Preliminary standards analysis.

3.2.3 Exploratory Work & Investigations

The Consultant must work closely with the DR to:

1. Implement construction with preparation of construction documents and contract administration of exploratory work and investigations as outlined in the program developed in the RS 2, Pre-Design to refine the design assumptions and the design itself;
 1. Conduct additional exploratory work and investigations, if required;
 2. Coordinate laboratory and in-situ testing and monitoring; and
 3. Compile, analyze and submit the results of the exploratory work and investigations into the report as defined in RS2 Pre-Design. The reports must be updated regularly as required throughout the duration of the Project;
2. Prepare all required documents and deliver the presentations to the AHJ's, integrate their recommendations and obtain their support and approval; and
3. Ensure the Model is continuously updated to reflect the scope and actual findings of all exploratory work and investigation using Scan to BIM.

3.2.4 Functional Program Completion

The Consultant must complete the Functional Program with User fit-up requirements that includes but is not limited to:

1. Participation in information workshops to be held with those who prepared the pre-design functional requirements to outline the information;
2. Functional requirements analysis for space allocation and all functions within all spaces to include but not limited to;
 1. Support space and special purpose space;
 2. Acoustics;
 3. Interior fit-up;
 4. Programmatic options including circulation paths;
 5. User reports, studies;
 6. Room data sheets updates;
 7. Security requirements including a design approach;
 8. Site;
 9. BCC Component requirements (furniture, fixtures and equipment) including a design approach; and
 10. BCC Connectivity requirements including a design approach.
3. Identification of information gaps in the recording of the Functional Program with recommendations to the DR as to further investigations and/or studies relative to the objectives and approach and any other Project requirements.

The final Functional Program and SD are an interrelated process, and as the building systems strategies are defined, so will the Functional Program be refined. An updated Functional Program

is required at the 100% SD Phase for Phase 2 – Office Fit-Up, reflecting the preferred design option for formal approval by the Users (if confirmed) and the DR.

For each fit-up option, this section is to include:

1. Updated Functional Program;
2. Circulation flows for employees, public and security;
3. BCC definition and integration of Components and Connectivity equipment and pathways into the base building;
4. Options that resolve Functional Program spatial and functional conflicts;
5. Area calculations that include summaries of building areas and all the accommodation areas and functions in the Functional Program;
6. Furniture storage analysis (to include circulation routes between storage rooms and designated locations); and
7. Strategy and protocols to manage and control the Model definition for base building, BCC Components and Connectivity.

3.2.5 Provision of Three (3) Distinct and Different Design Options

The Consultant must prepare a minimum of three (3) complete, distinct and viable SD options to be presented separately. Each submission must be illustrated in graphic format, including Models, and narrative formats (e.g., reports, BIM Modelling, energy modelling, renderings, Life Cycle Assessment [LCA], Drawings and PowerPoint) fully integrated and supported by sub-solutions for components such as structure, mechanical, electrical, building envelope and interior layouts in sufficient detail to allow comparison, analysis against Project requirements and a selection of design direction for continuation in DD. Indicate a recommended option and sub-option and indicate the advantages and disadvantages of each.

The Consultant must provide a comparative analysis of all three (3) options and develop the preferred design option that best integrates all other disciplines and best balances heritage value, planning framework and functionality with Project cost, time and scope constraints.

3.2.6 Program Requirement Analysis

The Consultant must provide an analysis of each of the three (3) proposed design options against the Functional Program.

3.2.7 Site Development Options

3.2.7.1 Landscape Architecture

The Consultant must prepare three distinctly different SD options in coordination with all stakeholders and is to include for each option:

1. Confederation Heights vision, mission and high level design principles as the base median for each option;
2. Complete graphic and narrative description of each option including, but not limited to:
 1. All works proposed in each option, including new interventions;

2. Colour-coded landscape architectural plans indicating the requirements of the functional program, circulation, accessibility and site security and proposed materials. Provide a narrative that indicates the degree of compliance with the functional program and potential alignment (depending on stage of development) with the Confederation Heights Master Plan;
3. Existing and Proposed grading and drainage drawings, sections and elevations and explanatory sketches;
4. Planting Drawings and listings;
5. Integration of all landscape features and infrastructure existing and new signage and way finding (regulatory, directional, information), circulation (vehicular, transit, pedestrian and bicycles) architectural and security lighting, security features (surveillance cameras, bollards, lockable pull-boxes, etc.), landscape furniture, vegetation, grading, soil and soil structure condition, drainage, green infrastructure and LID strategies for storm water management, irrigation, and mechanical, electrical and fire protection infrastructure;
6. Description of construction and heritage conservation methodologies and mitigation measures, cross reference with heritage conservation plan;
7. Description of the inter-relationships between the landscape and the building s and build infrastructure and materials;
8. Fit with overall vision for Confederation Heights
9. Identification of conflicts and discrepancies;
10. Proposed new street furniture design and materials;
11. Material samples;
12. Key factors that drive Project cost, schedule, risk and procurement;
13. Detailed Modelling of each option; and
14. Model renderings;
3. Signage Drawing indicating way finding strategy including regulatory, directional, information signs;
4. Site security Drawing, including vehicular screening facilities, perimeter bollards systems, soft landscaping security measures and surveillance cameras and sightlines, security lighting, security buffer zones, Crime Prevention Through Environmental Design (CPTED) and resiliency to security events such as terrorists or need to evacuate building and site;
5. Visual impact and visual corridor analysis, including design strategies, views within the Project boundaries, to and from the building and from key vantage points for each option including those from neighboring sites;
6. Climatic resiliency to severe storm events such as tornadoes, 500 to 700 year storm events
7. Four season climate impacts on operation, function and sense of place and use by employees.

8. Comparative analysis of options. Each must include a class D cost estimate;
9. Development of a set of evaluation criteria to select a preferred option.
10. Identification of a preferred design option that best integrates all other disciplines and best balances heritage value, sustainability, planning framework and functionality with Project cost, time and scope constraints.
11. Provide a final plan of the preferred option along with a class D cost estimate.

3.2.7.2 Architectural and Site Lighting

The Consultant must prepare coordinated architectural lighting options for the site in coordination with the Consultant Team, stakeholders (including the Long-Term Vision and Plan [LTVP]) and AHJ's, and is to include and incorporate into the Model:

1. Architectural lighting vision for each option;
2. Complete graphic and narrative description of each option including, but not limited to:
 1. All works proposed in each option including heritage impact of new interventions;
 2. Colour-coded lighting Drawings indicating programmatic requirements and proposed materials. Provide a narrative that indicates the degree of compliance with the lighting master plan, incorporating protection of heritage value;
 3. Proposed design for existing and new site lighting;
 4. Material samples;
 5. Key factors that drive Project cost, schedule, risk and procurement;
 6. Detailed Modelling of each option; and
 7. Model renderings;
3. Visual impact analysis including design strategies of all building facades, for each option and how it will fit with the Dark Sky Initiative

3.2.8 Architectural Options

3.2.8.1 General

1. The Consultant must coordinate all Project requirements in coordination with Project Team, stakeholders and AHJ's. The Consultant must:
 1. Demonstrate that each SD option meets the Functional Program, Project objectives and Project requirements;
 2. Ensure a comprehensive and fully coordinated and integrated design approach; and
 3. Test for coordination and interference in the Model.
2. The Consultant must include for each option:
 1. The architectural vision;
 2. Complete graphic and narrative description including, but not limited to:
 1. All works proposed in each option including heritage conservation and new construction;

2. Colour-coded architectural floor Drawings for every level of the Project indicating the requirements of the Functional Program and proposed materials. Provide a narrative that indicates the degree of compliance with the Functional Program, including area calculations, and options in narrative and graphic formats proposing mitigation of these conflicts or anomalies;
 3. Interiors including circulation (public and visitors), material handling circulation and storage, vertical and horizontal paths, service cores and other vertical and horizontal interventions;
 4. Building sections indicating the composition of walls, floors, roofs, foundations, windows and doors;
 5. Below grade Drawings showing program accommodation of each option. Design and cost/benefit analysis and recommendation for excavation options;
 6. Services including vertical transportation, plumbing, HVAC, fire detection and suppression, electrical, telecommunications, building automation;
 7. Interior and exterior elevations; and
 8. Material samples;
3. Modelling for each option; and
 4. Interior and exterior Model renderings and fly-bys of selected areas;

3.2.8.2 Building Envelope

The Consultant must, develop building envelope strategies that align with the findings from the exploratory work and investigations and support the SD options. Options to be incorporated for glazed curtain walls, windows (including window spandrels), masonry spandrel panels, and stone wing ends. Building envelope requirements to focus on the various components of this building and not only masonry. The Model must be used to simulate and evaluate the proposed strategies;

1. Run various energy simulations, including estimated annual energy performance, cost savings, greenhouse gas (GHG) emissions, and impact to base building systems, to define optimal solution for meeting performance option targets.

The Consultant must provide for each option:

1. An envelope component, assembly and material conservation approach;
2. The water management approach;
3. Substructure and foundations approach, including basement,;
4. Building envelope sections including masonry wall assemblies, foundation, roof assemblies, windows, insulation, all component assemblies between the interior and exterior;
5. Building envelope with the structural stabilization approach;
6. Masonry conservation approach including cleaning, re-pointing and back-pointing approaches, mortar mix analysis and design options, pinning, grouting, plastic

repairs, scaling, consolidation, removal of ferrous inserts and parging, dutchmen stone replacement, stone resetting of displaced stone; types and amounts of stone deterioration; causes/mechanisms; options for repair, estimated quantities of stone replacement;

7. Approach to roof, water shedding, window conditions;
8. The impact of indoor environment, e.g., temperature, humidity, air pressure and flows and mitigation;
9. Concept for temporary support for monitoring scope and equipment;
10. Special construction and dismantling, including heritage structures, hazardous materials abatement, etc.;
11. In consultation with the DR and Consultant's, architectural, structural and masonry conservation specialists, selection and quantification of replacement stones, potential quarry location(s), and stone procurement strategy;
12. In consultation with the DR, architectural and structural and masonry conservation expert, approach for envelope quality control testing;
13. Unit rate tables for all elements of the envelope rehabilitation, mapping the unit rates to the building facade for each option;
14. Impact analysis of building envelope of each option; and
15. Simulations of the building envelope approaches using the Model, including consideration for adding insulation to the existing heritage masonry walls and copper roof.

3.2.8.3 Accessibility

The Consultant must provide for each option:

1. A accessibility analysis of the site and building, including strategy and exemptions;
2. Circulation and accessibility Drawing detailing strategies and exceptions (such as existing stairs rise and run), including pedestrian, bicycle and vehicular. This Drawing must include parking areas, delivery and loading areas, gathering places, decision points, events staging areas etc.;
3. Pedestrian access and egress are to be based on the 6 minute walk to and from key destinations such as transit, light rail. This is in support of achieving a Transit Orientated Development (TOD) for all federal buildings located at Confederation Heights.

3.2.8.4 Acoustics

The Consultant must provide for each option:

1. Acoustic strategies including the approach to construction of the acoustic provisions;
2. With the input of the Project Team, develop acoustic requirements per discipline to support the design options being prepared:
 1. Consider impacts to heritage fabric and the requirement for speech privacy

3.2.9 Heritage Analysis Plan and Database

3.2.9.1 Heritage Impact Analysis of Design Options

The Consultant must prepare a heritage impact analysis in collaboration with relevant disciplines, stakeholders and AHJ's, along with input from the DR. Revise as required for submitting to FHBRO for review. Include for each option and where appropriate, incorporate into the Model:

1. A comparative evaluation of the impact that the proposed rehabilitation options (including structural/seismic, physical security, site alterations) will have on the heritage fabric of the building, measured against:
 - Applicable conservation policies, practices, plans and guidelines as identified in the heritage conservation background analysis;
 - The objectives set forth in the heritage conservation approach and identified in the heritage conservation background analysis; all landscape planning and urban design and landscape planning framework; and
 - The construction schedule and conservation budget;
2. Identification of opportunities and strategies that limit the impact to or enhance the heritage-character defining and the heritage character-contributing elements;
3. Identification of methodology of conservation work and mitigation measures, including evaluation of proposed repair materials and treatments, as required for each option;
4. Identification of a preferred design option that addresses the root causes of problems and that best balances heritage value and functionality with Project cost and time constraints, scope, and quality;
5. Narrative explaining how new design elements are compatible with the original building heritage value and character-defining elements in terms of planning, massing, architecture vocabulary, visual impact, materials, details and colour palette;
6. Elaboration of the methodology of conservation work and mitigation measures for the rehabilitation of the exterior envelope (masonry, masonry spandrel panels, stone wing ends, roof, glazed curtain wall, windows (including window spandrels), and exterior doors), in consultation with the building envelope and structural disciplines; and
7. Conclusions and recommendations in a comprehensive heritage conservation plan that best conserves the building in the context of the Project Functional Program, building guiding principles and Project requirements. The conservation strategy must describe the conservation philosophy and be in sufficient detail to inform decisions and direct the subsequent conservation plan.

3.2.9.2 Heritage Conservation Plan

The Consultant must prepare a heritage conservation plan in collaboration with relevant disciplines, stakeholders and AHJ's along with input from DR. Revise as required for the approval of the DR.

The heritage conservation plan is to include and be based on the most updated conservation approach, the heritage background analysis and the heritage impact analysis. This enables

the implementation of the recommended design option and is to include, as a minimum, for each conservation discipline:

1. Description of the proposed conservation scope of work for all Heritage Assets, including proposed methodologies, materials, requirement for mock-ups, and related documentation (e.g., drawings, sections, elevations, detail specifications, and qualitative acceptance criteria);
2. Narrative demonstrating compliance of proposed interventions with applicable conservation principles and practices, as identified in the heritage conservation background analysis;
3. A strategy for the implementation and reporting/monitoring of conservation treatment;
4. Selection and quantification of all materials required for conservation;
5. Updated terms of reference for quality control testing of conservation work and related materials;
6. Coordination and consistency of conservation scope, methodology and finishes for Heritage Assets that have a relationship to each other across the building or site through e.g. location/grouping, spatial hierarchy, finishes; and
7. Recommendations for the conservation long-term maintenance plan.

3.2.9.3 Heritage Materials Database (HMD)

The Consultant must continue to identify and compile the data for each Heritage Asset and finalize the Heritage Materials Database, incorporate into the Model as it is being developed in support of the heritage conservation plan. Ensure proposed interventions, methodologies and mitigation measures are included per database entry, as well as all information on the existing heritage materials.

3.2.10 Abatement and Demolition Options

The Consultant must define the scope and implementation options related to hazardous materials abatement for each SD option.

3.2.11 Sustainable Design Options

The Consultant must update and further develop the Sustainable Design Strategy Report for each SD option and the final preferred design option:

1. Confirm sustainability priorities and targets, the feasible sustainable design opportunities and strategies to meet these targets (further distinguishing targeted from potential) and prepare evaluation matrix to illustrate how options compare in performance (including their address of sustainability objectives), functionality and cost;
2. Align options analysis with GHG Guidelines options analysis methodology.
3. Run various energy simulations, updating model to evaluate proposed designs, including estimated annual energy performance, cost savings, greenhouse gas (GHG) emissions, and impact to base building systems, to define optimal solution for meeting performance option targets;

4. Demonstrate the life cycle costing and integrate Life cycle assessment (LCA) results that indicate the benefits to PWGSC of the proposed sustainable designs;
5. Provide Life Cycle Costing and develop the Life Cycle Assessment (LCA) to measure impact from various material and design choices in order to weigh additional criteria when evaluating final design options;
6. Prepare preliminary budgets;
7. Update report narrative as per above and the sustainability assessment scorecards, confirming likely performance rating and any outstanding risks or challenges that may impede desired performance;
8. Incorporate the requirements as set out in the Evaluation of Environmental Effects (EEE) letter or report produced by PWGSC.

3.2.12 Structural

The work throughout SD must enhance the solid understanding of the structural scope work and interventions required for a holistic rehabilitation that meets all Project goals. All items referenced in PD 5 Program of Works, 5.8 Structural, including, but not limited to; repairs, additions, seismic, blast, ballistic, functional program support and building code upgrades options must be identified and evaluated.

The Consultant must, in coordination with the Consultant Team, perform a detailed assessment and perform analytical Modeling of the structural systems to support and accommodate the new functional and technical requirements, base building repair, upgrade and/or modifications for each design option proposed.

3.2.12.1 Structure Modeling and Analysis

1. Complete structural analysis using the analytical Model developed, in RS 2 Pre-Design. Analyze for dead, live, snow, wind, seismic (60% and 100% of NBCC requirements), environmental loads, blast, and progressive collapse:
 1. Use first an undamaged condition as a baseline;
 2. Follow this with an analysis including all proposed modifications to the building;
 3. Follow this with an analysis based on its current degraded and partially repaired condition. Assess the risk levels associated with current condition; and
 4. Identify vulnerable building elements (e.g. masonry, operational and functional components [OFC], etc.) that should be temporarily supported, strengthened or dismantled prior to construction activities that create vibrations such as rock excavation using explosives or hoe ramming.
2. Complete a design option analysis, for each option, that must include:
 1. Seismic upgrading options (Base isolation, new stiff shear walls, and new steel brace frames in combination with new movement gaps between the perimeter frame and infill stone/masonry);
 2. Resolution of spatial, functional and operational conflicts;

3. Limitation of vibration and noise for rock excavation and construction to adjacent infrastructure;
4. Identification of building elements that would be at risk from rock excavation and proposed options for mitigation;
5. Description of the inter-relationships between the structural systems, building envelope and architectural finishes;
6. Model analysis including description of methodology and confirmation of seismic approach complete with backup calculations and Model details to support each option, including conventional upgrade and base isolation option;
7. Determination of the loading conditions based on the provisions identified in the regulatory analysis and any modifications to the structure;
8. Determination of the specific seismic loading conditions;
9. Identification of structural, deficiencies, deterioration and distress;
10. Determination of allowable loads that can be imposed on the building by the anticipated construction activities;
11. Comparative analysis of options including impact on heritage fabric, impact on building functions, impact on building systems, design lifespan, life cycle cost, constructability and maintainability;
12. The Consultant is to identify the sensitivity of each option to the interior fit-up options. Where the upgrade option is found to be sensitive to the fit-up layout option, the Consultant must analyze that option for each of the sensitive fit-up layout options;
13. Impact analysis of different target reliability levels (60%, vs. 100% NBCC 2015 seismic load requirements);
14. Operational and Functional Components (OFC) analysis;
15. Phasing approach to seismic and structural upgrades/ modifications, include temporary bracing scope and sequencing;
16. Detailed calculations in support of preliminary conclusions;
17. Documentation of all major assumptions and describe how they were arrived at;
18. Limitations and uncertainties with respect to material properties and structural system construction and behavior;
19. Identification of required information that is still outstanding;
20. Identification of a preferred design option that resolves the Functional Program, structural, seismic and physical security requirements and that best balances heritage value and functionality with Project scope, cost and time, constraints; and
21. Recommendations for immediate action, if required;
3. Conduct monthly technical workshop to review and discuss:
 1. An overview of the overall status of the structural scope, modelling and analysis;

2. Changes or modifications to the Modelling and analysis that have been made since the previous working meeting, including identifying the reason for the changes;
3. Progress of third party calibration of the structural model with highly sensitive vibration sensors;
4. Proposed changes or modifications to the Modelling and analysis, including identifying the reason for the changes;
5. Proposed changes to the exploratory work and investigations program that are apparent as a result of anomalies in behavior or gaps in understanding that become apparent during the Modelling and analysis; and
6. Impact of the changes and proposed changes on the Modelling and analysis schedule.

3.2.12.2 Structural Assessment

Complete a detailed condition assessment that must include, as a minimum, the following information:

1. Description of the structural system, its construction, components and materials;
2. Description of the condition of the structural system, including deterioration locations and types and a discussion of their causes and impact on the long-term health of the structural system;
3. Description of the inter-relationships between the structural system and building envelope and architectural finishes and a discussion of the impact of these relationships on both the structural system and the building envelope and architectural finishes;
4. Description of the past performance of the structural system, including identifying associated damage, and a discussion of the impact on the long-term health of the structural system;
5. Description of any proposed changes, modifications and load increases on the building and their impact on the structural system. Determine if these changes are structurally significant. If so, provide strengthening options and recommendations;
6. Description and discussion of the results of the structural analysis, including:
 1. Analysis results for gravity, wind, environmental, seismic and blast loading scenarios, including appropriate load combinations;
 2. Identification of structural deficiencies based on analysis results; and
 3. Summary and prioritization of identified structural deficiencies issues that need to be addressed prior to, and during, construction work, including evidence based explanations for why these deficiencies and issues must be addressed to demonstrate the best method to address this issues as a holistic approach;
7. Recording of existing conditions in the Model and on Drawings (plans, elevations, sections) showing: areas and quantities of damage/poor performance colour-coded to explanatory text, with photographs;

8. Appendices with analysis details, computer runs; and
9. Scope of options to address functional program requirements, structural deficiencies, seismic, blast and ballistic requirements with technical justification for each.

3.2.13 Geotechnical

The Consultant must develop recommendations that align the geotechnical information and analysis from the GSC with the structural, seismic and physical security analysis of the design options required for the phase 1 Interim Submission, and with further development of the preferred design option.

Incorporate geotechnical information into the Model.

3.2.14 Mechanical Options

The Consultant must, for each option:

1. Provide building service strategies including elevators, plumbing, HVAC, fire protection, building automation, security, acoustical isolation or speech privacy and intelligibility, protection of fresh air intakes, blast relief dampers/systems;
2. Provide strategies for use of renewable energy including natural ventilation. Provide strategies for managing duct work size within the space constraints of the existing building structure.
3. Describe the energy reduction achieved in each HVAC option and provide energy simulations with recognized energy simulation software;
4. Include emergency generator systems, with options for location of generators, and fuel storage tanks, complete with life cycle costs analysis, advantages, disadvantages, risks and recommendations.
5. Complete energy simulations to demonstrate energy use and provide comparisons of the options. HVAC system modelling must include options using natural ventilation and motorized windows operated by the EMCS
6. Describe new gravity storm piping systems in lieu of the existing sump and pump system. Provide elevations and connection points to the street storm system;
7. Describe mechanical requirements during construction;
8. Prepare the SD for mechanical components and systems for site and building services including plumbing, HVAC, fire suppression and detection, energy management and controls, and security. Provide recommendations complete with supporting justification and implications;
9. Provide analysis and recommendations for obtaining geothermal heat sourcing and incorporation into the building heating system;
10. Prepare SD options with analysis of monthly energy consumption, operating and maintenance costs for life cycle analysis. Review with the DR assumptions regarding a life cycle duration and costs of facility alteration, improvement, demolition, recycling and demolition. The Consultant will use an approach agreed upon with the DR for all energy simulations. Analysis will illustrate monthly energy consumption of each building system,

- and overall annual operating and maintenance costs over a calendar year. Life cycle analysis must be integrated with sustainability and commissioning requirements;
11. Provide detailed analysis and design for tie-in methodology, tie-in locations for temporary and permanent services, including metering as required. Identify in the Model the interim and final underground utility relocations, replacements and upgrades;
 12. Narrative and Drawings that indicate for each of the proposed mechanical systems and components;
 1. The advantages, disadvantages and recommendations for mechanical systems and components;
 2. Adaptability and flexibility of mechanical systems;
 3. System schematics describing each mechanical system and component;
 4. Preliminary energy analysis for each system proposed;
 5. Building control strategies for each system complete with supporting analysis;
 6. In conjunction with the PWGSC Commissioning Manager, identify whether full-time operating personnel are required to operate any mechanical equipment or if specialized personnel are required for on-going operations; and
 7. Determine whether personnel are required because of code requirements or because of the nature and size of the Project;
 13. Description of ventilation systems. The per capita supply of outdoor air is to be determined for each option and the long-term requirement and include relevant assumptions;
 14. Description of snow melting systems;
 15. The air supply, heating and cooling to each occupied space is to be described including relevant assumptions, including the use of geothermal heating;
 16. Whether or not the building will be provided with humidification systems if the building envelope allows;
 17. The location of each entry point for mechanical services;
 18. The connection and separation, relocation and replacement of services;
 19. Water supply requirements, for domestic, fire protection and chilled water;
 20. The area required for mechanical functions and identify all mechanical spaces within and serving the Project;
 21. Evaluate compliance of new hot water heating system with the ESAP Requirements for Building Heating and Cooling Systems Connected to the PSPC District Energy Systems in the NCR. Provide calculations to support selected temperatures and equipment types. Coordinate evaluation with architectural discipline in order to evaluate the improvements in envelope (windows, wall insulation, air tightness) heat transfer necessary to achieve the design guideline of the low temperature heating water system. Select perimeter heating systems and provide description of these systems;
 22. The requirements for all mechanical rooms;

23. Incorporate into the Model all systems, showing all pipes, ducts and equipment diagrams; and
24. List of all equipment/excel spread sheet (minimum information for each item: equipment number, location, service).

3.2.15 Civil/Municipal Options

The Consultant must, for each option:

1. Verify and confirm information and/or previous assumptions to support design assumptions;
2. Obtain the approval of the Ottawa Fire Service for proposed isolation, removal or reconfiguration of the water mains, all temporary and permanent fire hydrants;
3. Obtain the approval of the City of Ottawa for proposed isolation, removal or reconfiguration of all storm water systems and all sanitary sewer systems; and
4. In full coordination with the Consultant Team, propose design options for all below and above grade infrastructure and services within the Model, including sizing, materials and capacities. Each option must provide Drawings and sections complete with backup data to support each option.

3.2.16 Fire Protection Options

The Consultant must, for each option:

1. Provide options for an entirely new fire protection system;
2. Provide detailed narrative of new fire protection system with indication type and stages.
3. Provide narrative on code requirements;
4. Provide a narrative for decommissioning the existing system; and
5. Incorporate into the Model and provide single line block diagram which indicates the configuration of the system as well as the main components capacity.

3.2.17 Electrical Options

The Consultant must, for each option:

1. Propose the electrical design in sufficient detail for PWGSC's assessment and approval. Include the feasibility of proposed systems complete with energy consumption and design loads in consideration of sustainable and commissioning requirements;
2. Describe the normal, emergency and UPS electrical distribution:
 1. Provide a narrative explanation and description;
 2. Include the major and minor pros/cons in tabular format;
 3. Provide details explanations for theoretical load calculations for normal, emergency and UPS power needs. Include major load groups, their associated load management priorities, and their connected, demand loads and final loads;
 4. Detail the emergency power load management strategy. Determine how the requirements can be met;

5. Provide a narrative for the decommissioning the existing system; and
6. Incorporate into the Model options and provide single line sketches with block diagram configuration of the system and equipment capacity;
3. Lighting and Lighting Controls:
 1. Incorporate into the Model existing lighting and controls. All existing lighting fixtures must be identified. Differentiate between heritage to be retained/refurbished and those to be demolished;
 2. Provide options of the new lighting integrated with existing to maintain. Incorporate into the Model and provide floor Drawing and sketches;
 3. Provide a detailed narrative of options for lighting technologies and controls as well as pros/cons and final recommendations. Pay particular attention to sustainability objectives, including the life cycle cost analysis. Review in detail with the PWGSC Commissioning Manager;
 4. Provide tables of intended lighting levels and corresponding light source colour temperatures associated to major and minor areas;
 5. Provide a detailed narrative of the lighting control backbone intention and strategy including interconnection with Building automation system (BAS);
 6. Provide a narrative for decommissioning the existing system; and
 7. Updated table of lighting fixtures which are to be removed, maintained due to heritage value must be identified. Include strategy for refurbishment. Identify heritage lighting and fixture refit;
4. Public Address System:
 1. Provide a narrative and recommended best options on new system;
 2. Review and provide a recommendation of a white noise generation system; and
 3. Incorporate into the Model and provide single line block diagram of different systems and configurations;
5. Lightning Protection System:
 1. Incorporate into the Model and define new lightning protection system. Provide final options with typical elevations and floor Drawings;
 2. Provide narrative for new lightning protection system. Indicate constraints; and
 3. Indicate possible methods of installation/hiding of the down lead conductors.
6. Indicate expansion capacity of the proposed electrical systems and components;
7. Provide a complete energy analysis for the each option;
8. Indicate the spare capacity provided, when compared with the WP 2.0 typical requirements; and
9. Incorporate into the Model and provide narrative all decommissioning and temporary utilities during construction.

3.2.18 Commissioning

The Consultant must, for each option:

1. Identify the spatial, functional and operational requirements for PWGSC operations personnel, including storage and workshops throughout the building including, if necessary, requirements for temporary alteration or relocation of existing space;
2. Summarize requirements (outline scope and frequency) for all maintenance contracts in accordance with code, regulatory requirements, including specialty equipment, prudent materials and equipment redundancies and long-term conservation maintenance per class or type of Heritage Asset, as agreed by the DR;
3. Include an assessment of staffing and skill requirements to operate and maintain each system forming part of the Project, including temporary systems during Project implementation;
4. Summarize the projected annual energy consumption of each utility (water, gas, electricity, steam, chilled water); and
5. Prepare a design intent brief as described below;
 1. Prepared and submit at the end of SD. Update and resubmitted at the end of each delivery phase; design development, construction tender packages commissioning and finalized prior to Completion, reflecting as-commissioned components and systems;
 2. It must be well-organized using simple non-technical language with graphics to facilitate its use as a reference document for all building systems;
 3. It must include, but is not limited to:
 1. A narrative of the operational intent for every building system, indicating how the operational requirements were translated into the design intent for the Project;
 2. An explanation of what a system or component does, areas it serves, why the system or components were selected and, in general terms, how the design and operating concepts of the systems and components are accomplish, including:
 1. general control strategies, sequences and reset schedules;
 2. seasonal switch-over procedures;
 3. emergency procedures during a fire event, power or equipment failure;
 4. reduced and simplified Drawings illustrating system configurations, including single line and plan Drawings of each system;
 5. interfaces with existing systems;
 6. monitoring and maintenance requirements; and
 3. A record of, and rationale for, design decisions made throughout the Project and how these impacts or change the operational intent.

3.2.19 Building Components and Connectivity (BCC)

The Consultant must prepare the preliminary BCC design for Components and Connectivity including security requirements.

3.2.19.1 Building Components

The Consultant must assemble and develop the requirements for BCC Components for each option including, but not limited to:

1. A furniture recommendation report based on the Functional Program and parameters developed with the DR and the Users. The furniture recommendation report is to include:
 1. Schematic layout for furniture types; and
 2. Finishes;
2. Recommendations are to reflect the integration of existing and heritage furniture and art and artefacts, the vision of the Users, functional requirements, proposed alternatives, the space allocation or furniture and furniture storage as well as a cost estimate;
3. Building Component Matrix (BGC):
 1. The BGC is a tool for recording all items to be procured under the BCC Components mandate, for following these items through the procurement phase, for listing the procurement process for each item and for tracking items through delivery and installation. As such, it will serve as the definitive instrument for the BCC Components. The BGC provides a more streamlined strategy for information recording and tracking. Imbedding the information for each Component into the Model. Each Component must be tagged with a code number which is linked in the Model to an attributes list. The list is to identify the type, finish, dimensions, Connectivity requirement, and other characteristics of the item;
 2. Develop the format for the BGC. The BGC will be the document that includes, but is not limited to, the following information for each individual Component. (This information will be required when the design is more advanced during DD);
 1. Component room number and location;
 2. Dimensions;
 3. Manufacturer, make, and model number;
 4. Generic description including mandatory requirements and finishes;
 5. Work Breakdown Structure (WBS) category (Tier 1 and Tier 2);
 6. Procurement group number;
 7. Delivery requirements;
 8. Installation requirements;
 9. Confirmation of the Component as a new procurement or is from an existing inventory; and
 10. For existing inventory, include original location of Component;
 3. Design dynamic blocking for all Components and incorporate the blocking into the Model. The dynamic blocking must include Component dimensions. The blocking structure and component layout Drawings must directly link to the BGC.

The BGC must automatically update as changes are made to the blocking structure and Component layout Drawings;

4. Develop the format for a Building Components List (BCL) that directly links and is updated with the BGC. This information will be required when the design is more advanced during DD. The BCL will be a document that includes, but is not limited to, the following information for each unique Component type:
 1. Quantity;
 2. Unit cost;
 3. Total cost estimate per unique Component type;
 4. Dimensions;
 5. Manufacturer, make, and model number;
 6. Generic description including mandatory requirements and finishes;
 7. WBS category (Tier 1 and Tier 2);
 8. Procurement group number;
 9. Delivery requirements;
 10. Installation requirements;
 11. Confirmation of if the Component is a new procurement or existing inventory;
 12. For existing inventory, include original location of Component; and
4. In consultation with the DR, the requirements for scheduling the procurement of furniture and equipment.

3.2.19.2 Building Connectivity / Security

The Consultant must assemble and develop the requirements for BCC Connectivity for each option including, but not limited to:

1. Recommendations are to reflect the integration of existing and new multimedia devices, the vision of the Users, functional requirements, proposed alternatives, the space allocation, as well as a cost estimate
2. IT, MM and enterprise integrated security services (IT/MM/EISS) to accommodate each option;
3. Provide an impact analysis of physical security Components to the building interiors;
4. Provide a narrative on the integration of IT/MM/EISS;
5. Fully integrate and incorporate into the Model.

3.2.20 Budget and Schedule

1. Prepare Class C Cost Estimate and confirm budget;
2. Provide updated schedule confirming timing of deliverables.

3.3 Deliverables

3.3.1 Schematic Design Report

The Consultant is to provide three SD Report submissions for review: the Phase 1 Interim SD and 99% Final SD Report for the base building design, followed by the updated and completed report for both phases (including Phase 2 Office Fit-Up). At a minimum, the Consultant must:

1. Coordinate all services of the Consultant Team;
2. Develop all options, sub-options, analysis and recommendations;
3. Integrate all ongoing RS 2 Pre-Design information;
4. Prepare all required documents and present to the FHBRO and AHJ's, integrate their recommendations and obtain their support and approval.

Acknowledging the advanced state of the structural options and the potential impacts to architecture and heritage, ensure reports are integrated and coordinated for each SD Submission. Each submission will be reviewed by the Project Team.

The Consultant must maintain full production during the submission review process, revise the final draft in response to the compiled review comments and submit a final submission for acceptance to the DR.

The Phase 1 Interim Submission is to include the three (3) distinct and different design options, site development options, Heritage Impact Analysis of Design Options, and Sustainable Design Options for review by DR, and revised to suit to submit to FHBRO and NCC for review and approval.

The interim and final reports must contain integrated and viable SD options that balance sometimes competing project objectives:

1. Comply with the requirements of the functional program and all applicable plans, policies, practices, standards and guidelines;
2. Include Drawings that illustrate the functional relationships of the Project and its scale and character and include scope narratives, with consideration of impacts to construction planning and scheduling, construction cost, and construction risk;
3. Present graphic and narrative options to resolve conflicts, anomalies and other issues and present the advantages and disadvantages of each option; and
4. Consolidate the SD proposals, findings, analysis and recommendations.

Provide a recommendation for the option that best balances the requirements of the Project with functionality, viability, cost, and schedule, understanding that this option could be a hybrid of the three (3) viable options presented. Present the advantages and disadvantages of each option and ensure alignment of these points with the objectives: The Consultant must present the options to the various stakeholders for their review. The format of presentations/ workshops may need to be customized to meet the needs of each review group.

The recommended option in the Phase 1 99% Report may be a combination of features from the three (3) options.

Presentations are to contain, but are not to be limited to the following information:

1. Construction schedule and implementation plan;
2. Construction cost;
3. Functional, operational and security requirements;
4. Impact on future building use and operations;
5. Impact on site operations;
6. Impact and benefits on the environment and overall sustainability objectives of the Project; and
7. Impact on heritage values and heritage character-defining elements;
8. Master Plan updates.

Reports must consolidate all the information gathered to illustrate an integrated analysis of the design options. They must be concise, coordinated and must integrate and consolidate information from the Consultant Team, with detailed information attached in appendices. Include as a minimum:

1. Executive summary outlining all recommendations;
2. Glossary of terms;
3. Summary of information gathered and documentation reviewed, with an annotated bibliography;
4. Regulatory Analysis and Recommendations;
5. Exploratory work and investigations;
6. Functional Program update and summary;
7. Design Options, including the preferred design option for the ;
8. Site;
9. Architectural;
10. Heritage Analysis, Plan and Database;
11. Abatement and Demolition;
12. Sustainable Design;
13. Structural/Seismic;
14. Mechanical, including BAS and geoexchange
15. Civil/Municipal;
16. Fire Protection;
17. Electrical;
18. Commissioning and design intent brief;
19. Building Components and Connectivity;
20. Budget and Schedule;
21. Cost, time and risk analysis that considers the input of the Stakeholders;
22. Updated Design Management Plan; and

23. Updated Model for the building and site.

3.3.2 Response to Schematic Design Report

The Consultant must:

1. Review and analyse all the comments provided by the DR;
2. Prepare and submit a written response within 20 working days to all the submission comments;
3. Integrate comments into the subsequent submissions as directed by the DR;
4. Depending on the completeness of the submissions, the DR may provide written instructions to the Consultant to proceed to the next Stage while they respond to comments received.

RS 4 DESIGN DEVELOPMENT

4. Design Development (DD)

4.1 Intent

DD will occur in two phases:

- Phase 1 – Base Building
- Phase 2 – Office Fit-Up

Obtain written authorization from the DR before proceeding with DD Phase 1 and Phase 2.

The intent of DD is to further refine and develop the Preferred SD option, which may be a combination of elements from each SD option, as well as establishing baseline cost estimate for the Project. The Consultant must address and resolve all design conflicts and anomalies and ensure full coordination and optimal design iteration and work flow of the Consultant Team.

DD includes drawings and other documents that describe the scope (including the full resolution of all major components), quality and cost of the project in sufficient detail to facilitate high quality Class 'B' (substantive) cost estimates, design approvals, confirmation of code compliance, detailed planning of construction and project approval. Developed designs are to be computer drawn.

The Consultant must ensure design interferences within the Model are identified and resolved weekly. Revise and optimize the individual work flow of each Consultant Team member to meet schedule requirements.

4.2 Design Services

4.2.1 Review of Existing Documentation and Site Conditions

Continued from the SD Phase, the Consultant must continually inform themselves of changes to the building condition during the Project. The ongoing requirement is to:

1. Review all reports to understand any changes in the general condition of the building;
2. Conduct site reconnaissance, inspections, surveys, measurements, studies, evaluations as required; and
3. Interview operational personnel and Users to confirm any changes in requirements.

4.2.2 Regulatory Analysis

The Consultant must, in collaboration with Consultant Team, to refine the:

1. Site and Building code analysis and requirements;
2. Fire and life safety strategy; and
3. Standards analysis.

Continue discussions, reviews and integrate commentary from AHJ's.

4.2.3 Exploratory Work and Investigations Finalization

The Consultant must continue exploratory work and investigations as outlined in the program developed in the Pre-Design Phase to:

1. Finalize its exploratory work and investigations to advance the design;
2. Compile, analyze and submit results of each investigation into a comprehensive summary report as defined in the Pre-Design Phase; and
3. Update the Model with as-found data (wall/floor assemblies and elevations, windows and door opening sizes, etc.).

4.2.4 Functional Program Update

The Consultant must advance the Functional Program in coordination with Project Team.

1. Identify proposed changes to the approved functional program:
 1. Advise the DR of all proposed changes;
 2. Inform the DR of potential opportunities or risks related to the proposed change;
 3. Obtain the approval of the DR before incorporating any proposed change; and
 4. Update and track functional program changes within individual data sheets, with a summary of changes;
2. Refine in detail and incorporate into the Model programmatic layouts, including:
 1. Detail listing and numbering strategy for all rooms;
 2. Update spatial relationship diagrams;
 3. Update area calculations and analysis; and
 4. Update functional program data sheets as required.

4.2.5 Site Design

4.2.5.1 Landscape Architecture

The Consultant must refine the landscape design approach approved at SD, incorporating new information into the Model and narrative descriptions including all work proposed including, but not limited to:

1. Planting Drawings and listings;
2. Tree/landscape protection and monitoring requirements;
3. Detailed requirements and dimensioning for all landscape features and infrastructure, including, signage and way finding, exterior lighting, security elements, street furniture, site amenities, vegetation, grading, cut and fill, soil and soil structure, drainage, storm water and irrigation;
4. Heritage conservation details, methodologies and mitigation measures, cross reference with heritage conservation plan;
5. Temporary construction requirements;
6. Details of the inter-relationships between the landscape and the buildings and built infrastructure and materials;

7. Details of proposed new furniture design and materials;
8. Signage indicating way finding strategy including regulatory, directional, information signs;
9. Circulation and accessibility for including pedestrians;
10. Circulation for vehicles, bicycles and pedestrians, include parking areas, delivery and loading areas, gathering places, decision points, events staging areas etc.;
11. Detailed site security, including guardhouse, perimeter bollards systems, surveillance cameras and sightlines, security lighting, on-site patrolling, security buffer zones,;
12. Visual impact and visual corridors assessment, including views within the Project boundaries and views to other buildings and the downtown core;
13. Sustainability strategies; and
14. Customized Model renderings and sample boards to support approval processes.

4.2.5.2 Architectural and Site Lighting

The Consultant must advance the approved architectural lighting option for the Project in coordination with Consultant Team, stakeholders and AHJ's. Incorporate new information into the Model including:

1. Detailed graphic and narrative description including, but not limited to:
 1. All works proposed including heritage impact of new interventions;
 2. Colour-coded lighting Drawings indicating programmatic requirements and proposed materials;
 3. Site Drawings, sections and elevations and explanatory sketches;
 4. Integration of security lighting, security features (surveillance cameras, bollards, lockable pull-boxes, etc.), landscape furniture, and vegetation;
 5. Description of electrical load and distribution requirements; construction and heritage conservation methodologies and mitigation measures, cross reference with heritage conservation plan;
 6. Description of the inter-relationships between the landscape and the building s and built infrastructure and materials;
 7. Individual building and whole system control sequencing, (public, ceremonial and event requirements) and building system support for control room(s);
 8. Identification of conflicts and discrepancies;
 9. Proposed design for existing and new site lighting; and
 10. Prepare comprehensive Model renderings;
2. Prepare Material samples;
3. Summarize and explain key factors that drive Project cost, schedule, risk and procurement;
4. Prepare detailed and rendered views of each building façade; and
5. Incorporate sustainability design requirements.

4.2.6 Architectural Design

4.2.6.1 General

The Consultant must coordinate the Consultant Team's advancement of the approved SD ensuring the functional program and Project objective requirements are met. Incorporate new information into the Model including:

1. Detailed and coordinated design narratives from all members of the Consultant Team;
2. Floor Drawings for each floor, including mezzanines, indicating all required accommodation, circulation, stairs, elevators, ancillary spaces, service areas. building grid lines and key dimensions must be indicated;
3. Reflected ceiling Drawings for all floors;
4. Detailed elevations of all exterior facades indicating all doors and windows. Indicate finished and structural floor and ceiling heights and any concealed spaces;
5. Cross sections indicating floor levels, room heights, corridor elevations, interior elevations of significant spaces including the Court Rooms, public and ceremonial spaces, meeting rooms and other spaces;
6. Detailed wall sections and special design features with sufficient illustration and explanation including physical, acoustic and physical security features to permit design approval;
7. Detailed services locations and layouts including elevators, plumbing, HVAC, fire protection, electrical, telecommunications, security, building automation;
8. Architectural features, including materials, millwork, finishing details and samples sufficient to permit choice of materials and finishes;
9. Drawings, elevations, sections, typical details for built in furniture and case goods, all schedules (room, door, window etc.);
10. Lighting design for interior;
11. Sample boards for all finish materials including, but not limited to wall and carpet colour options; and
12. Comprehensive interior and exterior renderings using the Model (minimum of four (4) different spaces).

4.2.6.2 Building Envelope

The Consultant must advance the building envelope design in coordination with Consultant Team, stakeholders and AHJ's. Options to be provided for glazed curtain walls, windows/spandrels, masonry spandrel panels, and stone wing ends. Building envelope requirements to focus on the various components of this building and not only masonry. Incorporate new information into the Model including:

1. Detailed building envelope design with elevations, sections and details of all building envelope components, including masonry walls, roofing, windows, doors, stonework, damp proofing, waterproofing, flashing, building insulation, caulking and sealants, finishes, and showing existing and new structural members;

2. Substructure Drawings, including foundations and basement, below grade work;
3. Structural conservation engineering; (e.g. masonry, mortar, gables, chimney, roof);
4. Detailed structural stabilization requirements;
5. A repair material selection and description of methodology for all envelope treatments. Cross reference with heritage conservation plan;
6. Special construction, dismantling and demolition, including heritage structures; and hazardous materials abatement;
7. Indicate the limits of and requirements for temporary support, scaffolding, and permanent reattachments;
8. Indicate envelope and material stabilization, masonry cleaning and water management requirements;
9. Refinement of the compatibility analysis for the various types of envelope components including replacement, estimated quantities of replacement, procurement strategy and terms of reference for procurement. Advance this element if procurement lead time warrants early purchase;
10. Final terms of reference for envelope quality control testing; and
11. Updated unit rate tables for all elements of the envelope rehabilitation, mapping the unit rates to the building facade, indicating the measured/anticipated quantities.

4.2.6.3 Accessibility

The Consultant must provide:

1. A refined accessibility site and building strategy;
2. A detailed accessibility for all persons drawing;
3. Continue discussions, reviews and integrate commentary from AHJ's.

4.2.6.4 Acoustics

The Consultant must

1. Prepare an acoustical design that includes wall, floor and ceiling sections and details for all spaces requiring acoustic security. Include required acoustical ratings for doors, transfer ducts, conduits and other assemblies;
2. Complete required investigations to finalize the approved design approach;
3. Incorporate lessons learned from mock-ups into the acoustic design. Ensure comprehensive acoustic design requirements reflect the approved functional program. Provide the requirements to all disciplines;
4. Finalize acoustic testing and inspection requirements for all disciplines;
5. Validate all disciplines, understand the acoustic requirements as they apply to them;
6. Assess potential constructability impacts. Identify construction inspection and performance testing processes and their frequencies, along with final testing. and
7. Validate the design of all disciplines incorporate the acoustic requirements into their designs and into the Model prior to the 99% DD submission

4.2.7 Heritage Conservation Plan

The Consultant must refine and coordinate all aspects of the heritage conservation plan with the Consultant Team, DR, stakeholders and AHJ's for each conservation discipline and for each conservation treatment to the point where a performance specification per discipline/treatment can be prepared.

Update the Heritage Materials Database and incorporate into the heritage conservation plan, and Model.

4.2.8 Abatement and Demolition Design

The Consultant must specify the scope and implementation options related to hazardous materials abatement for the design. Provide details on special construction and demolition including hazardous materials abatement.

4.2.9 Sustainable Design

The Consultant must update and further develop the Sustainable Design Strategy Report, including:

1. Develop, refine and confirm sustainable design solutions for optimal performance of preferred design option (or hybrid thereof) (including revised performance rating scorecard with expected level to be achieved, indicating where/what supporting documentation/reference can be found, and which measures will or will not be met). Update budgets, and identify any outstanding design issues impacting the sustainable performance targets that require immediate follow-up, describing any risks/changes/issues to mitigate prior to tender;
2. Include energy model (and budgets across all disciplines) of the preferred design option, including details on energy loads, estimated annual energy performance cost and GHG emissions as predicted by using current energy cost for Ottawa;
3. Update LCC and LCA of the preferred design option, including details on embodied energy, carbon, and impacts on other environmental metric – considering whole building footprint;
4. Submit waste audit and waste reduction work plan as required and in consultation with the Environmental Consultant; and
5. Narrative must confirm process and evaluation that resulted in preferred SD option (or hybrid thereof) and how it meets/aligns with the Project sustainability objectives, and performance targets.
6. Incorporate the requirements as set out in the Evaluation of Environmental Effects (EEE) letter or report produced by PWGSC (as needed).

4.2.10 Structural Design

The Consultant must complete the analysis and design of the selected seismic upgrade approach and all structural interventions, as well as any final investigations in coordination with the DR and Consultant Team. The Consultant must:

1. For the approved design option incorporate new information to complete the structural design into the Model:
 1. Design for all structural deficiencies and issues that must be addressed prior to and during construction;
 2. Provide detail Drawings, sections, elevations, and connection or other details for modifications to existing and new systems and materials, components, cladding and load-bearing details, blast and ballistic requirements, fireproofing methods and any significant or unusual details or components and operational functional components;
 3. Design structural system to support all new mechanical, electrical functional program and technical requirements and BCC loads;
 4. Coordinate the design for all architectural and engineering components and systems below grade, in floors, walls and ceilings and their relationships with the building structure. Identify and resolve all clashes/interferences in the Model;
 5. Confirm that target reliability level for seismic upgrade to current version of NBCC and PWGSC Seismic Standard is met;
 6. Identify and model elements that may be vulnerable to vibrations, including temporary stabilization, strengthening or dismantling prior to construction. Include loading, bracing, and support requirements for scaffolding as it relates to the structure and building envelope;
 7. Develop construction details necessary for the implementation of the structural work, including the sequencing of temporary bracing, shoring or stabilization;
 8. Include the inter-relationships between the structural systems, building envelope and architectural finishes;
 9. Identify proposed changes or modifications to the Model and analysis, including identifying the reason for the changes and impact;
 10. Develop approaches for the use of mock-ups, testing and investigations to validate the feasibility, constructability and effectiveness of the proposed work. Review with the and obtain approval from the DR;
 11. Update the exploratory work and investigation plan to validate existing conditions and further the design; and
 12. Include all dead and live loads, seismic loads, blast and ballistic loads and any atypical loads and all detailed calculations.

4.2.11 Geotechnical

The Consultant must review all documentation and identify to PWGSC any missing geotechnical information required to evaluate the approved design that has been developed.

Incorporate new information into the design and refine the Model.

Incorporate the following into the developed design:

1. Excavation method and support including detailed design such as rock anchor spacing, shotcrete, etc.;

2. Excavation support including proposed alternatives;
3. Subsurface conditions;
4. Protection of existing buildings including design details;
5. Underpinning and support including detailed design information;
6. Dewatering design and mitigation;
7. Foundation system design details;
8. Identify existing services/structures that may interfere with proposed works;
9. Identify mitigation measures required to deal with special issues;
10. Review of the design disciplines that include geotechnical components;
11. Final vibration monitoring plan coordinated with structural and heritage monitoring;
12. Geotechnical instrumentation monitoring coordinated with structural and heritage element monitoring;
13. Construction monitoring plan;
14. Backfill requirements;
15. Waterproofing design; and
16. Pre-construction survey.

4.2.12 Mechanical Design

The Consultant must complete the design of the approved SD option in coordination with the Consultant Team. Detail and incorporate into the Model:

1. Service entrances for heating, chilled water, domestic water, sanitary and storm drainage, and connections to utility services including all invert elevations;
2. Geothermal heating system wells and connections with building heating system;
3. Sizing and materials of ventilation, cooling and heating systems with locations and layouts of all major equipment and showing all security systems protection of fresh air intakes, blast relief/ dampers systems;
4. Primary and secondary and sub-metering requirements and locations;
5. Plumbing and piping systems showing routing and sizing of lines and location of pumps and other equipment;
6. Acoustic control measures for the mechanical design;
7. Update energy consumption per system and the overall consumption by utility; and
8. Include equipment list of all equipment with equipment number and location.

Finalize the design concept of the heating systems in compliance with the ESAP Requirements for Building Heating and Cooling Systems Connected to the PWGSC District Energy Systems in the NCR.. Provide calculations to support selected temperatures and equipment types.

Coordinate evaluation with architectural discipline in order to evaluate the improvements in envelope (windows, wall insulation, air tightness) heat transfer that are necessary to achieve the design guideline of the low temperature heating water system.

The Consultant must describe in detail:

1. The proposed mechanical systems and components including any ancillary devices needed to support emergency power systems; and
2. The building systems control architecture including the proposed EMCS network architecture, mechanical control schematics and the sequence of operation for each building system. Include the interconnection and alternation requires for all connected buildings.

4.2.13 Civil/Municipal Design

The Consultant must advance the design and incorporate new information into the Model including:

1. Site services and building service connections with references to building outlines, site access roads and sidewalks and including existing and proposed grades and existing and proposed drainage;
2. All manholes with invert elevations, valves, hydrant locations, tunnels, duct banks, proposed pipe sizes and slopes and pipe invert elevations at the building foundations;
3. All pipe capacities and estimated storm and sanitary flows. Where the proposed system connects to existing sewers describe the impact of the connection on the existing system understanding the intent is to address storm water on site; Create a summary sheet; and
4. All trench, duct bank and tunnel details including profiles and elevations of below grade services.

4.2.14 Fire Protection Design

Detail and incorporate into the Model:

1. Floor Drawings for new fire alarm system to show end of line device location;
2. Table of every piece of fire alarm equipment to be identified;
3. Single line diagrams with main equipment and approximate amount of end of line devices;
4. Decommissioning floor drawing with existing fire alarm system devices and piping to be removed.

4.2.15 Electrical Design

The Consultant must complete the design of the approved SD option in coordination with the Consultant Team. Provide a short narrative description of all systems and major components. Detail and incorporate into the Model:

1. Normal, Emergency and UPS Electrical Distribution:
 1. The chosen electrical option;
 2. Theoretical load calculations for normal, emergency and UPS power requirements. Refine load tables for every piece of equipment and divide in their particular load management priority;

3. Electrical equipment sizing;
4. Distribution Single Line Diagram with nomenclature, capacities;
5. Distribution floors Drawings with identified equipment location;
6. Emergency power load management system sequence of operation;
7. Floor Drawings of every floor with tables associated to each room indicating every type of power;
8. Decommissioning floor Drawings to include location of major equipment to be demolished and or maintained with associated demolition phase; and
9. Primary metering and sub-metering. Indicate the short circuit information at point of entry; Indicate metering locations;
2. Lighting and Lighting Controls:
 1. Floor Drawings with layout of existing lighting to maintain and new additional lighting;
 2. Lighting schedule for new lighting fixtures;
 3. Lighting control layout and control logic, associated light fixture zones;
 4. Specific rooms which will contain specific lighting control systems, including architectural lighting systems;
 5. Decommissioning floor Drawings with lighting to be removed and re-instated, if required;
 6. Provide Drawings and details for site and building lighting include proposed typical fixtures; and
 7. Updated table of lighting fixtures which are to be removed, maintained due to heritage value must be identified. Include strategy for refurbishment. Confirm scope for heritage lighting and fixture refit;
3. Public Address System:
 1. Floor Drawing to indicate locations of main equipment and end of line devices;
 2. Single line diagram with main equipment; and
 3. Review and design (if required) of a white noise generation system;
4. Lightning Protection System:
 1. Roof Drawing with device location;
 2. Single Line Diagram of new system with main equipment and interconnection of buildings; and
 3. Decommissioning implementation strategy;
5. Confirm expansion capacity of the proposed systems and components;
6. Update a complete energy analysis for the proposed options;
7. Confirm spare capacity provided; and
8. Define and Model all decommissioning and temporary utilities during construction.

4.2.16 Commissioning Plan

The Consultant must coordinate the input of all disciplines and:

1. Prepare preliminary commissioning and training plans, the PWGSC Commissioning Manager for all building systems and integrated systems, comprehensive construction monitoring (geotechnical, envelope and structural, base isolation components as applicable, temperature, humidity, air quality, heritage elements, etc.), and full load dynamic testing of all building systems. Include in the training plan:
 1. Operator skills training requirements and prerequisites;
 2. Schedule for all training that includes at least two (2) separate follow-up training sessions per type of training; and
 3. Schedules that limit training sessions to a maximum of three (3) hours per day. Stagger the training so that personnel can attend without major disruption to ongoing operations;
2. Updated design intent brief for every building system;
3. Compile information in support of the heritage conservation long-term maintenance plan. The documentation will support the effective care of Heritage Assets by class or type, as well as new materials integrated into the Project. This will be compiled for the approval of the DR, in collaboration with the Consultant Team and FHBRO. Within the Heritage Assets database, document all proposed maintenance requirements per asset including:
 1. Ongoing routine or periodic maintenance procedures;
 2. Cleaning or maintenance materials used or to be employed in the future;
 3. Frequency and scope of recommended inspections or surveys; and
 4. Required skills/qualifications of personnel to undertake maintenance;
4. Forecast or discretionary maintenance tasks.

4.2.17 Building Components and Connectivity (BCC) Design

4.2.17.1 BCC Components

The Consultant must incorporate into the Model all BCC Components. Indicate multiple furniture layouts, location Drawings and specifications, finishes and colours; and the location and identification of all equipment. Drawings and specifications for BCC Components are to include BCC Component storage and circulation routes.

Prepare Component Drawings and Component information that includes but is not limited to:

1. Layout of all custom-made furniture and furnishings, case goods, workstations, work settings, support and special purpose spaces;
2. Location and identification of all equipment;
3. All window treatments;
4. Based on the colour scheme approved at SD prepare and submit a final finishes presentation board(s) for all furniture requirements;
5. Review and confirm all Component counts, fittings and all accessories;
6. Provide a report with narrative and graphic representation of all furniture finishes, including samples and specifications for all furniture, fittings, window coverings and accessories requirements;

7. Coordinate Component Drawings based on final equipment and furniture layout Drawings with architectural, mechanical and electrical disciplines and Security Design and IT Engineering Consultants;
8. Mechanical and electrical space and location requirements on the final equipment and furniture Drawings and ensure the mechanical and electrical Drawings accurately reflect the furniture and equipment layout including:
 1. Final Lighting layout;
 2. Final location of light switches;
 3. Final location of HVAC controls;
 4. BCC Connectivity devices;
 5. Plumbing location and space requirements; and
 6. Additional cooling and exhaust location requirements;
9. Coordinate with electrical and BCC Connectivity designs;
10. Confirm all electrical, telephone, data and video layouts;
11. Provide elevations of all areas to reflect locations of electrical end devices including plugs, controls, switches based on final equipment and furniture layout Drawings;
12. Update the BCL and the BGC; and
13. Prepare move plans for existing Components, heritage furniture and art and artefacts.

4.2.17.2 BCC Connectivity / Security

The Consultant must incorporate into the Model all BCC Connectivity and security requirements.

The Consultant must

1. Provide detailed integration and full coordination of the IT Engineering consultants BCC Connectivity components and equipment, including security features with built in furniture;
2. Ensure complete coordination of furniture layout and BCC Connectivity designs;
3. Coordinate and Model BCC Connectivity (IT/MM/EISS) components and equipment.
4. Update and integrate the IT Engineering consultant's requirements for and design of all IT, MM and enterprise integrated security services (IT/MM/EISS). Model and fully integrate IT/MM/EISS requirements for the Project;
5. Provide a narrative on the integration of IT/MM/EISS; and
6. Prepare move plans for existing multimedia equipment.

4.2.18 Budget and Schedule

1. Prepare Class B cost estimate and confirm budget;
2. Provide updated schedule and confirm timing of deliverables.

4.3 Deliverables

4.3.1 Design Development Report

The Consultant is to provide DD Report submissions: the Phase 1 DD Report for the base building design, followed by the updated and completed DD report for both phases (including Phase 2 Office Fit-Up). The Consultant must:

1. Coordinate all services of the Consultant Team;
2. Integrate all ongoing Pre-Design and SD investigation work submitted; and
3. Prepare all required documents and deliver the presentations to the FHBRO, NCC, and AHJ's, integrate their recommendations and obtain their support and approval.

Consultant is to provide integrated and coordinated draft reports at 50% completion, at 90% completion and at 100% completion. Each submission will be reviewed by the Project Management Team and the Users. PWGSC will compile the reviewer's comments and the Consultant will respond to each of the compiled comments prior to proceeding to the next submission. The Consultant will revise each submission based on the compiled review comments and submit a 100% submission for acceptance.

The DD report will update the SD report and consolidate the scope and activities described above. The report must be concise and it must integrate and consolidate reports from the Consultant's sub-consultants and specialists with detailed information attached in appendices. The final DD report will be used as a control document to monitor the progress of the Project. The DD report will contain integrated and viable DD that:

1. Comply with the requirements of the functional program, all applicable plans, policies, practices, standards and guidelines and that is consistent with the accepted SD including accepted options;
2. Include Modelling that illustrates the functional and building systems relationships of the Project and its scale and character;
3. Present Model renderings and narrative options to resolve conflicts, anomalies and other issues and present the advantages and disadvantages of each option; and
4. Consolidate the DD proposals, findings, analysis and recommendations.

The Consultant must ensure that DD reports communicate the entirety of the proposed design, referencing all disciplines and indicating the relevant components and systems required to a level of detail to make decisions regarding the design and for the confirmation of the high quality substantive Class B Cost Estimate of the work proposed. The body of each DD report is to include as a minimum:

1. Executive summary with précis of the report and outlining all recommendations;
2. Glossary of terms;
3. Summary of information gathered and documentation reviewed, with and annotated bibliography;
4. Regulatory Requirements;
5. Exploratory work and investigations;

6. Functional Program update;
7. Site Analysis Design;
8. Architectural Design;
9. Heritage Conservation Plan;
10. Abatement and Demolition Design;
11. Sustainable Design;
12. Structural/seismic Design;
13. Mechanical Design (including ECMS and geoeexchange);
14. Geothermal Design
15. Civil/municipal Design;
16. Fire Protection Design;
17. Electrical Design;
18. Commissioning Plan;
19. Building Components and Connectivity (BCC);
20. Cost, time and risk analysis;
21. Updated Design Management Plan; and
22. Updated Model

4.3.2 Response to Design Development

The Consultant must:

1. Review and analyse all the comments provided by the Project Team;
2. Prepare and submit a written response within 20 working days to all the submission comments; and
3. Integrate comments into the subsequent submissions as directed by the DR;
4. Depending on the completeness of the submissions, the DR may provide written authority to proceed with the next stage while Consultant addresses the comments received.

RS 5 CONSTRUCTION DOCUMENTATION

5. Construction Documents

5.1 Intent

The consultant must obtain written authorization from the DR before proceeding with the Construction Documents stage.

The objective of the Construction Document stage is to translate the design development documents into construction drawings and specifications to guide and direct the contractor and sub-contractors in carrying out their work on the project.

Drawings are a means of communicating information in a two-dimensional format using lines, graphic symbols, and text. Drawings describe the relationships between building components and the following characteristics:

- location of the component;
- name or identification;
- size and dimension;
- shape and form;
- details or diagrams of connections for the building assembly.

Specifications are precise descriptions of products, materials, standards, equipment, services, construction systems, construction methods and processes, and workmanship. The specifications also describe physical and environmental conditions to be created and maintained in the work area, on site, in adjacent areas, or off site. In addition, the document sets out procedures for contract administration required to control and monitor the quality of the work and reporting of progress.

- 66% complete indicates substantial technical development of the project - well advanced architectural and engineering plans, details, schedules, and specifications. Possible submission to local authorities for pre-permit review.
- 99% complete is the submission of complete construction documents ready for tender call and submission to local authorities for permit purposes.
- 100% complete final submission incorporates all revisions required in the 99% version and is intended to provide PWGSC with complete construction documents for tender call. Drawings and specifications are complementary and are meant to be read together to fully describe the project.

The Consultant is to prepare Model, depicting in detail, the coordinated and interference free relationships between building elements and their location, name or identity, dimensions, shape and form and the details required to execute and achieve the intended results. Ensure design interferences within the Model are identified and resolved weekly. Revise and optimize the individual work flow of each Consultant Team member to meet schedule requirements and shorten durations.

Construction documents, including Drawings and specifications, must be prepared in accordance with "Doing Business with PWGSC". The construction documents must describe the products, materials, standards, equipment, services, construction systems, methods and processes and level of workmanship required. Specifications also describe the physical and environmental conditions to be created and maintained in work areas, on-site, in adjacent work areas or off-site. Specifications also indicate the procedures for contract administration to control and monitor the quality of the work, performance verification requirements, and the reporting of work progress.

5.2 Design Services

5.2.1 General

The Consultant must provide fully coordinated construction documents and:

1. Participate in the required meetings and workshops, record and distribute minutes;
2. Coordinate and integrate all the submissions from the Consultant Team;
3. Define commissioning procedures, construction monitoring requirements, performance expectations, Consultant led and Contractor led training sessions, requirements for operating and technical maintenance manuals, post-construction monitoring, and record Drawings/Model;
4. Submit construction documents, conduct design charrettes and respond to PWGSC comments;
5. Coordinate and integrate all construction documents submission review comments;
6. Confirm the format of the Model, Drawings and specification and comply with the stipulated requirements for the Project;

5.2.2 Construction Documents Content

The Consultant must use the Model graphical information to generate discipline specific Drawings complete with elevations, sections, details and schedules. Create Project-specific specifications and construction documents. The construction documents can be generally categorized to include:

5.2.2.1 Regulatory

1. Final building code data summary;
2. Final fire separations, life safety, accessibility, smoke control Drawings, specifications and exemptions; and
3. AHJ's review reports, recommendations and approvals.

5.2.2.2 Program Design

1. Programmatic accommodation, including horizontal and vertical zoning diagrams;
2. Spatial relationship diagrams; and
3. Area calculations and analysis.

5.2.2.3 Site Design and Site Drawings

1. Site Drawings including property line with dimensions, benchmarks, existing structures, new structures, site improvements, fencing, roads, streets, drainage, right of ways;
2. Municipal infrastructure, subsurface and above grade services. Describe capacities and limitations and potential opportunities and benefits. Include building and flow-through services;
3. Underground utilities;
4. Historical site features;

5. Environmental features including sustainable design strategies;
6. Existing conditions site Drawings;
7. Removals Drawings;
8. Landscape Drawings;
9. Layout Drawings complete with all relevant dimensions;
10. Grading and drainage Drawings – existing and proposed;
11. Signage Drawings;
12. Irrigation Drawings;
13. Planting Drawings;
14. Bio-swale and storm water retention areas plan;
15. Cross sections, elevations, sections, schedules, details of critical areas for all of the above Drawings, fully dimensioned and complete with a north arrow and legend; and
16. Details must show type of material, size, colour, layout pattern (if applicable) with unit numbered for heritage or envelope elements building reconstructed, site furniture, railings, tactile markers for accessibility, security bollards and other related security elements on the site.

5.2.2.4 Architecture and Engineering

1. Floor Drawings including walls, floor elevations and grade elevations at building line, construction to remain, references to other details and elevations, room names (subject to security requirements), room numbers, door swings and numbers, window numbers, floor materials, plumbing fixtures, built-in fixtures, stairs, special equipment, vertical transportation, legend as required, and dimensions;
2. Roof Drawings including roof outline, overall dimensions, setbacks, slopes, drainage, reference to other Drawings and details, roof materials, penetrations and roof mounted equipment;
3. Reflected ceiling Drawings including partitions extending to and through the ceiling, ceiling material and grid lines, ceiling heights, location of all lights including exit lights, diffusers, access panels, speakers, sprinklers, all other equipment and ceiling penetrations, and expansion joints;
4. Exterior elevations including structural grid centre lines, vertical dimensions, floor-to-floor heights, opening heights, references to other Drawings and details, floor lines, elevations of major elements, grade lines, foundation lines, materials, windows, doors and all other openings, symbols for window/door schedule, gutters, and signs;
5. Building sections including dimensions to grid centre lines, face of wall dimensions to other components, vertical dimensions from foundations to parapet relating all elements to top of structural members, materials, all connection methods, mechanical and electrical elements shown schematically, roof construction, floor construction, and foundation construction;

5. Interior elevations including vertical dimensions to critical elements, reference to other Drawings and details, openings in walls, wall finishes, built-in fixtures, location of switches, and all wall mounted equipment;
6. Schedules including room schedule, door schedule, window schedule, hardware schedule and schedules for all architectural work, louvers and equipment;
7. Structural Drawings including footing and foundation Drawings, rebar layout, framing Drawings, structural sections, details, seismic/blasting reinforcing schedules and connection details, all temporary structural bracing/shoring requirements complete with timing and sequencing of bracing/shoring and all loads;
8. Mechanical Drawings including plumbing, HVAC and Fire Protection Drawings, including riser diagrams of all mechanical systems, equipment/systems section details, location of equipment, layout of ductwork, pipes fixtures and all other components, plumbing isometrics, fire protection components, floor plan layouts and details, mechanical rooms layouts, details all connections and support, and equipment schedules; specifications for all mechanical equipment
9. Geothermal drawings fully describing all wells required as well as connections with mechanical systems and services
10. Electrical Drawings including power, lighting, telecommunications Drawings, IT, MM, signal and integrated security systems, one-line diagrams, transformer, equipment and fixture schedules, building automation, pathways and service infrastructure, layout and details for all electrical and telecommunications rooms;
11. Energy monitoring control system (EMCS) network architecture, control schematics, sequence of operation including where applicable seasonal switchover, alarm thresholds, digital data control (DDC) input and output point schedules for each mechanical and electrical system;
12. Acoustic construction requirements (Drawings, sections, details, construction specifications) and performance verification requirements;
13. Construction documents for all exploratory openings and mock ups;
14. Updated energy model including building load calculations, energy consumption per system and totalized for each utility for 66% and 99% submissions ensuring the analysis is reflective of the mechanical and electrical sequences of operation per system;
15. Provide with the 99% submission all calculations for structural, civil, mechanical, electrical, acoustical, building science design and equipment selection. The calculations will be indexed and provided in a format suitable to the DR. Confirm the format;
16. Review and approve materials and construction processes specifications to meet sustainable development objectives and commissioning requirements;
17. Temporary maintenance requirements for building components and systems during construction and for 12 months after Substantial Performance of the work. Include requirement for service call-back with stipulated response times;

18. Construction and post construction building component and system monitoring systems including all details and specifications;
19. Provide updates to design intent brief;
20. Include commissioning plan, performance verification procedures for components, systems and integrated systems within each specification subsection. Include expected testing results and maintenance management information for each piece of base building equipment and each system, and for integrated systems. Include seasonal commissioning testing, adjusting and reporting requirements;
21. Establish timing and requirements for two separate integrated systems (life safety compliance) tests, prior to Substantial Performance and again prior Final Completion;
22. Identify and include all tests to be conducted at manufacturer's plants, on-site during construction, installation, commissioning on-site and during the operation phase;
23. Include complete infra-red scan of entire electrical system under full load (occupied) conditions;
24. Develop training requirements for operations and maintenance personnel;
25. Building Health Monitoring Plan:
 1. After monitoring Plan approval, prepare appropriate contracting documentation (terms of reference, scopes of work, drawings and/or specifications for purchase or tendering to contractors) necessary to complete the monitoring system installation, operation and maintenance work as per Deliverables:
 - Contracting documents to clearly define the scope of work and include details and information to complete the installation, operation and maintenance of monitoring systems; and
 - Conservation specialists to be part of the team to plan, define and complete site work to install, operate and maintain equipment when heritage assets are adjacent to or impacted by the work;
 2. Submit contract documents for review and approval by the DR prior to initiation of the installation, operation and maintaining work;
26. Selective demolition including removal of redundant mechanical, electrical, and fire protection systems, heritage components, hazardous materials abatement; and
27. Update and optimize sustainable design opportunities and strategies including LCA with final changes/modifications from DD.

5.2.2.5 Building Envelope Design

In collaboration with the relevant disciplines prepare fully integrated complete discipline specific Drawings, sections, elevations, details, schedules, and specifications including design narratives, decision logs, calculations, etc.

Sections/Drawings including:

1. Substructure Drawings, including basement and below grade work;
2. Interiors, including interior construction, protection;
3. Services, including, fire protection, electrical and mechanical, building automation, hygrothermal or other envelope monitoring during construction and post-construction (coordinate with structural, heritage and other disciplines);
4. Building envelope Drawings and sections including exterior wall assemblies, glazing, window systems, doors, roof anchors, and stonework, damp proofing, waterproofing, flashing, building insulation, caulking and sealants, finishes etc., and showing existing and new structural members;
5. Structural conservation engineering;
6. Performance specification for scaffolding and enclosure system, and temporary support requirements;
7. Detailed Drawings and directions for masonry repair: including, replacement, dismantling, rebuilding, grouting;
8. Detail directions for stone cleaning: including the cleaning process and methodology, and acceptable level of patina requirements;
9. Architectural lighting Drawings with components, connection details, envelope penetration details and specifications cross-references as required to electrical Drawings;
10. Detailed Drawings and directions for exploratory openings and mock-ups;
11. Complete envelope screening and remedial repair six (6) months prior Substantial Performance;
12. Thermographic scan of the entire envelope in winter conditions during the warranty period after Substantial Performance of the work;
13. Detail directions on unit price, fixed price, work and measurements for payment;
14. Detail directions on any other Project specific conservation work deemed necessary;
15. Support data, studies, calculations;
16. Special construction and dismantling, including masonry and hazardous materials abatement;
17. Final specifications (including prequalification and sustainable procurement strategies);
18. Written reports for updated design narrative and calculations; and
19. Include copies of all investigation reports and tests.

5.2.2.6 Conservation Performance Specifications

1. Create and finalize detailed performance specifications per material, application and condition. Integrate the information developed in support of a long-term conservation maintenance plan in preparing performance specifications. Include Observed existing conditions;

2. Detailed treatment and methodology requirements;
3. Mock-ups and pilot projects;
4. Sequencing of conservation phase and milestones. Consider the implementation of the overall construction;
5. Implementation and quality monitoring requirements;
6. All treatment and conservation documentation as entries within the Heritage Materials Database and
7. Heritage Materials Management Plan (HMMP) for all heritage elements to be relocated or removed.

The final decision on the scope and extend of conservation work rests with the DR.

5.2.2.7 Geotechnical

Incorporating information and analysis from the GSC, include:

1. Excavation method and support;
2. Underpinning and support including detailed design;
3. Protection of existing building;
4. Dewatering requirements;
5. Foundation system requirements;
6. Identify existing services/structures that may interfere with proposed works;
7. Identify mitigation measures required to deal with all technical issues;
8. Review of related Drawings by others that include geotechnical components; and
9. Subsurface conditions.

5.2.2.8 Sustainability Certification

Update the Sustainable Design Strategy Report and also confirm that the minimum sustainability performance targets are being met as follows:

1. Energy reduction of 52% compared to the NECB 2011;
2. Minimum GHG emissions reduction between 65% and 88% compared to 2005-2006 existing building baseline; and
3. Meet/certify to LEED Platinum or 5 Green Globes or equivalent industry recognized standard.
4. Pursue WELLv2 Core certification (Silver)

5.2.2.9 Building Components and Connectivity

5.2.2.9.1 BCC Components

BCC Components will be separate construction documents prepared by the Consultant. Prepare Building Component Drawings based on updated information in the Model and specification that include:

1. Final layout of all custom-made and commercially available building Components;
 1. Final location and identification of all furniture fixtures and equipment;
 2. Final window treatments cross-references as required to electrical Drawing;
2. Prepare and submit a final finishes presentation board(s) for all building Components;
3. Confirmation of all Component counts, fittings and all accessories;
4. Confirmation of all electrical, telephone, data and video layouts;
5. Coordinated Component Drawings based on final equipment and furniture layout Drawings, with architectural, mechanical and electrical disciplines and BCC Connectivity designs and Security Design;
6. Mechanical and electrical space and location requirements on the final equipment and furniture Drawings and ensure the mechanical and electrical Drawings accurately reflect the furniture and equipment layout including:
 1. Final lighting layout;
 2. Final location of light switches;
 3. Final location of HVAC controls;
 4. BCC Connectivity devices and wiring attachments;
 5. Plumbing location and space requirements; and
 6. Additional cooling and exhaust location requirements;
 7. Identification of the location and number of telephone, data and video outlets;
 8. Elevations of all special purposed areas to reflect locations of electrical end devices including plugs, controls, switches based on final equipment and furniture layout Drawings;
 9. Updated BCL and BGC listings that are completely integrated into the Model; and
 10. A report with narrative and graphic representation of all furniture finishes, including samples and specifications for all furniture, fittings, window coverings and accessories requirements.

5.2.2.10 Full Capital Replacement Plan

Prepare a Full Capital Replacement Plan for the Project.

5.2.2.11 Procurement and Installation of BCC Components

The Consultant must:

1. Minimize the number of required procurement groups and construction tender packages. Ensure construction tender packages are as approved by the DR, list sample components and equivalent mandatory technical criteria for evaluation. Group all Building Components in the BCC into procurement groups and construction tender packages of like items;

2. Produce Building Component lists for procurement purposes and advise the GC of Building Component procurement and installation requirements in the specifications. Include contract specific installation Drawings showing delivery site, path of travel, and final installation locations. Review and obtain approval of GC for delivery and installation Drawing. The procurement of the Building Components will require a significant quantity of individual construction tender packages;
3. Work closely with the GC to coordinate delivery and any staging required for Building Components; and
4. Review the procurement planning and schedule with the GC and DR. Adjust as required to meet construction operations' requirements.

5.3 Deliverables

The Consultant is to prepare and submit construction documents derived from Model information as described below:

1. Finalize and issue various terms of reference and specifications for field quality control testing to be done by and independent firms engaged by PWGSC or the GC. The Consultant is to review, comment and make recommendations regarding the independent firm's response(s) the terms of reference or proposed alternative solutions;
2. Prepare separate construction documents for full scale mock-ups to serve as a learning experience for the Consultant Team and construction trades for:
 1. Typical window and wall section in exterior wall, including window spandrel as well as penetration of power supply to exterior lighting;
 2. Architectural lighting connection to power supply, with penetration of the building envelope; and
 3. Specific elements of conservation work to be determined by the DR, in consultation with the Consultant.

The Consultant Team must apply the lessons learned from each mock-up and ensure construction documents reflect the lessons learned.

5.3.1 66% Complete Construction Documentation

The Consultant must provide the following:

1. An updated Model with the design coordinated and clash detection identified and resolved;
2. All Drawings and specifications included with preliminary performance requirements per specification sub-section;
3. Detailed door, window, hardware, colour and other schedules, including textures, sheens, colour chips and material samples;
4. Quantities of each type of heritage material replacement and confirmation of supplier compatibility and availability;
5. Detailed unit rate tables for materials;

6. Draft Division 01 specifications;
7. Detailed Drawings for all temporary protection, bracing, supports, etc., building component and systems monitoring, including installation sequencing and performance requirements, and required mock ups;
8. 66% design intent brief;
9. Full Capital Replacement Plan
10. Updated Class B Cost Estimate; and
11. Updated critical path and milestone schedules for design activities.

5.3.2 99% Complete Construction Documentation

The Consultant must ensure construction documents are fully coordinated. This includes:

1. An updated Model with the design coordinated and clash detection identified and resolved;
2. Extensively detailed Drawings and specifications included with detailed performance requirements per specification sub-section and commissioning equipment coding identified;
3. Final signed and sealed original Drawings and specifications included with final performance requirements per specification sub-section and final commissioning equipment coding identified;
4. Final door, window, hardware, colour and other schedules, including textures, sheens, colour chips and material samples;
5. Quantities of each type of heritage material replacement and confirmation of supplier compatibility and availability;
6. Final unit rate tables for materials;
7. Final Division 01 specifications;
8. Final Drawings and specifications for all temporary protection, bracing, supports, etc., building component and systems monitoring, including installation sequencing and performance requirements, and required mock ups;
9. 99% complete design intent brief, detailing each building system; and operational criteria, performance requirements;
10. Building code analysis sorted in the prescribed Ontario Association of Architects matrix and an equivalent matrix for the National Building Code. Where the OBC and the NBC differ, prepare a comparison table to highlight the differences; Finalize all code exemptions, including rationale, approval body, approved decisions;
11. Updated energy simulation estimated annual energy consumption for each utility as predicted;
12. Update sustainability documentation, including the Sustainable Design Strategy Report, to reflect changes which occur during construction, ensuring necessary waste management training session is delivered and waste diversion reporting is completed;

13. Provide data, studies, detailed calculations, etc. that are fully indexed for final review and records for all disciplines;
14. Class A Cost Estimate;
15. Updated critical path and milestone schedules for design activities;
16. Updated LCC and LCA for the base building, fit-up, and site;
17. Update and finalise Regulatory Analysis; and
18. Updated waste audit and waste reduction work plan for inclusion with aligned specifications.

5.3.3 100% Complete Construction Documentation

The 100% submission will be provided after the issuance of the last tender addendum.

RS 6 CONSTRUCTION TENDER

6. Tender Calls, Bid Evaluations & Contract Award

6.1 Tendering services

The Consultant's services include, but not limited to:

1. Preparation of pre-qualification requirements. Revise as required and submit to the DR for approval;
2. Attendance at the bidders' briefing meetings for pre-qualification construction;
3. Analyzing and responding to questions from municipal officials, or during the pre-qualification of suppliers or construction tender period. Provide the DR with responses within two (2) days of question, or as agreed by the DR;
4. Updating the Model and specifications based on bidder's questions. Provide the DR with addenda inclusive of all information required by bidders to fully interpret the tender documents. GC will issue all addenda to all bidders;
5. Maintaining a record of all inquiries directed to DR during the bidding period and submit the record to the DR at the close of bidding for audit's records;
6. Assisting in the evaluation of tenders by providing advice on the following:
 1. The completeness of the tender response in all respects;
 2. The technical/design aspects of the tenders;
 3. The effect and suitability of alternatives and qualifications that may have been included in the tender. Revise the Model as required to reflect any impact of accepted alternates or qualifications;
 4. The tenderer's ability to undertake the scope of work;
 5. The availability of adequate qualified labour, equipment and materials to do the work; and
 6. Participate in the bid variation analysis between bids and the latest Class 'A' Cost Estimate;
 7. Review the bidder's schedule;
7. Actively follow up with municipal officials, until permits are obtained. Provide a summary of follow-up meetings with municipal officials regarding the status of building permit application; and
8. Issuing a complete commissioning plan for construction documents.

6.2 Pre-Qualification and Tender Documents

The Consultant must prepare a tendering report for each tender and submit to the DR, to include, but not limited to:

1. A summary of the information required by the bidders to fully interpret the tender documents;
2. A summary of addenda issued based on questions arising out of the bidders briefing meetings and requests for clarification;

3. A summary of the cost with respect to the Class "A" estimate; and
4. A summary of the effect and suitability of alternatives and qualifications that may have been included in the tender.

6.3 Retender as required

The Consultant must:

1. As required and approved by the DR, redesign and reissue construction documents(s), updating the Model and specifications as necessary to bring the cost within the stipulated limits; and
2. If required, prepare and submit a detailed narrative of the implications for retendering, including cost impacts and the risk implications and proposed mitigations.

6.4 100% Construction Documents Issued for Construction

The Consultant must, in collaboration with relevant disciplines:

1. Prepare and update construction documents to include all revisions resulting from the addenda issued during the tender period;
2. Confirm in writing to the DR that all addenda have been integrated into the tender documents to be issued for construction, that the Model is fully updated and coordinated with all component and system clashes resolved, and that the updated specifications reflect all addenda; and
3. Sign and seal all "Issued for Construction" documents (Drawings and specifications) within five (5) days of the issuance of the last addendum. Provide one (1) reproducible copy of the complete construction documents.

6.5 BCC Components

The Consultant must update the BCC and the Model with the final make, model, and description of all awarded Building Components within 10 working days of contract award.

RS 7 CONSTRUCTION AND CONTRACT ADMINISTRATION

7. Construction and Contract Administration

7.1 Intent

The intent of this phase is to implement the project in accordance with the Contract Documents and to direct and monitor all necessary or requested changes to the scope of work during construction, commissioning and closeout. The Consultant must work in the spirit of information sharing with PWGSC. All material specifications, mixes and test results must be turned over to PWGSC for future maintenance purposes. The following services are required for each construction phase, and for each tender package.

7.2 Design Services

7.2.1 General

The Consultant must:

1. Coordinate all services of specialists and sub-consultant's disciplines as applicable, and advise and consult with the DR;
2. Prepare a communications protocol in consultation with the DR. Issue to Project Team after receiving DR approval;
3. Update detailed, critical path and milestone project schedules;
4. Update sustainability documentation to reflect changes which occur during construction, ensuring necessary waste management training session is delivered and waste diversion reporting is completed; and
5. Revise and update the Consultant work plan provided as part of the Consultant's Proposal in response to this Request for Proposal. The updated work plan must reflect the detailed Services required to the completion of the project. Indicate which member of the Consultant Team is performing which Service, when and at what frequency. Submit to DR for approval. The updated work plan will be the control document to manage and monitor the Consultant's Services throughout the demolition, construction, commissioning and warranty phases of the project. If necessary, revise the work plan during the construction and commissioning phases.

7.2.2 Site Visits

The Consultant must:

1. Conduct weekly construction inspection services ensuring that the architect of record and sub-consultants and specialist's disciplines as applicable are in attendance. Ensure compliance with contract documents;
2. Establish a written understanding with contractors as to what phases or aspect of the work are to be inspected prior to being covered up;

3. Assess quality of work and identify in writing to the GC and the DR, all defects and deficiencies observed at the time of such inspections;
4. Inspect materials and prefabricated assemblies and components at their source or assembly plant, as necessary for the progress of the project; and
5. Issue in writing, to PWGSC, any directions, clarifications or deficiency lists.

7.2.3 Construction Meetings

The Consultant must:

1. Immediately after award of each construction package, arrange and participate in a construction briefing meeting with the successful construction sub-trade, the GC, and the DR. Ensure participation from all pertinent specialist sub-consultant disciplines;
2. Prepare minutes of construction briefing meetings and distribute copies to all participants and to other persons agreed upon with the DR;
3. Participate in weekly construction progress meetings, commencing with the construction briefing meeting. The meetings will be chaired by the GC, and will typically include the main sub-contractors, the Consultant and its specialist sub-consultant disciplines, the DR, and various other PWGSC representatives. The DR may invite Users and other project Stakeholders to attend any of these meetings as necessary. Prepare and distribute minutes of these meetings.

7.2.4 On-Site Interference Meetings

The Consultant, including the lead architect, lead mechanical designer, lead electrical designer and other sub-consultants as and when required, must participate in weekly on-site meetings with the GC and key sub-trades, at or near the commencement of construction, to resolve construction interference problems. IT/MM/ISS related interference problems must be incorporated as part of this coordinated and integrated on-site construction solution. The Consultant Team must issue Site Instructions and, if required Contemplated Change Notices, to the GC to immediately resolve interference issues and facilitate the construction process.

7.2.5 Project Schedule

The Consultant must:

1. Monitor the GC's construction schedule, take necessary steps to ensure the schedule is maintained, and submit a detailed report to the DR concerning activities that are at risk of being delayed. Submit correspondence to the DR demonstrating that a detailed review of the schedule has been completed;
2. Keep accurate records of causes of construction delays on site, as well as the actual amount of construction personnel and equipment down time resulting from delays, and submit to DR as they occur;
3. Make every effort to assist the GC in avoiding delays;
4. Ensure the GC's detailed Commissioning Schedule is updated before the start of the Commissioning Phase of the project. Routinely monitor and assist in updating this schedule throughout the commissioning of the work.

7.2.6 Contract Documents

The Consultant must:

1. Carry out reviews of the work, to determine if the work is in conformity with the Contract Documents. Submit deficiency reports on a bi-weekly basis;
2. Interpret the requirements of the Contract Documents and make findings as to the performance by the sub-contractors;
3. Meet with the GC and construction sub-trades, as required, to clarify potential ambiguities in the Construction Documents. Requests for Information (RFI's) identified as critical to the project schedule must be responded to promptly and with priority;
4. Render interpretation, in writing and graphic form, as may be required, with reasonable promptness on the written request of either the DR, or the GC. A maximum of five (5) working days will be tolerated for Consultant response to GC RFI's;
5. Render written findings, within a reasonable time, on all claims, disputes and other matters in question between PWGSC and the GC relating to the execution or performance of the work or the interpretation of the Contract Documents; and
6. Render interpretation and findings consistent with the intent of and reasonably inferable from the Contract Documents. Provide two (2) updates to each construction document issuance "Issued for construction" (plans and specifications) incorporate all change orders in outline. Timing of each update must be determined in coordination with DR and GC.

7.2.7 Inspection

The Consultant must:

1. Reject work which does not conform to the Contract Documents and whenever in the Consultant's opinion, it is necessary or advisable for the implementation of the intent of the Contract Documents, require special inspection or testing of work, whether or not such work has been fabricated installed or completed;
2. Order minor adjustments in the construction work which are consistent with the intent of the Contract Documents, when these do not involve an adjustment in the construction contract prices and or an extension of the construction contract durations.

7.2.8 Supplemental Instructions

The Consultant must:

1. Furnish supplemental instructions to the sub-contractors, with reasonable promptness, or in accordance with a schedule for such instructions agreed to by the DR and the GC;
2. Keep the DR informed of the progress and quality of the work and report any defects or deficiencies in the work observed during the course of the site review;
3. Determine the amounts owing to the GC based on the progress of the work and certify payments to the GC.

7.2.9 Change Control

The Consultant does not have authority to change the work or the price of any Contract(s). The Consultant must:

1. Obtain the approval of the DR for any changes which affect cost or design concept;
2. Upon the DR's approval, obtain quotations from the GC in detail. Review prices and promptly forward recommendations to the DR;
3. Detail all changes with Change Orders (CO), including those not affecting the cost of the project;
4. Utilize an existing PWGSC change control process for scope change. Identify and track type of change as one of: Site Condition, User Requested, and Design Condition on each submitted Contemplated Change Notice (CCN). DR may disagree with the chosen type of change and has the option to advise that a change may be a different type than that chosen by the Consultant;
5. Prepare Contemplated Change Notices (CCN) and Change Orders (CO), verify quantities, and provide justification for approval and signature by the DR in accordance with the Contract Documents. An estimate for each submitted CCN must be provided by the Consultant;
6. Advise the DR of all potential changes to scope for the duration of the implementation;
7. Assess/analyze time impact of all proposed changes, advise the DR of impact analysis including all potential delays;
8. Provide cost planning and estimating advice during construction;
9. When a CCN is to be issued based on unit prices, keep accurate account of the work, recording dimensions and quantities;
10. Indicate any changes or material/equipment substitutions on Record Documents and in the Model; and
11. Review the Contractor's submittals within five (5) working days; prioritize review and processing to ensure the project schedule is maintained;

7.2.10 Commissioning

The Consultant must:

1. Prepare performance testing requirements for each system/integrate system and indicate expected results for each system and integrated system test;
2. Ensure compliance with Commissioning Plan for each phase of occupancy/completion, update plan as necessary;
3. Ensure continued review and witnessing of all activities related to the commissioning process;
4. Participate in the processes for systems and integrated systems (life safety compliance) testing, at each stage of occupancy;
5. Ensure Commissioning the Facility requirements are delivered.

7.2.11 Full Capital Replacement Plan

The Consultant must update the Full Capital Replacement Plan with as-built conditions.

7.2.12 Project Close Out

The Consultant must:

1. Prepare Certificates of Substantial Performance and Certificates of Completion;
2. Collect the written warranties and related documents from the GC and forward to DR for review;
3. During the 12-month warranty period, investigate all defects and alleged defects and issue instructions to the GC. Participate in two (2) formal building walkthroughs and provide reports for each visit;
4. Update training plan and complete commissioning processes;
5. Prepare and provide to the DR and the GC all Systems Operating Instructions (name plate instructions);
6. Finalize Systems Operations Manual and User O&M Manual to 100% status, reflecting as-commissioned operation of all building systems;
7. Conduct a final warranty review with all applicable Consultant members, PWGSC representatives and sub-contractors. Issue instructions to the subcontractors as may be required. Follow up as required. Complete a narrative report and submit to the DR.

7.2.13 Shop Drawings

The Consultant must:

1. Review sub-contractor submittals including shop drawings, product data, and samples, within five (5) working days from receipt, for conformance with the general design concept of the work as provided in the Contract Documents. Prioritize reviews of submission to expedite construction;
2. Provide a list of all shop drawings, samples and product data to be submitted by the subcontractors;
3. Verify that shop drawings include the project number and are recorded in sequence;
4. Establish and implement a shop drawing handling/distribution protocol acceptable to the Project Team. Verify the number of copies of shop drawings required. Consider additional copies for User review;
5. Shop drawings must be stamped: "Checked and Certified Correct for Construction" by the sub-contractors and stamped: "reviewed" by the Consultant before return to the sub-contractors; and
6. All equipment must be CSA approved, or CSA equivalent. In the case of equivalency, provide letters of approval for use in Canada.

7.2.14 Inspection and Testing

The Consultant must:

1. Provide the DR with specified and recommended list of tests to be undertaken, including on site and factory testing;
2. Ensure all testing is detailed within the Commissioning Plan;
3. Once the contract is awarded, assist DR in briefing testing firm on required services, distribution of reports, communication lines, etc.;
4. Participate on-site at all testing. Certify results in accordance with design and operational intent. Review all test reports and take necessary action with the GC when work fails to comply with contract;
5. Immediately notify the DR when tests fail to meet project requirements and when corrective work will affect schedule; and
6. Assist the DR in evaluating testing firm's invoices for services performed.

7.2.15 General Contractor's Progress Claims

The Consultant must:

1. Review GC monthly progress claim request in detail. Submit to GC, copying DR, all concerns with the claimed levels of completion. Discuss with GC and come to agreement on any items of disagreement;
2. Verify at each progress payment that sub-contractors have accurately recorded information on the site as-built set of Contract Documents;
3. The claims are made by completing the following forms where applicable:
 1. Request for Progress Payment; and
 2. Cost Breakdown Statutory Declaration Progress Claim;
3. Review and sign designated forms and promptly forward claims to the DR for processing;
4. Submit with each progress claim:
 1. Updated schedule of the progress of the work; and
 2. Detailed photographs of the progress of the work.

7.2.16 Materials on Site

1. The GC and their sub-contractors may claim for payment of material on site, but not yet incorporated in work;
2. Material must be stored in a secure place designated by the DR;
3. The Consultant must check and verify a detailed list of materials with supplier's invoice showing price of each item which must accompany a claim;
4. Items must be listed separately on progress payment forms after the breakdown list and total; and
5. As material is incorporated in the work, the cost of this material must be added to the appropriate breakdown list and removed from the material list.

7.2.17 BCC Components Delivery and Installation

The Consultant must:

1. Coordinate the delivery and installation of BCC Components in consultation with all suppliers and the GC. Final delivery dates to be confirmed with the DR;
2. Have representatives on-site during the delivery of BCC Components to accept and confirm delivery of appropriate product, and acquire all packing slips;
3. Confirm that all quantities of all BCC Components have been delivered. Consultant to prepare a deficiency list of all damaged or missing items;
4. Oversee installation/set-up of BCC Components by supplier; and
5. Provide deficiency list to the DR for each floor or area of BCC Components completed.

7.2.18 Sustainability Certification

Update the Sustainable Design Strategy Report, including confirming that the minimum sustainability performance targets are being met as follows:

1. Energy reduction of 52% compared to the NECB 2011;
2. Minimum GHG emissions reduction between 65% and 88% compared to 2005-2006 existing building baseline;
3. Meet/certify to LEED Platinum or 5 Green Globes or equivalent industry recognized standard; and
4. Pursue WELLv2 Core certification (Silver).

7.2.19 Acceptance Board

The Consultant must inform the DR and the PWGSC Commissioning Manager, once satisfied, that the project is substantially completed. The Consultant, GC, and major sub-trades representatives must form part of the Project Acceptance Board and attend all meetings as organized by the DR.

7.2.20 Interim Inspection

1. The Acceptance Board must inspect the work and list all unacceptable and incomplete work on a designated form. The Board will accept work from the sub-contractor's subject to the deficiencies and uncompleted work listed and priced;
2. The sub-contractors must provide a work plan of actions and schedule to correct all deficiencies; and
3. The Consultant must coordinate with the DR to monitor, inspect and report on the progress of deficiencies corrections.

7.2.21 Substantial Performance

The DR will formally issue the official Certificate of Substantial Performance forms (formerly called Interim Certificate of Completion) to the GC.

The Consultant must:

1. Prior to the issuance of Certificate of Substantial Performance, obtain as built marked-up drawings from the Construction Team. Provide a copy to the DR;
2. For payment, obtain the required completion and signing, by the parties concerned, of the following documents:
 1. Certificate of Substantial Performance – PWGSC form 1796;
 2. Statutory Declaration – PWGSC form 2835; and
 3. Other submittals required to support the progress claim are:
 1. Workman's Compensation Clearance Certificate;
 2. Contractor's Invoice;
 3. Cost Breakdown; and
 4. Certificates or written approval from AHJs such as HRSDC, City of Ottawa, Electrical Safety Authority, TSSA, etc.;
3. Verify that all items are correctly stated and ensure that completed documents and any supporting documents are furnished to the DR for processing.

7.2.22 Building Occupation

PWGSC or the Users may occupy the building after the date of acceptance of the building by the Acceptance Board. The acceptance date is normally that of the Certificate of Substantial Performance issued to the subcontractors. As of the acceptance date, the sub-contractors may cancel the Contract Insurance, and PWGSC or the Users (as the case may be) assumes responsibility for:

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

7.2.23 Take-over

The official take-over of the project or parts of the project, from the GC is established by the PWGSC Project Management Team and the Users. The date of the Certificate of Substantial Performance signifies commencement of the 12-month warranty period for work completed on the date of each certificate in accordance with the General Conditions of the Contract.

The Consultant must:

1. Provide the DR and the PWGSC Commissioning Manager with original copies of sub-contractor warranties for all materials and work covered by an extended warranty or guarantee, according to the conditions of the specifications. Verify their completeness and extent of coverage.

7.2.24 Operation and Maintenance Data Manual

The Consultant must:

1. Provide four (4) sets of the Operation and Maintenance Data Manuals, each volume, produced by sub-contractors in accordance with the project specification and verified for completeness, relevance and format by the Consultant and submitted to the DR and the PWGSC Commissioning Manager prior to interim acceptance or actual start of operation and instruction period, whichever occurs sooner;
2. Prior to submission to the PWGSC Commissioning Manager, provide written comment in detail indicating the acceptability of all manuals. The sub-contractors shall retain one (1) copy of each volume for their record and use during the instruction period.

7.2.25 Training

The Consultant must:

1. Ensure all training is detailed within the Commissioning Plan;
2. Provide training sessions on design and operational intent, including, but not limited to HVAC, and electrical systems. Make arrangements and ensure that PWGSC Operations and Users are properly instructed on the operation of all services and systems using the final Systems Operations Manuals as reference; and
3. Participate and document content at every training session.

7.2.26 Keys

The Consultant must ensure that all keys and safe combinations are delivered to the DR.

7.2.27 Final Inspection

The Consultant must:

1. Inform the DR when satisfied that all work under the contract has been completed, including the deficiency items at all agreed completion points

PWGSC reconvenes the Acceptance Board which makes a final inspection of the Project. If everything is satisfactory the Board issues interim and final acceptance of the Project to the sub-contractors.

7.2.28 Final Completion

The official take-over of the Project is established by the official Certificate of Completion forms (formerly called Final Certificate of Completion). The DR will formally issue these forms to the GC.

The Consultant must:

1. Verify that all items are correctly stated and ensure that completed documents and any supporting documents are furnished to the DR for processing. The final payment requires completion and signing, by the parties concerned, of the following documents:
 1. Sustainability Certification

2. Certificate of Completion (Final) – PWGSC form 1797;
3. Statutory Declaration - PWGSC form 2835; and
4. Submission of all Project submittals including, but not limited to reports, O&M manuals, as-built drawings;
5. Other submittals required to support the progress claim are:
 1. Contractor's Invoice;
 2. Cost Breakdown;
 3. Workmen's Compensation Clearance Certificate iv. ESA Certificate v. TSSA Certificates;
 4. Hydro Certificate(s); and
 5. Any other applicable certificates (i.e. Building Permits, Occupancy Permits, Notice of Project Closure, etc.).

7.2.29 As-Built and Record Drawings and As-Built Specifications

The Consultant must:

1. Check and verify GC and sub-contractor as-built records for completeness and accuracy;
2. Obtain from the sub-contractors all modification/updates to as-built records from Substantial Performance to Final Completion;
3. Show deviations in construction from the original Contract Documents including changes resulting from Change Orders or from Site Instructions;
4. Indicate maintenance management system (MMS) numbers for each piece of mechanical and electrical equipment on each drawing;
5. Produce Record Drawings and specifications, incorporating final as-built information into project drawings for both the site and building;
6. Provide a complete set of final shop drawings in hard copy and electronic format; and
7. Submit a comprehensive consolidated final package of Record Drawings and As-Built Specifications within 12 weeks of issuance of the Certificate of Completion.

7.3 Deliverables

The Consultant must prepare and consolidate the following information:

1. Written reports from site visits including persons involved;
2. Monthly written reports on the progress of the work and cost of construction, including updated as-built records;
3. Cost and scheduling reports with updates at the end of each month;
4. Additional detail drawings when required to clarify, interpret or supplement the Construction Documents;
5. Written Site Instructions;
6. Copies of reviewed shop drawings and of reviewed drawings from furniture/equipment suppliers;

7. Update the "Issued for construction plans and specifications;
8. Update the Full Capital Replacement Plan
9. Acoustical performance assessment report;
10. Certificates of Substantial Performance and Certificates of Completion including respective reviews and acceptances;
11. Final Area Measurement / Space Usage Report;
12. Debrief of Commissioning activities outlining the commissioning process, major activities, and lessons learned from this project;
13. Finalize the Systems Operation Manual and Users O&M Manual to reflect as commissioned operation and maintenance of each building system;
14. Training summary;
15. List of Spare Parts;
16. Certified and dated Performance Verification (PV) results;
17. Update the Model to provide as-built drawings and as-built specifications based on the as-built marked up drawings obtained from sub-contractors;
18. Other Management Manuals as required including Standard Operating Procedures Manual as per the Canada Labour Code Part 2;
19. Finalised Sustainability Strategy Report, including sustainability performance assessment rating (i.e. Green Globes) documentation (including verification submissions) and final certification;
20. Warranty deficiency list;
21. Final Warranty Review and Report; and
22. Post-Construction Evaluation.

RS 8 COMMISSIONING

8. Commissioning the Facility

8.1 Intent

As a member of the PWGSC team, the PWGSC Commissioning Manager, represents the Owner's and User's interests, and is responsible for overseeing all commissioning activities during the development, implementation and post construction phases of the project.

Throughout this Phase, the Consultant must work closely with the PWGSC Commissioning Manager, Consultant and Consultant's Independent 3rd Party CxA, and the various sub-contractors to implement commissioning activities and create useful, well integrated drawings, reports and manuals, in compliance with Contract Documents.

8.2 Design Services

The Consultant's independent 3rd Party Commissioning Agent must:

1. Perform 33% (DD), 66%, 99% and 100% Specification and Drawing reviews and provide comments from an O&M and Commissioning perspective. Ensure all Specification Divisions are cross referenced to the Commissioning Specifications as applicable.
2. Review and provide complete documentation on the Operation and Maintenance (O&M) requirements for the new facility;
3. Prepare Systems Operations Manual (SOM) and Preventative Maintenance Support System (PMSS)/ Maintenance Management System (MMS) documentation;
4. Advise on O&M requirements for the new facility, including staffing, service contracts, training requirements, spare parts and special equipment;
5. Prepare contents of O&M Manuals SOM and Users O&M manual in accordance with the PWGSC Project Commissioning Manual current edition;
6. Carry out various checks and tests to determine if the new facilities function is in accordance with the contract documents;
7. Identify GC and sub-contractor commissioning, Performance Verification (PV) and testing responsibilities including Seasonal Commissioning requirements;
8. Plan the PV activities, develop the installation checklists and PV report forms, and prepare a detailed verification schedule. PV tests will be performed by the GC, witnessed and certified by Consultant. Maintain detailed development reports and review with the GC for special systems such as EMCS; and
9. Complete PV inspection forms for all components, sub-systems, and systems and a final PV report will be submitted to the PWGSC Commissioning Manager.

8.2.1 Design Development

8.2.1.1 O&M (General)

The Consultant must:

1. Submit an O&M report showing how the design will meet O&M requirements including the following subjects;
 1. Spatial requirements for O&M staff (office, lockers, kitchen, showers, washrooms, flow of people and supplies, storage for special tools, spare parts, and maintenance materials;
 2. Cleaning (janitor closets, receptacle for vacuum, equipment supply and storage);
 3. Capacity of the facility to change in response to program changes over its life expectancy;
 4. Spare equipment, extra material and redundancies needed to operate and maintain this facility over its life expectancy;
 5. System selection based on life cycle cost analysis considering energy, maintenance and operational cost; and
 6. "Phased" construction program;
2. Assist the PWGSC Commissioning Manager in preparation of a preliminary O&M budget. The O&M budget will contain detailed breakdown of various items with the assessment of the systems selection;
3. Provide an assessment of;
 1. Staffing & skill requirements to operate and maintain the facility;
 2. The need for service contracts, i.e. elevators, water treatment, controls emergency generators, fire alarm, security, etc.: and
4. Input into the Building Management Plan information regarding operational management requirements.

8.2.1.2 Extent of Commissioning

The Commissioning Process must be completed as per CSA-Z320-11 Commissioning Standard and LEED Enhanced Commissioning requirements and applies to the exterior Envelope, all building mechanical, electrical and controls systems and equipment identified in the project's Terms of Reference for Consultant Services Call-up. The Commissioning Manager has specifically identified the following building systems and equipment for which the commissioning process shall apply. Unless indicated otherwise, the sampling rate must be 100% of the applicable systems and equipment. Exhaust ventilation and control systems. Include provisions for deferred testing under design and seasonal conditions.

Life Safety Integrated Testing is required as per the NBCC & NFCC following CAN/ULC S-1001-11. The issued for Tender Specifications will determine the extent of the actual systems to be commissioned not to be limited to the following list:

1. Building Envelope
2. Supply / Make-up ventilation, heating and control systems

3. Indoor Air Quality and Building Pressurization
4. Humidity Control Systems
5. Energy recovery systems
6. Fire and smoke dampers (spring loaded and motorized)
7. Parking ramp snow melting system
8. Storm and sanitary drainage piping and pumping systems
9. Domestic water supply and metering
10. Emergency Power and associated Fuel storage and Transfer systems
11. EMCS Controls and Building Automation System
12. Fire protection systems
13. Exit Lights
14. Emergency Lighting
15. Wet sprinkler system
16. Dry and/or glycol sprinkler system
17. Standpipe and hose system
18. Fire Alarm System and ancillaries
19. Low voltage (750V and below) electrical power distribution system and equipment
20. Dry-type transformers Distribution panel-boards

8.2.1.3 O&M Manuals and Systems Operations Manual (SOM)

The Consultant must complete design intent and prepare SOM. Submit at the end of the design development stage. Consultant and their 3rd Party CxA to provide review comments and conditions for accepting preliminary O&M Manuals.

8.2.1.4 Commissioning Plan

The Consultant's 3rd Party CxA to provide Preliminary Cx Plan to PWGSC for review and approval, as a living document the CxA is to update the plan as the project evolves. Any change orders or site instructions affecting the plan are to be included Submit a preliminary commissioning plan to the DR for review and approval.

8.2.2 Construction Documents & Tendering

8.2.2.1 O&M (General)

The Consultant's independent 3rd Party Commissioning Agent must:

1. In consultation with the PWGSC Commissioning Manager, continue the assessment which started during the design phase with respect to O&M concerns including staffing, redundancies, spare equipment and extra material, service contracts, preventative maintenance and equipment identification, O&M facilities and the O&M budget. Ensure all review comments provided by the PWGSC Commissioning Manager are addressed;

2. Incorporate design and performance intent in the Construction Documents and identify anticipated performance outputs in PV forms; and
3. Identify GC and subcontractor commissioning, PV and testing responsibilities.

8.2.2.2 Standard Operating Procedures Manual

The Consultant must:

1. Provide all design and operational intent, sequence of operation, etc., for the SOM;
2. Provide emergency start-up/operations/shut-down procedures;
3. Provide Single Line Diagrams of all systems;
4. Provide PMSS/MMS inventory lists and Valve Schedules;
5. Provide Service Contract lists; and
6. Provide Shop Drawing lists.

8.2.2.3 Commissioning Specification

The Consultant's independent 3rd Party Commissioning Agent must:

1. Use PWGSC disciplinary master specification for commissioning as the basis for the Project specifications for commissioning. Complete design information required in the PV report forms;
2. Specify detailed PV procedures and output, documents, scheduling and reporting requirements within each relevant specification subsection;
3. Identify and include in specification all tests to be conducted at manufacturer's plants, on site during construction, installation, commissioning on site and during the operation phase; and
4. Develop training package for O&M personnel and include in specification as required.

8.2.2.4 "PMSS/MMS" Specification

The Consultant must use the PWGSC Master Specification for the identification of equipment and inventory in conjunction with the PMSS/MMS. Provide PMSS/MMS coding and system nomenclature on tender documents. Coordinate with existing building equipment inventories.

8.2.2.5 Submission Requirements

The Consultant's independent 3rd Party Commissioning Agent must:

1. Submit the commissioning plan at the end of the design phase and updated and resubmit at the end of each stage of the construction documents. The Consultant and the PWGSC Commissioning Manager must work together to update the Commissioning Plan;
2. Submit the commissioning specifications at the end of the 66% construction drawings stage and are updated and resubmitted at each subsequent stage of the construction documents;

3. Submit the SOM at the end of the 66% construction drawings stage, and is updated and resubmitted during subsequent phases of the construction documents;
4. Respond to all PWGSC comments in writing at each stage.

8.2.3 Construction / Installation

8.2.3.1 Site Reviews

Consultant and the 3rd Party CxA to perform regular quality site reviews during construction to ensure the work is being performed as per the Specifications, drawings and following industry best practices as applicable

8.2.3.2 O&M (General)

The Consultant's independent 3rd Party Commissioning Agent must:

1. Assemble, review and approve all commissioning documentation, including check lists, PV report forms, PV procedures, instruments to be used, and instrument calibration, and incorporate relevant data from reviewed shop drawings and installed component data, three (3) months before the project Substantial Performance;
2. Assemble all certified tests results and incorporate into the O&M manuals which mean herein, Systems Operations Manual and Users O&M Manual;
3. Review the selected test instruments which are to be calibrated less than three (3) months prior to Substantial Performance;
4. In consultation with the various sub-contractors, select the commissioning test instruments;
5. Review GC and sub-contractor compliance with the contract documents;
6. Witness and certify tests conducted before concealment and start up;
7. Verify that each system is completed, safe to operate and ready for start-up; and
8. Ensure that all deficiencies are rectified and acknowledge that the installation of components and systems are ready for the commissioning phase.

8.2.3.3 Manuals

The Consultant's independent 3rd Party Commissioning Agent must:

1. Revise the O&M manuals as construction progresses, ensuring that it reflects the installed systems;
2. Review for acceptance the sub-contractors' O&M Manuals; and
3. After their own review and acceptance, submit all manuals O&M manuals to the PWGSC Commissioning Manager for review and comment. Manuals must be in accordance with the PWGSC Commissioning Manual, current edition. Standard Operating Procedure as per Canada Labour Code Part 2.

8.2.3.4 Training

The Consultant's independent 3rd Party Commissioning Agent must:

1. Co-operate with the PWGSC Commissioning Manager in making necessary arrangements for site O&M staff familiarization;
2. Prepare training material in accordance with this RFP and the approved Commissioning Plan; and
3. Document all training sessions.

8.2.4 Commissioning Phase

8.2.4.1 General

The Consultant's Independent 3rd Party CxA must submit a list of the technical staff required to conduct all performance and verification tests for approval by the PWGSC Commissioning Manager prior to beginning testing and verification.

8.2.4.2 Manuals

The Consultant's Independent 3rd Party CxA must review the 100% O&M Manuals and submit comments to the PWGSC Commissioning Manager. Manuals are to be in accordance with all modifications to the project.

8.2.4.3 Spare Parts

The Consultant's Independent 3rd Party CxA must finalize the delivery of all the spare parts requirements through the project and assist the PWGSC Commissioning Manager in the definition of additional parts not listed in the Construction Documents.

8.2.4.4 Performance Verification

The Consultant's Independent 3rd Party CxA must;

1. Witness that the components, sub-systems and systems are tested in accordance with the provisions of the Contract Documents and ensure all systems meet design intent. Include testing of BCC equipment that is interconnected to, and that impacts, the operation of the base building, and certify same, including testing during off-hours;
2. Witness that systems and integrated systems testing (life safety compliance testing) at partial occupancy and again at final occupancy and certify same, including testing during off-hours;
3. Report in writing to the DR and to the PWGSC Commissioning Manager indicating compliance or anomalies regarding witnessed events. The Consultant is to investigate and recommend in writing any corrective actions to be taken to facilitate compliance with design intent and design criteria;
4. Provide solutions during the PV process with respect to the variances from the design parameters;
5. In consultation with the PWGSC Commissioning Manager, and the DR, recommend take-over of the facility, after successful completion of the life safety compliance

testing, subject to outstanding deficiencies or deferred tests during the operational phase;

NOTE: Start-up and Test and Balancing (TAB) are construction activities and do not form part of the Commissioning Phase.

6. Instruct the GC to correct all the deficiencies identified and recorded during the PV and adjust or alter the systems to achieve the design parameters. Retest as required.

8.2.4.5 Training

The Consultant must coordinate the training of O&M personnel and conduct training sessions.

8.2.4.6 Documentation

The Consultant's Independent 3rd Party CxA must:

1. Review all PMSS/MMS nomenclature, devices and submissions prepared by the GC and by the various sub-contractors. Ensure on site implementation and tagging of PMSS/MMS;
2. Draft the Technical Maintenance Manual (TMM); provide all required information for the proper maintenance of the heritage masonry and all building envelope elements; and
3. Prior to Interim Inspection, debrief the DR and the PWGSC Commissioning Manager on the commissioning process including training, problems; required changes to systems (with costs) which are outside the sub-contractor's responsibility, but which are deemed necessary to meet project requirements; commissioning procedures and other information, experiences and suggestions for future projects. Submit a report to the PWGSC Commissioning Manager. Repeat this process when 80% occupancy is achieved.

8.2.5 Post-Construction (Operation)

The Consultant's Independent 3rd Party CxA must:

1. Make recommended revisions to documentation to reflect all changes, modifications, revisions and adjustments as finally set upon completion of commissioning;
2. In conjunction with the PWGSC Commissioning Manager, develop an occupant's comments/complaints audit system for the facility. O&M Supervisor to track problems that occur during the Operational Phase of the project. Prepare and conduct occupant surveys every two (2) months. Tabulate results; advise the DR and the PWGSC Commissioning Managers and implement corrective measures as required;
3. Witness completion of Performance Verification and review reports;
4. Monitor environmental and life safety system checks which must be carried out by the sub-contractors or O&M staff prior to the expiration of warranties;

5. Participate in warranty inspections with PWGSC Commissioning Manager, Operations Staff and sub-contractors. Prepare and submit detailed inspection reports within (5) days of inspection;
6. Identify and monitor all deficiencies to be rectified by the sub-contractors prior to the expiration of warranties;
7. Finalize the TMM manual;
8. Submit Project Archives to the DR and to the PWGSC Commissioning Manager, Operations staff and sub-contractors. Prepare and submit detailed inspection reports within five (5) days of inspection; and
9. Participate in lessons learned workshops with PWGSC and User representatives.

8.2.6 Post Construction (Evaluation)

The Consultant's Independent 3rd Party CxA must prepare a final written debriefing report for the DR and the PWGSC Commissioning Manager reviewing the Commissioning Process discussing the following:

1. What component and or systems, if any, that were not commissioned - and why;
2. Lessons learned: What could have been done better;
3. A remedial work plan outlining prudent follow-up actions or projects by PWGSC. Include scope, estimated costs and duration per follow-up item; and
4. Any other related information.

This report must be delivered 12 weeks after the final occupancy is achieved and must be updated after the 11-month warrantee inspection and reissued.

8.2.7 Design Intent Brief (Building Management Manual)

8.2.7.1 Objectives

The Design Intent Brief is intended to provide:

1. A narrative description of the project's conceptual framework; and
2. A record of and rationale for decisions made throughout the project.

The Design Intent Brief represents the Consultant's point of view. It will be produced initially at the Design Development phase and subsequently updated and submitted at the end of each subsequent project delivery phase (Construction Documents and Construction and Contract Administration).

1. This Brief will serve as a "Building Management Manual" and must be oriented towards the Owner/Investor.
2. The Design Intent Brief must be well organized in terms of text and graphics to facilitate future use as a building reference document.
3. The final version of the Design Intent Brief produced at the end of the Construction and Contract Administration phase will form part of the final submission package including the Record Drawings and Contractor's Operation and Maintenance (O&M)

Manual. Reference may be made in the Design Intent Brief to these other packages.

8.2.7.2 General

The Consultant must prepare the Design Intent Brief. The Brief is a design document that outlines the design intent of the project and explains the purpose of the facilities and what they are meant to do.

The Brief must contain a design description of each facilities system; including structural, mechanical, electrical, civil, fire protection communication systems, public paging system, security system and sub-basement service tunnel systems.

The Design Intent Brief explains not only “what” a system and/or components do, but “why” the system or the components are being selected and, in general terms, “how” the design and operating concepts of the systems and integrated systems will be accomplished.

The Design Intent Brief differs from the traditional Contractor’s Operations and Maintenance (O&M) Manual in that the O&M Manual identifies the materials and components used in a project without explaining the design intent. The O&M Manual details the materials, components, maintenance of the components, spare parts for the components, operation and performance of the components based on both the manufacturer’s stated performance criteria and the actual, operational performance of the final installation. The traditional Contractor’s O&M Manual identifies “what” component or system has been chosen, not “why” it has been chosen.

General requirements for all facilities systems, including ALL interconnected or ancillary systems must include, but are not limited to:

1. A narrative description of the system or component;
2. The purpose of the system or component;
3. Options and analysis that were considered (concept phase only);
4. The design intent;
5. Sustainable features and strategies and resulting implications for building performance and user (what changes for occupants) lessons learned and final certification awarded;
6. The design criteria and the applicable code/standard that was used, including load calculations for each discipline;
7. The area served by the system or component and, as applicable, all connected or related loads and system capacities;
8. Any special features or unique supply items/sources, general control strategies, sequences, and reset schedules;
9. Seasonal switch-over procedures;
10. Emergency procedures during a fire condition, power or equipment failure;
11. Reduced simplified plans illustrating system configurations, including single line and plan drawings of each system;

12. Interfaces with existing systems; and
13. All design assumptions.

Also include, as required:

14. Anticipated future changes not included in the project;
15. Any special maintenance issues; and
16. Any requirements for ongoing monitoring for geotechnical conditions or ground behaviour.

8.2.7.3 Production and Delivery

The format of the Design Intent Brief must:

1. Be professionally presented in a D-ring binder with 216 mm x 280 mm quality bond paper, complete with drawings and/or plans;
2. Contain a detailed index and dividers for all sections. The index must also include a complete detailed reference (sub-index) of the Contractor's O&M Manuals to describe where other related operations and maintenance information is located;
3. Contain a complete listing of names, addresses, telephone, and facsimile numbers of all firms, designers, and related agents who participated in the design and delivery of the project;

8.2.7.4 Interim Submission Requirements:

Unless otherwise indicated, the Consultant must:

1. Submit two (2) copies of the Design Intent Brief with each interim submission. Include the Sub-basement service tunnel system included in this Project and its purpose, outline control strategies and operation, relationships to connected systems, initial code analysis, and all design assumptions to date;
2. Submit in draft format at the Design Development and 50% Construction Documents;

Note that this is an evolving document and only an overview is required at these submissions.

3. Update and submit for review at 95% Construction Documents submission. The Brief must be essentially in its final format regarding its structure and organization, such that subsequent submissions need only add missing information.

Note that the Design Intent Brief must be 90% complete when the construction documents are tender ready.

8.2.7.5 Final Submission

Final Submission requirements the Consultant must submit are:

1. Submit the 99% complete Design Intent Brief to the DR for review towards the end of the Construction and Contract Administration phase, at Interim

Completion. Incorporate all comments and resubmit the Design Intent Brief as required;

2. Within 12 weeks of issuance of the Substantial Certificate of Performance, but prior to issuance of the Final Certificate of Completion, Submit final, 100% complete Design Intent Brief with submission of Record Drawings and O&M Manual as one (1) submission package. In addition to the contract submission requirements, provide three (3) additional electronic copies; and
3. Give an overview presentation of the Design Intent to the Contractor/Supplier and Project Team at the initial stage of construction.

8.2.7.6 Training

Towards the end of the Construction and Contract Administration phase, the Consultant will present the Design Intent Brief as a training session for Facility Management and Operations staff.

The Consultant must prepare a training course outline and submit it to the DR for review and comment at least two (2) weeks prior to the proposed training dates. Update and resubmit as required. Include an agenda and a course outline summarizing the content and duration of training. The training provided must clearly relay:

1. An understanding of the intent of the design;
2. Limitations of the systems; and
3. Reasons for the choice of systems.

The Consultant must coordinate the date(s) of the training session(s) with the DR. The DR will organize the location and provide the lists of participants.

The Consultant must prepare a summary of the training sessions. Indicate dates, subject matter, and all personnel present for training. After training, submit the training summary to the DR outlining the content of training and who participated at each session.

8.3 Deliverables

The Consultant's Independent 3rd Party CxA must:

1. Provide written reports on the progress of the work and the cost of the project at the end of each month;
2. Prepare additional detail drawings when required to clarify, interpret or supplement the Construction Documents;
3. Prepare post contract drawings;
4. Provide interim and/or final certificates;
5. Prepare commissioning requirements:
 1. Design Intent Brief;
 2. Training summary;
 3. Spare Parts;

4. Certified and dated PV results;
5. As-Built, Record Drawings and Specifications reflecting the built works o Debrief of Commissioning Activities; and
6. Warranty deficiency list;
6. Prepare a waste diversion summary indicating the destination (reuse, recycling or landfill) and quantity (by weight or volume) of all waste materials removed from site;
7. Prepare a report on final warranty review; and
8. Update the Model to incorporate all as-built conditions.

RS 9 RESIDENT SITE SERVICES

9. Resident Site Services during Construction

9.1 Intent

Site services are an essential aspect of the Consultant's mandate. These services are the primary focal point for the Consultant's production input to and in support of construction operations. The continuous flow of accurate and fully coordinated information to and from the construction site will ensure a very high level of design and construction sequencing and productivity.

This will be executed by several different individuals from the Consultant Team with varying skills depending on the type of work being executed. The Consultant's Resident Site Services Team must have the authority, ability and capacity to immediately respond to evolving situations daily, in all parts of the site, coordinating site information with ongoing design production, and providing immediate design direction to the GC for all site matters of construction and temporary protection.

Lead by a highly experienced and licensed architect, the Consultant's Resident Site Services Team must adapt in composition as the overall Project advances and include robust administration support.

Multidisciplinary site services are required, when construction is ongoing and is to be available when construction operations perform multiple shifts per day, in the proactive planning and management of activities with the GC and other Project stakeholders, including evenings and during weekends.

9.2 Design Services

The purpose of Resident Site Services is to ensure the presence of the Consultant's representatives on-site to inspect, coordinate and monitor all aspects of the work during the construction of the facility, and liaise with the GC, PWGSC and other agencies as appropriate to the work. This service is over and above those inspection services listed under RS7 Construction and Contract Administration.

9.2.1 Resident Site Representatives (RSR)

1. A minimum of one (1) is required to be on site at all times as soon as construction implementation begins:
 - The Principle RSR must be a Senior Architect with at least 10 years of resident site supervision experience on large and directly relevant construction projects, "Large" is considered to be a project with a construction value over \$10M. This individual is required to be present on site during every work shift for the full duration of the project; and
 - An assistant to the Principal RSR with at least five (5) years of previous resident site services experience. This individual is also required to be present on site for the full duration of construction.
2. The RSR must:
 - Be directly responsible to the Consultant and all members of the Consultant Team;
 - Become thoroughly familiar with the contract documents, the applicable Building Codes and all Fire Commissioner of Canada Standards, all Federal, Provincial and Municipal

Standards for the health and safety of construction workers; and

- Become thoroughly familiar with the requirements of the Project Brief and Project responsibilities of others which relate to these services.

9.2.2 RSR Duties and Responsibilities

9.2.2.1 General

The RSR must inspect all phases of the work in progress to ensure that all work is proceeding in accordance with the Contract Documents. The RSR must bring to the attention of the GC, after verifying with the Consultant, any discrepancies between the work, the contract documents and accepted construction procedures. Issues of significance are to be reported immediately to the Consultant, appropriate Consultant Team members, the DR and Commissioning Managers.

The RSR must keep a daily log of inspections and must issue a weekly written report to the Consultant, for distribution to the Project Team. The written report will contain description of inspection, progress of work to date, relevant photos and any other supplemental information that will aid in communicating to the intended audience. The Consultant will submit a template of this weekly report prior to the start of construction for the approval of the DR. The RSR will make any other reports or surveys as required by the DR through the Consultant.

The RSR must verify quantities of materials received and record work progress through daily photographs. If work is based on unit prices, measure and record the quantities for verification of monthly progress claims and the Final Certificate of Measurement.

9.2.2.2 Interpretation of the Contract Documents

Interpretation of the contract documents will be the responsibility of the Consultant. The Consultant may, however, have the RSR provide them with information regarding job conditions and may require the RSR to relay day-to-day instructions to the GC. It will be the duty of the RSR to assist the Consultant and further inform the Consultant of any anticipated problems which may delay the progress of the work. The RSR and Consultant must provide any additional detail drawings as and when required to properly clarify or interpret the Contract Documents. The Consultant must determine the method of relaying such information.

9.2.2.3 Changes in the Work

The RSR must not authorize or order any change in the work which will constitute a change in design or in the value of the contract except as delegated by the DR. The Consultant may call upon the RSR to assist in the evaluation of changes in the work, where knowledge of job conditions is required.

9.2.2.4 Communication & Liaison

The RSR must:

1. Convey the Consultant's instructions regarding the required standards of workmanship to the GC;
2. Refer to specifications, confer and obtain guidance on these with the Consultant. The

matter is then to be brought to the attention of the GC's Superintendent. Although informal discussions with sub-trade Superintendents are usually permissible, (with agreement from the GC), the RSR must not deal directly with foreman or tradesmen, or interfere with the progress of the work;

3. Communicate formally with the GC via memorandum form only. When this form is issued, the RSR must immediately file copies with the Consultant the DR and the PWGSC Commissioning Managers;
4. Contact the Consultant immediately when it is apparent that information or action is required of the Consultant, (e.g., general instructions, clarifications, sample of shop drawing approvals, requisitions, contemplated change orders, site instructions, details, drawings, etc.);
5. Accompany PWGSC and User representatives on inspections and report to the Consultant requirements, comments or instructions from PWGSC;

NOTE: The RSR should encourage site inspection requirements, comments or instructions to be provided in writing.

6. Consider and evaluate any suggestions or modifications to the documents advanced by the Contractor(s) and immediately report these to the Consultant with comments;
7. Ensure that the DR and Commissioning Managers and Consultant are notified promptly when key pieces, of materials equipment or Building Components are delivered, so that these parties can arrange for the appropriate personnel to inspect them, prior to installation; and
8. The RSR will investigate, witness, review and approve in writing, all temporary or permanent connections into any of the buildings' systems prior to the work being undertaken.

9.2.2.5 Schedule

The RSR must:

1. Monitor the approved construction schedule, take necessary steps to ensure that the schedule is maintained and submit a detailed monthly report to the DR and the Consultant concerning any delays;
2. Keep accurate records of causes of delays and related issues;
3. Make every effort to assist the GC to avoid delays; and
4. In discussion with the GC, Consultant and DR ensure the commissioning schedule is updated throughout the project.

NOTE: Only PWGSC may approve any request for time extensions.

9.2.2.6 Inspection of the Work

As the work progresses, the RSR must make on-site observations and spot checks of the work to determine whether the work, materials and equipment conform to the contract documents and

supplementary documentation. The RSR must advise the GC of any deficiencies or unapproved deviations via memorandum and report immediately to the Consultant and the DR any of these on which the GC is tardy or refuses to correct.

Through effective and timely communications, the RSR must arrange for the Consultant to undertake periodic inspections with respect to the progress of the work. The RSR must further coordinate all inspections with AHJ's to review/inspect the construction work at appropriate times and must advise the Consultant, and DR of such inspections.

The RSR must also report if materials and equipment are being incorporated into the Project prior to approval of relative shop drawings or samples. The RSR must assist in the preparation of all deficiency, interim, preliminary and final reports and certificates in collaboration with the DR and the Consultant. The RSR must be responsible for the measurement of all work to be done on a unit-cost basis.

9.2.2.7 Site Meetings

The RSR must attend all job-site meetings. Immediately after Consultant contract award, arrange a briefing meeting with the Project Team.

9.2.2.8 Inspection and Testing Coordination

The RSR must see that the tests and inspections required by the Contract Documents are conducted, and is to ensure the designer of record is present to witness and certify the results. Report the results in the daily log. The Consultant and DR are to be notified by the RSR as to when testing will occur in advance of the tests.

9.2.2.9 Limitations

The Resident Site Representative must not:

1. Authorize deviations from the contract documents;
2. Conduct tests or certify test results;
3. Approve shop drawings or samples;
4. Advise the Users in any matter without obtaining guidance from the DR;
5. Accept any work or portions of the building;
6. Enter into the area of responsibility of the Contractor's Site Superintendent; and
7. Stop the work unless convinced that an emergency exists.

9.3 Deliverables

9.3.1 Daily Log

The RSR must keep a daily log recording the following at minimum:

1. Weather conditions, particularly unusual weather relative to construction activities in progress;
2. Major material and equipment deliveries;

3. Daily activities and major work done through all shifts of construction work;
4. Start, stop or completion of activities through all shifts of construction work;
5. Presence of inspection and testing firms, tests taken, results, etc.;
6. Unusual site conditions experienced;
7. Significant developments, remarks, lessons learned etc.; and
8. Reports, instructions from appropriate authorities' response actions.

NOTE: The log and daily photographs are the personal property of the RSR. Copies of the logbook and daily photographs, certified as true copies, are to be provided to Consultant and DR weekly.

9.3.2 Site Records

The RSR must maintain orderly and updated files at the site for the use of the DR and the Consultant as follows:

1. Issued for Construction Documents;
2. Approved Shop Drawings;
3. Approved Samples;
4. Site Instructions (SI);
5. Contemplated Change Notices (CCN);
6. Change Orders (CO);
7. Daily Progress Photographs;
8. Memoranda;
9. Test and Deficiency Reports;
10. Correspondence and meeting minutes; and
11. Contact information including; names, addresses and telephone numbers of key personnel from PWGSC, Consultant and GC and their sub-contractors and key personnel associated with the contract.

Issued for Construction documents must be carefully preserved and kept up to date with all change orders, site instructions, details, as-built conditions, etc., for each construction contract. The RSR must follow approved protocol for the security and protection of the construction documents and information held on-site. The RSR must review monthly, the accuracy of as-built marked up drawings kept by the GC and report any discrepancies or deficiencies to the Consultant, prior to processing of progress payments.

RS 10 BILINGUAL DOCUMENTS

10. Bilingual Documents

10.1 Scope of Services

This Project requires services in both official languages. Throughout all phases of this Project the Consultant must be able to provide services orally and in writing in Canada's two (2) official languages. These services include, among other things, responses to questions and presentations to PWGSC and user groups.

Where formal submissions of deliverables in Canada's two (2) official languages are required, the following criteria will apply:

1. The languages are considered equal in status and neither is considered to be a translation of the other;
2. The Consultant must be responsible for the accuracy and completeness of translations and the consistency of documents; and
3. A single set of drawings (originals) on which written information is shown in both languages and separate written documents for each language for the executive summaries, specifications and operating and maintenance documentation must be produced.

10.1.1 Design Deliverables

The following must be prepared and delivered in Canada's two (2) official languages:

1. Schematic Design Report including seismic upgrade information;
2. Value Engineering and Life Cycle Costing reports;
3. Design Development Report; and
4. Presentations to AHJ's.

10.1.2 Construction Documents

All 100% construction contract documents prepared by the Consultant must be in Canada's two (2) official languages as per the terms of this contract and "Doing Business with PWGSC".

10.1.3 Commissioning – Related and As-Built Documents

Produce the following commissioning-related documents in Canada's two (2) official languages:

1. Final Systems Operational Manual;
2. Training documentation; and
3. Design intent documentation.

10.2 Quality Standards

Ensure that the services and deliverables provided are of a professional standard in both official languages. Assume professional responsibility for accuracy, completeness and consistency of translation. Both languages are considered equal in status – neither is considered to be of lesser standing because it is a translation of the other.

ANNEXES

ANNEX A: BUILDING FLOOR PLANS

(To be issued by addendum)

ANNEX B: BUILDING INFORMATION MODELLING (BIM) PARTICULAR CONDITIONS

B.1 – BIM Particular Terminology

Aggregated Model The Aggregated Model refers to the deliverable set out for each project milestone within each project phase during the project delivery process, where a coordinated model is required to move to the next milestone or Phase Model. The Aggregated Model is provided to the DR for review by the relevant Project Team members for technical review of Model quality and integrity. Model content is reviewed in exported drawing and report formats.

As-Built Model The As-Built Model refers to the deliverable during the construction contract administration phases where a coordinated model is assembled from the previous project Phase Model and all changes resulting from approved Change Orders and Shop Drawings. The As-Built Model reflects all changes to the previous Phase Model that occur during, or as a result of, Construction. This includes field information collected during construction, especially relating to concealed conditions and information that is not available in the tender documents or previous Phase Model. The As-Built Model is the final model deliverable for the Construction Phase.

Building Information Model | Modeling | Management (BIM)

Model (the product of the modeling process) - The object-based digital representation of the physical and functional characteristics of a facility and its site. The Building Information Model serves as a shared knowledge resource for information relating to site and/or facility and its various systems and elements, forming a reliable basis for decisions during its lifecycle from inception, design, construction and onward.

Modeling (the process of modelling) - A collection of Authorized Uses, workflows, and modeling methods used to achieve specific, repeatable, and reliable information results from the final product. Modeling methods affect the quality of the information generated from the Model. The intended use (Authorized Use) of a Model dictates the methodologies of information generation, sharing, and coordination to be used to deliver the associated Required Service. Modeling methodologies reflect desired project outcomes and phasing.

Management (the definition of data and process management) - Building Information Management supports the data standards and data requirements for BIM Use. Data continuity allows for the reliable exchange of information in a context where both sender and receiver understand the information. In addition, this data further supports ongoing maintenance of, and changes to, the data inherent in the operations and management of the physical contexts that it represents. PWGSC requires that all Model files, regardless of specialized tools, be delivered in both Native and IFC file formats.

BIM Specialist The BIM Specialist is an identified member of the Consultant Team responsible for the initial creation, verification, coordination, quality, and completion of the deliverables outlined by the BIM PxP. The BIM Specialist is the Lead within the Consultant Team and this title is used specifically in the Project context with the understanding that others within the Consultant Team may carry organizational BIM Titles (e.g. Manager, Coordinator, Modeler) and representing a discipline or BIM Use. The competency of the BIM Specialist is defined in section B.6 of this

Appendix.

Discipline Model

The Discipline Model refers to the individual disciplinary or specialty models provided by sub-consultants or specialists. These models remain the responsibility of the Model Element Author (MEA's) specified, until received by the BIM Specialist for amalgamation into Aggregated or Phase Models. Discipline Models must be kept up-to-date throughout the project delivery process and must reflect all pertinent changes made throughout the design, construction and commissioning phases.

Industry Foundation Classes (IFC)

The IFC specification is a neutral data format used to describe, exchange and share information typically used within the building and facility management industry sector (AEC/FM). The IFC specification is developed and maintained by building SMART International (formerly known as International Alliance for Interoperability - IAI), and currently has two releases used by PWGSC for various MVD uses; IFC 2X3 and IFC4.

Level of Development (LOD)

The Level of Development describes the level of completeness to which a Model Element is developed. At PWGSC, the LOD Specification is made up of three (3) parts; the level of accuracy which is organization specific, the level of geometry and representational detail, and the level of information embedded. The LOD specification levels describe stages through which a Model is expected to progress during Design, Construction and into Handover. At PWGSC, this is generically indicated in Annex D: Model Element Table and organized by Unifomat Elements. LOD can be applied, according to the Protocol and PxP, to Model Element categories, systems or individual instances.

The LOD is a benchmarking suggestion for the purposes of discussion with the Consultant Team and will require review and Project Team approval before entry in the BIM PxP as contractually authoritative.

Note: When used to describe a Model as a whole it is generally taken that all individual Model Elements are, at a minimum, to the LOD described.

Level of Accuracy (LOA)

The Level of Accuracy describes the level of precision to which a Model Element is reflective of true as-built conditions. The LOA is determined as the tolerance of error range between individual Model Elements and their physical counterparts. When used in the PxP or Protocol, LOA must refer to the minimum level of precision required, with the tolerance range as described. The LOA is typically used only in the verification of construction, commissioning and operation phases of new-build projects, or from the first phase of rehabilitation or renovation projects.

Measurement Model

The Measurement Model describes the product of modeling an existing facility and/or site for the purposes of using BIM in a forthcoming project or for an anticipated Use Case (i.e. Facility Management, Asset Management and Energy Management etc.). The Measurement Model is similar to a Post-Construction Model in that its information has been gathered post-construction from on-site measurements using field verification of existing conditions. The Measurement Model, when triggered by a forthcoming project, is used as a basis from which project BIM can proceed, and as such is often procured either before or during Pre-Design. This Model does not contain verified building system or assembly information, but rather, highly precise finish-to-finish geometry. This Model cannot be used for Analysis Model Uses requiring the presence of MEP, Structural or hidden Architectural elements.

Model Element The Model Element refers to an individual part of the model, representing a portion of the project, system or assembly to which it belongs. The Model Element is made up of physical-, data- and catalogue-, based information. Product data, or data-sets, must be defined and identified in the Protocol and on a discipline-, system-, or assembly-, basis.

Model Element Author (MEA)

The Model Element Author refers to the Consultant Team member or specialist identified in the Model Element Table and PxP as responsible for the discipline, system, assembly or element being authored. The MEA is responsible for the development and contribution of a range of Model Elements to a Model.

Phase Model

The Phase Model refers to the deliverable set out for each project phase during the project delivery process where a coordinated model is required to move to the next phase. The Phase Model is the deliverable resulting from the technical review and application of Project Team comments generated by previous milestone Aggregated Models.

BIM Project Execution Plan (PxP)

The BIM Project Execution Plan is a document that lays out how BIM will be implemented on the project, and is a result of the collaboration of the Consultant Team and the DR and will be dependent on the approval of the DR. The BIM PxP is a project delivery tool guiding the Consultant Team in the smooth delivery of the project BIM throughout its phases. Once approved, the Consultant Team must adhere to and update the BIM PxP throughout the project delivery.

Protocol

The Protocol refers to the set of project-specific and project-defined standardized procedures, conventions and guidelines documented and agreed upon by the Consultant Team for operation of the various software identified for use in the delivery of BIM for the project. The Protocol is a project delivery tool guiding the Consultant Team in the smooth coordination of processes used to deliver BIM for the project. The procedures, conventions and guidelines identified in the Protocol ensure that each contributing MEA maintains reliability, consistency and quality in keeping with project requirements and desired outcomes. This document is the responsibility of the Consultant Team, and subject to the approval of the DR.

Record Model

The Record Model is the coordination of the Construction Phase Model, As-Built Model, as well as any shop drawings or Models resulting from the Commissioning or BCC procurement phases. The Record Model reflects the changes identified to the Consultant by the GC and/or DR, and includes updating of the As-Built Model with commissioning, BCC, supplier and last moment change order information generated during procurement and installation. The Record Model is the final model deliverable during project close-out phase.

B.2 – BIM Use Definitions

Existing Conditions Modeling

A process in which a project team develops a 3D model of the existing conditions for a site, facilities on a site, or a specific area within a facility, through additional data collection, site verification and existing information. This model can be developed in multiple ways: including laser scanning and conventional surveying techniques, depending on what is desired and what is

most efficient. Once the model is constructed, it can be queried for information, whether it is for new construction or a modernization project.

Note: Differentiating the Existing Conditions Modeling from Measurement Modeling is the additional geometry of elements behind walls and information inherent to building systems and assemblies. Measurement Modeling is finish-to-finish, with no verified engineering geometry or information for HVAC, MEP or Structure, and not a part of the Scope of Work for this Project.

Phase Planning (4D Modeling)

A process in which a 4D model (3D models with the added dimension of time) is utilized to effectively plan the phased occupancy in a rehabilitation, renovation, retrofit, addition, or to show the construction sequence and space requirements on a building site. 4D modeling is a powerful visualization and communication tool that can give the entirety of the Project Team a better understanding of project milestones, construction plans and vacancy vs. occupancy and/or swing space logistics.

Cost Estimation (5D Modeling)

A process in which BIM can be used to assist in the generation of accurate quantity take-offs and cost estimates throughout the lifecycle of a project. This process allows the project team to see the cost effects of their changes, during all phases of the project, which can help curb excessive budget overruns due to project modifications. Specifically, BIM can provide cost effects of additions and modifications, with potential to save time and money and is most beneficial in the early design stages of a project.

3D Coordination

A process in which Clash Detection software is used during the coordination process to determine field conflicts by comparing 3D models of building systems. The goal of clash detection is to eliminate the major system conflicts prior to installation.

Design Authoring

A process in which 3D software is used to develop a Building Information Model based on criteria that is important to the translation of the building's design. Two groups of applications that are at the core of BIM-based design processes are Design Authoring Tools and Audit and Analysis Tools.

Engineering Analysis (Structural, Lighting, Energy, Mechanical, HVAC, etc.)

A process in which intelligent modeling software uses BIM to determine the most effective engineering method or products based on design or performance specifications. Development of this information is the basis for what will be passed on to the owner and/or operator for use in commissioning or operating the building's systems (i.e. energy analysis, structural analysis, emergency evacuation planning, etc.). These analysis tools and performance simulations can significantly improve the design of the facility and its energy consumption during its lifecycle in the future.

Note: Though some Engineering Analysis Tools enable closed-loop analysis wherein the result of the analysis directly informs improvement to the Design, others are linear processes wherein the Design must run iteratively through the Tool until such time as the desired result is achieved. Engineering Analysis is under **no circumstances** to be performed as a validation of Design only; it is expected to inform the Design and be executed iteratively.

Sustainability Targets Evaluation

A process in which the project BIM is evaluated based on the Sustainability Criteria or Targets outlined in the Project Brief and defined by the Project Authority. This process must occur during all stages of a Project's Delivery



lifecycle including planning, design and construction, as well as handed over for continuous validation during operation. Applying sustainable development principles such as GHG reduction, clean energy, sustainable products etc. to a project in the planning and early design phases is more effective (ability to impact design) and efficient (cost and schedule of decisions). This comprehensive process requires more disciplines to interact earlier by providing valuable insights through an Integrated Design Process (IDP). In addition to achieving sustainable goals, certain certification models such as LEED will necessitate the addition and automation of certain calculations, documentation exports, and verifications. Energy simulations, calculations, and documentation can be performed within a common data environment when BIM responsibilities are well defined and BIM data is well managed.

Code Validation

A process in which code validation software (e.g. Solibri) is utilized to check the model parameters against project specific codes. Code validation is currently not in widespread use, however standard rule sets and automated checkers are available through Vendors and online Forums. As model checking tools continue to develop, PWGSC will continue to approve their use in BIM Projects for the purposes of ongoing Lesson Learning and Standards Development.

Design Reviews

A process in which stakeholders use a 2D or 3D view of the Project BIM and provide their feedback via annotation, tagging/flagging, red-line markup, or clash identification. These aspects include evaluating meeting the program, previewing space aesthetics and layout in a virtual environment, and evaluating against set parameter or attribute criteria such as layout, sightlines, lighting, security, ergonomics, acoustics, textures and colors, etc. Software offering this BIM Use are often called Issue Management or Coordination Tools, and also commonly offer Document Management, Field Checking, RFI/Change Order workflows and more. This Use can also be reinterpreted to meet the needs of a Constructability Review.

Building System Analysis

A process that measures how the complex's newly designed performance compares to the specified design intent and preferred option. This includes how the mechanical system operates and how much energy a building uses. Other aspects of this analysis include, but are not limited to, ventilated facade studies, lighting analysis, internal and external CFD airflow, and solar analysis.

Note: This must be part of the tendering specification writing, product selection, and later commissioning, processes in BIM.

Record Modeling

The process used to depict an accurate representation of the physical conditions, environment, and assets of a facility. The record model must, at a minimum, contain information relating to the main architectural, structural, and MEP elements. It is the culmination of all the BIM Modeling throughout the project, including linking Operation, Maintenance, and Asset data to the As-Built model (created from the Design, Construction, 4D Coordination Models, and Subcontractor Fabrication Models) to deliver a Record Model to the owner or facility manager. Additional information including equipment and space planning systems may be required to meet PWGSC needs.

B.3 – General BIM Conditions

1. The Consultant agrees that BIM must be used for the project in accordance with this Appendix, the PxP, the Protocol and the Model Element Table (the



PxP, Protocol and MET may be revised during the course of the project as needed and subject to DR approval);

2. The Consultant agrees that model content must be shared, used and relied upon throughout the course of the project in accordance with this Appendix, PxP, Protocol and MET; and
3. The Consultant must promptly report any errors, inconsistencies, omissions or hard/soft clashes discovered in a Model transmitted or shared as a deliverable, to the DR. In so doing, the Consultant must not relieve any Model Element Author of liability for any of their contributions.

B.3 Risk and Reliance

PWGSC will provide a Measurement Model at the Project outset for use in the development of the project BIM. The Consultant must verify the model accuracy and content using additional Scan-to-BIM technology and carries the sole responsibility for this task, and the drawing accuracy. Additionally, all Model Element Authors and Users must only rely on the Model to the degree specified in the

B.4 Modeling Scope

The Modelling scope for the project must be as set out in this Annex and will be further documented and revised by the PxP, Protocol and Model Element Table.

1. The Phases of the project where Modelling is to be used are:
 - Pre-Design;
 - Schematic Design;
 - Design Development;
 - Construction Documentation;
 - Construction Contract Administration;
 - Building Components and Connectivity (BCC); and
 - Project Close-Out.
2. The required BIM Uses for models generated for this project are as listed below but not limited to:
 - Existing Conditions;
 - Phase Planning (4D Modeling)
 - Cost Estimation (5D Modeling)
 - 3D Coordination;
 - Design Authoring
 - Engineering Analysis including:
 - Structural (Seismic)



- Energy (Mechanical, Electrical & Lighting etc.)
 - Sustainability Targets Evaluation;
 - Code Validation;
 - Design Review;
 - Building System Analysis (Building Components and Connectivity – BCC); and
 - Record Modeling.
- 3. The services associated with providing the information necessary for post-construction Model-Use must only be required if designated in the list below.
 - Complex and Facility Management;
 - Operations & Maintenance;
 - Heritage Asset Management;
 - Energy and Performance Management; and
 - Space Management.

B.5 – Model Management

1. The Consultant must in consultation with the Project Team, meet, and confer to agree on the content and details of the PxP and Protocol;
2. The Project Execution Plan (PxP) must include but is not limited to the sections outlined in the PxP Template as provided in this Project Brief;
3. To fulfill the requirements set out in the PxP Template, the Consultant must utilize:
 - The Project Brief;
 - Other supplied or generated documentation (e.g. Project Communication Plan);
 - The Model Element Table attached to this document (LOD, LOA and Authorized Uses);
 - The Protocol resulting from this Agreement; and
 - The Information Delivery Manual (IDM).
4. The Consultant must create the Protocol, which must include, but is not limited to, the following:
 - Identification of all anticipated Discipline and/or Specialty Modelling requirements necessary to meet project BIM requirements as set out in this Appendix and the Project Brief;
 - Identification of the Information Exchange Protocols for each Model

- contributor during the Aggregation process;
- Identification of the preferred procedural protocols for each Model contributor in their chosen software;
 - Identification of general Modeling Protocols in the Design Authoring tool of the Consultant's choosing, to include naming and attribute strategies;
 - Proposed strategy for the coordination of a single Protocol from the procedural protocols (if identified) of each Model contributor in their chosen software; and
 - Proposed strategy for ensuring interoperability between the software chosen by the various members of the Consultant Team (i.e. IFC import/export, procedures for associated/embedded information, BCF or MVD's).
5. To fulfill the requirements set out above, the Protocol must utilize:
- The Project Brief and other supplied documentation;
 - The Model Element Table attached to this document (LOD, LOA, and Authorized Uses); and
 - The PxP resulting from this Agreement.
6. The Consultant must appoint a Consultant Team member as the BIM Specialist and must renew or designate another Consultant Team member as necessary to ensure that there is an active and qualified BIM Specialist at all times during the project; If the BIM Specialist, or the role of the BIM Specialist, is to be changed at any point during project delivery, the Consultant must provide written notice and justification. All changes to the role of the BIM Specialist are subject to the approval of the DR.

B.6 – BIM Specialist Competency Table

During the evaluation of experience of the key personnel, PWGSC will evaluate the experience of the BIM Specialist against core competencies such as Education or Role and Project Experience, but base this evaluation on the following domain- and execution-specific competencies.

ADMINISTRATION The day-to-day organizational or project activities required to meet and maintain strategic objectives.	Policies & Procedures	The BIM Specialist must be capable of developing policies, procedures and standards in order to improve the efficacy and/or efficiency of project or organizational BIM tools, processes or workflows.
	Performance Management	The BIM Specialist must be capable of assessing BIM capability/maturity, individual competency and project performance for the purpose of appropriate

		staff or consultant selection, and for the monitoring of staff and consultant performance using standardized metrics.
	Tendering & Procurement	The BIM Specialist must be capable of developing the necessary specifications, tools and documents to pre-qualify, recommend or procure BIM products and services, as well as produce BIM content for the express purpose of tendering or supporting a procurement process.
	Contract Management	The BIM Specialist must be capable of administering the contractual documentation underlying Collaborative BIM Projects and workflows. This includes assisting an Architect or other designated Contractual Authority in fulfilling the Information and Contract Management role within a project team or organization.
	Risk Management	The BIM Specialist must be capable of managing the risks associated with using BIM tools and collaborative workflows, as well as the specific services being delivered through BIM within which the nature of BIM may introduce additional risk (e.g. Security Components, Building Connectivity etc.).
	Quality Management	The BIM Specialist must be capable of establishing, managing and controlling the quality of procured or authored models, documentation and other project deliverables.
OPERATION The daily, hands-on individual efforts required to deliver a project, part/aspect of a project, and facilitate decision making regarding capital planning, project delivery or handover.	General Modeling	The BIM Specialist must be capable of using software tools to model project requirements and generate model-based deliverables across industries, information systems and knowledge domains.
	Capturing and Representing	The BIM Specialist must be capable of using software tools and specialized equipment to capture and represent physical spaces and environments, both visible and invisible.
	Planning and Designing	The BIM Specialist must be capable of using software tools for conceptualization, planning and design.
	Simulating and Quantifying	The BIM Specialist must be capable of using software tools to conduct various types of model-based simulations and estimations.

	Linking and Extending	The BIM Specialist must be capable of using models to monitor Building Performance or control its spaces, systems and equipment.
	Custom Modeling	The BIM Specialist must be capable of using software tools to deliver a custom combination of model-based deliverables reflecting a variety of BIM Uses.
TECHNICAL The abilities required to generate Organizational, Asset or Project Deliverables across disciplines and specialties.	Document Management	The BIM Specialist must be capable of using Document Management Systems or similar to store, manage and share all file types associated with a BIM workflow.
	Modeling	The BIM Specialist must be capable of generating BIM models based on pre-defined modelling standards and protocols.
	OpenBIM	The BIM Specialist must be capable of using IFC, MVDs and BCF for Model interoperability between various software architectures and APIs.
	Documentation	The BIM Specialist must be capable of generating drawings and construction documents using standardized details and workflows.
	Presentation & Animation	The BIM Specialist must be capable of generating professional-quality renderings or 3D animations using specialized software tools.
	Model Management	The BIM Specialist must be capable of managing and maintaining BIM models generated using standardized processes, protocols and specifications.
	Issue Management	The BIM Specialist must be capable of using Issue Management Software to identify, resolve, manage and report on Issues within a BIM Model or Defined View.
IMPLEMENTATION The activities required to introduce or formalize BIM concepts, tools and workflows within a Project Team.	Implementation Fundamentals	The BIM Specialist must be capable of identifying and managing issues associated with BIM implementation.
	Component Development	The BIM Specialist must be capable of implementing a structured approach for developing or customizing Model Components using documented and approved Object Modeling Protocols.

	Library Management	The BIM Specialist must be capable of developing or managing component libraries as required for the standardized delivery of the BIM Project and its Components.
	Standardization and Templates	The BIM Specialist must be capable of generating standardized templates, item lists and workflows for initiating, checking or delivering BIM Projects.
RESEARCH & DEVELOPMENT The abilities required to evaluate existing processes, investigate new solutions and facilitate their adoption within the project.	General Research and Development	The BIM Specialist must be capable of conducting general or BIM-specific research and development activities.
	Knowledge Management and Engineering	The BIM Specialist must be capable of developing a BIM Knowledge Management Strategy and capturing/representing the BIM-specific knowledge of staff, clients and stakeholders.
	Change Management	The BIM Specialist must be capable of developing a Change Management strategy that accompanies/supports the BIM execution and implementation for the Project.
	Research & Analysis	The BIM Specialist must be capable of interpreting developmental research focused on BIM innovation or collaboration.
	Knowledge Sharing	The BIM Specialist must be capable of capable of sharing BIM knowledge and experience with the wider Project Team through formal/informal workshops and presentations.

ANNEX C: BIM PROJECT EXECUTION PLAN (PXP) TEMPLATE

BIM Project Execution Plan (PxP)

A PWGSC Template for Consultants - Version #.#

[This Template is a guide to the information required to successfully deliver a BIM for a PWGSC Project.
This template must be completed to align to the specifics of each Project in which it is used]

[Date]

FOR

[Project Title]

[Project Number]

[Project Location]

BY

[Authoring Companies]

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9. Model Element Table	Error! Bookmark not defined.
9.1 Insert the updated Model Element Table here.....	Error! Bookmark not defined.
9.2 Insert the Authorized Uses Table here.	Error! Bookmark not defined.
9.3 Insert the Model Element Author Worksheet here.....	Error! Bookmark not defined.

1. Project Description

1.1 Project Information

	Project Title:	
	Project Location:	
	Project Number:	

1.2 Project Team

1.2.1 PWGSC Project Team Members

Contact Name	Title/Role	Email	Phone
	Departmental Representative	_____@_____.____	(###) ###-####
	Technical Expert (BIM) ¹	_____@_____.____	(###) ###-####

1.2.2 BIM Specialist (as designated by the Prime Consultant)

Contact Name	Title/Role	Company	Email	Phone
	BIM Specialist		_____@_____.____	(###) ###-####

¹ The DR is assisted by a Technical Services Lead who assigns a BIM Coordinator to the project. This subject matter expert reviews model-based deliverables for quality assurance and control.

1.2.3 Consultant Team BIM Coordinators and Modellers (Sub-Consultants and Specialists)

Contact Name	Title/Role	Company	Email	Phone
			_____@_____.____	(###) ###-####
			_____@_____.____	(###) ###-####
			_____@_____.____	(###) ###-####
			_____@_____.____	(###) ###-####

1.3 Project Outline**1.3.1 Required Work**

This section must include a general scope, and description of the high-level work required for this project that will be delivered through the implementation of BIM.

1.3.2 Project Goals

Based on the Consultant's understanding of the information provided in the Project Brief/Request for Proposal and Model Element Table describe how BIM is to be used to achieve the specific project goals during the specified project milestones and phases.

1.3.3 Security Requirements

Based on the Consultant's understanding of the information provided in the Project Brief/Request for Proposal, and the Project security requirements, describe how the specific BIM security requirements will be achieved.

Special consideration should be taken regarding both collaboration and exchange methods for information. Either a federated-, or cloud-based data exchange of information will be established at the discretion of the Prime Consultant (Consultant) (off-site) or the Departmental Representative (DR) (on-site).

1.3.4 Constraints/Opportunities

Project constraints and opportunities could include (but are not limited to) items such as:

7. Measured Model data capture during phased abatement, demolition and renovation;
8. Security requirements;
9. Specialized Model Uses, presenting unique opportunities to optimize, test or utilize new or existing technologies for PWGSC;
10. Collaboration with a General Contractor (GC) and the GC's Team;
11. Opportunities to implement BIM for Uses not mentioned in Project Documentation to increase efficiency or quality of delivery; and
12. Learning opportunities for the various Project Team members when including a new workflow, process or software solution in the project delivery.

1.3.5 Project Schedule

Based on the Consultant's understanding of the information provided in the Project Brief, Model Element Table and Information Delivery Manual (IDM), a detailed schedule must be prepared for the implementation of BIM for the project delivery, that aligns with the Project Schedule.

Two (2) forms of schedule must be included in this PxP. First, a high-level schedule of Project Phases must be included as per Table 1 - Example below and describe how BIM is to be used to achieve the specific project goals during the specified project milestones and phases and updated to reflect any changes anticipated to the schedule due to the implementation of this PxP. This high-level schedule need only include the key deliverable Models (Phase Models) and serves as a central location for key dates related to BIM delivery.

Second, a detailed Gantt chart depicting the Phases, Milestones and Reviews expected during the implementation of BIM for project delivery must be aligned with those dates outlined in the Project Brief and Table 1. This second and more detailed schedule must be attached to the PxP as Annex B-1-2, and include a detailed project activity breakdown (to include, in addition to the Reviews, Milestones and Phases, any deliverables between Consultant Team Members such as Discipline Models, etc.). The dates associated with deliverables within the Consultant Team are to be listed for over all Project Team information, as well as to ensure the smooth delivery of the project BIM deliverables.

Table 1 – Example: Key Project Activities

Required Service #	Project Stage	Duration	Estimated Completion
-	Consultant Team Contract Award	_ Weeks	DD/MM/YYYY
-	General Contractor Contract Award	_ Weeks	DD/MM/YYYY
RS 1	BIM PxP and Protocol (Design Management Plan)	_ Weeks	DD/MM/YYYY
RS 2	Pre-Design	_ Weeks	DD/MM/YYYY
RS 3	Schematic Design (SD)	_ Weeks	DD/MM/YYYY
RS 4	Design Development (DD)	_ Weeks	DD/MM/YYYY
RS 5/6	Construction Tender Documentation	_ Weeks	DD/MM/YYYY
RS 7	Construction and Contract Administration	_ Weeks	DD/MM/YYYY
RS 8	Commissioning	_ Weeks	DD/MM/YYYY

1.4 Existing Documentation

The Consultant, in keeping with the existing and supporting documentation listed in the Project Brief, must list all pertinent and referenced documents below for the purposes of providing BIM operators, coordinators and managers within the Consultant Team with a centralized list of resources. All documentation must be listed as retrievable links wherever possible.

e.g. The following documentation has been made available to the consultant, to assist in the completion of the required services of the contract which required the creation and signing of this Project Execution Plan:

2. Doing Business with PWGSC
3. PWGSC's Information Delivery Manual
4. Project Model Element Table
5. Project Brief
6. ...etc.

2. Project BIM Use

2.1 BIM Objectives

To begin the PxP process, the Project Team must outline the objectives of using BIM as related to the identified Project Goals. These BIM objectives will mostly consist of project-specific and measurable outcomes, and the Consultant Team is encouraged to strive to improve the successes of the various project phases they address.

2.1.2 High Level BIM Objectives

Priority (1 - 3)	Objective Description	Associated Uses
e.g. 1	e.g. Accurate 3D Record Model for Asset Management	Record Modelling 3D Coordination
e.g. 2	e.g. Increase efficiency of Design Process	BIM Authoring Design Review 3D Coordination
e.g. 1	e.g. Condensed Schedule Project Delivery	4D Modelling 3D Coordination Project Phasing

2.2 Authorized Use Worksheet

The following Worksheet is intended to assist in the discussion between the Consultant Team and the DR during the verification of the Authorized Uses listed in Annex B of the Project Brief. Based on the Consultant's understanding of the information provided in the Project Brief and Model Element Table, list all anticipated BIM Uses for this project before seeking authorization². The Worksheet provides a generic, non-exhaustive list of possible Uses; as such, it is the Consultants responsibility to provide the completed list.

Exchange Requirement	Planning & Pre-Design	Schematic/Design Development	Construction	Post Construction
Functional Programming				
Site Analysis				
Measured Model				
Scheduling				

² Between this Annex and the Model Element Table, these Uses refer to the primary desired outcomes for the implementation of BIM on a specific project, but may be subject to change during the lifecycle of the project. The Departmental Representative is the Authority for BIM Use.

Exchange Requirement	Planning & Pre-Design	Schematic/Design Development	Construction	Post Construction
Cost Estimation				
Design Coordination & Review				
Structural Analysis				
Energy Analysis				
Geotechnical Analysis				
Lighting Analysis				
Sustainability Evaluation				
M&E Analysis				
Building Automation Systems Planning & Programming				
Construction Specifications				
Design Packages				
3D Control & Planning				
As-Built Model				
Change Management				
Record Model				
Commissioning				
Heritage Asset Management				
Furniture & Equipment				
Space Management				
Other Specialty Deliverables:				

2.3 Authors and Users of BIM Deliverables

Based on the Consultant's understanding of the information provided in the Project Brief and Model Element Table, list the Model Element Authors (MEA's) and users for each BIM deliverable. Update and/or modify the Model Element Table to reflect anticipated items for each deliverable. Confirm the Level of Development (LOD), Level of Accuracy (LOA) and non-geometric attributes expected for each Model Element. Attach the updated Model Element Table to the PxP.

2.3.1 BIM Roles and Responsibilities

Describe all BIM roles and responsibilities below, (such as the BIM Specialist, BIM Coordinators/Managers for each Model Element Authoring group, Technologists etc.) The following list is an example only.

BIM Role	Contact	Responsibilities
e.g. BIM Specialist	Name of Team Member	Listed Responsibilities

2.3.2 BIM Teams and Staff

Describe the Consultant Team Members responsible for the various BIM Uses within the project.

BIM Use	Organization	Location	Lead Contact
e.g. Disciplinary Model	Discipline Organization	Organization Address	Lead Contact Name

2.3.3 Consultant Team Organization

Describe the organization and structure of the Consultant Team using a flow chart. This section is to be filled by the Consultant on behalf of the Consultant Team and is to be informed by the communications and planning strategies implemented for the project. Once completed, this org-chart will be used to assist in the development of process mapping.

3. Technological Resources

3.1 Software

Describe proposed software and versions in the tables below.

Note: PWGSC requires that all software be IFC compliant (version 2X3 or later).

3.1.1 Authoring Software

Consultant Team Member	Software	Version	Native Format	Comments
e.g. Architect	Name	XXXX	.XXX	

3.1.2 Coordination Software

Consultant Team Member	Software	Version	Native Format	Comments
e.g. BIM Specialist	Name	XXXX	.XXX	

3.1.3 Specialty Software

Consultant Team Member	Software	Version	Native Format	Comments
e.g. Energy Modeller	Name	XXXX	.XXX	

3.2 Interoperability

3.2.1 Propose an interoperability strategy describing the proposed implementation of the items included, but not limited to: IFC

3.2.2 Model View Definitions (MVD)

3.2.3 BIM Collaboration Format (BCF)

3.3 Hardware

Based on the understanding that hardware specification becomes valuable when information begins to be shared between several disciplines or organizations, and when ensuring that the downstream hardware is not less powerful than the hardware used to create the information, PWGSC requires a description of the proposed hardware solutions to be used for the project.

With this in mind, and to ensure that PWGSC can both use, and manage, the information generated during this project, the Consultant Team must choose the hardware that is in the highest demand and most appropriate for the majority of BIM Uses identified in Section 2. The hardware specifications chosen must reflect the minimum requirement for Consultant Team compliance in the table below.

Note: This information will be used by PWGSC in the development of lessons learned and future IT/IM solutions for internal business processes.

BIM Use	Operating System	Hardware Specifications
e.g. Design Authoring	Name	Processor Requirements Memory Requirements Graphics Card Requirements Network Card etc.

3.4 Associated Databases

Based on the Consultant's understanding of the information provided in the Project Brief, list all databases anticipated for amalgamation into, and/or linking to, the Modelling process.

Database	Format	Notes
e.g. Heritage Asset DB	e.g. XML	Notes should include additional information pertinent to the incorporation of secondary data sources to the Modelling process.

3.4.1 Database Integration Strategy

Based on the Consultant's understanding of the Project Brief, describe an integration strategy for those databases requiring amalgamation or linking to the Modelling Process.

3.5 Process Mapping

In accordance with the Information Delivery Manual, provide process maps for:

Level 1.....A Project Map of all the BIM Uses in the larger setting of the project's phasing and delivery.

Level 2.....A detailed Project Process Map of the BIM Uses identified in the Annex B-2. These process maps provide a detailed plan for execution of each BIM Use. They also define the specific Information Exchanges and control points for each activity.

Note: A legend and description of all elements/symbols included on the maps must be placed in this section. Sample maps are available in the IDM, but must be modified based on project specific information and requirements. All process maps must be compliant with the Business Process Modelling Notation (BPMN).

3.5.1 Level 1 – Project Map

The Project scale Process Map must be inserted here.

Figure 1 - Sample Level 1 Project Map

3.5.2 Level 2 – Project Process Map

Based on the Consultant's understanding of the Project Brief, Contract, Information Delivery Manual and Model Element Table, list the Project specific Modelling Processes that have been mapped and attached to this PxP. This list must take the form of a table as seen below.

Project Process	Consultant Team Member Responsible
i.e. Design Authoring	Name

4. Project Administration

Based on the Consultant's understanding of the information provided in the Project Brief and Model Element Table, define the following.

4.1 Collaboration Strategy

Describe the proposed strategy for collaboration during project delivery, in alignment with the overall Project Communication Plan. This strategy must take into account the various constraints, opportunities and security requirements identified in Section 1.3. The solution must include items such as communication methods, document management, document transfer, and record storage, etc.

4.1.1 Meetings

The following are examples of meetings that must be considered and/or used during the completion of this PxP.

Meeting Type	Project Stage(s)	Frequency	Participants	Location
e.g. BIM Requirements Kick-Off	e.g. Pre-Design	e.g. One-time		
Others:				

4.1.2 Electronic Communication Procedures

To be developed at the discretion of the Consultant Team, however please note that BCF is required for IFC Model View Definition.

4.2 Coordination

Describe the proposed solution for modelling coordination during project delivery. This solution must take into account the various constraints, opportunities and security requirements identified in Section 1.3.

4.3 Quality Control

Describe the overall strategy for quality control of the Model. This strategy must take into account the LOD and LOA described in the Model Element Table, as well as the Authorized Uses and desired outcomes for the project.

4.3.1 Quality Control Checks

This section of the PxP is to be filled at the discretion of the Consultant Team, and will be used by PWGSC for lesson learned and future BIM requirement development. Quality Control checking must reflect the best practices set out by the BIM Specialist as the lead for BIM implementation on the project.

Checks	Description	Party Responsible	Software	Frequency
Visual	Ensure that there are no unintended model components and the design intent has been followed.			
Clash	Detect problems in the model where two components are interfering with each other (industry refers to these as hard or soft clashes).			
Integrity	Describe the QC validation process used to ensure that the Project Data Set has no undefined, incorrectly defined or duplicated values, and the reporting			

	process on non-compliant elements and corrective action plans.			

5. Information Exchanges

In accordance with the Information Delivery Manual, and as a result of the process mapping undertaken for this PxP, the following list of Exchange Requirements must be verified against project requirements, and project processes. These Exchange Requirements must then be attached to this document.

5.1 Information Delivery Schedule

List and document the information exchanges marked as deliverables that will occur for this project for submission and approval. Create a schedule for all submissions. Detailed Exchange Requirements for each Information Exchange listed in the schedule must be attached to this PxP.

ER	Date Due	Sender	Receiver	Model File	Format
e.g. Design Authoring - 3D Coordination	DD/MM/YYYY	e.g. Structural Engineer	e.g. BIM Specialist	e.g. DD Structural Model	.Native .IFC

6. Project Schedule (updated against BIM requirements)

Insert an updated Gantt Chart Schedule for the Project.

7. Project Process Mapping

- 7.1 Insert each individual Project Process Map here.
- 7.2 [Add additional process maps if required]

8. Project Exchange Requirements

- 8.1 Insert each individual Exchange Requirements here.
- 8.2 [Add Exchange Requirements if required]

9. Model Element Table

- 9.1 Insert the updated Model Element Table here.
- 9.2 Insert the Authorized Uses Table here.
- 9.3 Insert the Model Element Author Worksheet here.

ANNEX D: MODEL ELEMENT TABLE

To be issued by Addendum

ANNEX E: PWGSC REAL PROPERTY SUSTAINABILITY FRAMEWORK

To be issued by Addendum

ANNEX F: GUIDELINE – PROJECT G.H.G. OPTIONS ANALYSIS METHODOLOGY

To be issued by Addendum